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Nano Technologies and Computer Modelling

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First Principles Simulations on Yttrium, Oxygen, and Titanium Precipitation inside *fcc*-Fe Lattice

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Abstract

The detailed modeling of the defect in the face centered cubic (fcc) Fe lattice has been performed using the DFT PAW (Density Functional Theory Projector Augmented Wave) method as implemented in the VASP computer code. Within the framework of this study, the calculations of single vacancy, O, and Y impurities have been performed. Pair-wise interactions between vacancy, O, and Y have been calculated along with the assessment of the binding energies between these defects. The interactions between multiple defects have also been calculated. Migration barriers have been assessed using the NEB (Nudge Elastic Band) method. Due to an initial presence of low-concentration Ti impurities in steels, which can form both TiO and YTiO precipitates, additional first principles calculations on the corresponding models have been carried out as well. The results of performed calculations reveal the major factors contributing in the formation of the ODS steels.

Keywords: oxide dispersed strengthened steels (ODS), ab initio calculations, density functional theory

1 Introduction

Oxide dispersed strengthened (ODS) steels are considered as the promising structural materials for future fusion reactors. The implementation of ODS steels allows increasing the operating temperature of the reactor by 100°C, which noticeably improves its efficiency. Both size and spatial distribution of the yttrium oxide particles, which can include, e.g., Ti atoms naturally distributed in steels, affect the mechanical properties of the ODS steels and their radiation resistance. However, the mechanisms of oxide particle formation in ODS steels are not fully understood yet.

Small amounts of Ti are added during the mechanical alloying of yttria allowing to refine the dispersion of the reinforcing oxides during hot isostatic pressing (HIPping). As the size of Ti atom is very similar to the size of Fe atom, the former is substituting regular iron atoms in the Fe lattice much easier compared to yttrium substitute atoms, while oxygen atoms may both substitute regular iron atoms in the Fe lattice and occupy interstitial positions.

ODS steels are manufactured during the mechanical alloying followed by the HIP process at temperatures of around 1000-1200 K under the pressure of 100 MPa. ODS particles found after HIPping are the remnants of initial oxide powder that are formed during MA. This may be supported by the fact that the HIPping temperatures are lower than yttria melting temperature so thermal process does not occur during the oxide particle transformation. There are experimental evidences that after milling a noticeable part of Y and O atoms can be decomposed from yttria clusters in steel matrix with concentrations above their equilibrium solubili. In this case, the precipitation of Y_2O_3 nanoparticles can occur already at the hipping stage as a result of yttrium-oxygen co-precipitation.

2 Computational details

VASP 5.2 computer code based on the Density Functional Theory (DFT) approach with a plane-wave (PW) basis set combined with the Perdew-Wang-91 GGA (Generalized Gradient Approximation) non-local exchange-correlation functional has been used to perform ab initio calculations [1]. The core electrons are described using the Projector-Augmented Wave method (PAW). Its computational procedure includes an iterative solution of Kohn-Sham equations, which is based on residuum-minimization and optimized charge-density mixing routines, it employs a plane-wave (PW) basis set combined with the PAW scalar relativistic pseudopotentials [2]. The latter include Fe core electrons of ($4s^13d^7$ outer shell), O ($2s^22p^4$), Y ($4s^24p^65s^14d^2$), and Ti ($3p^64s^23d^4$) atoms with 8, 6, 11, and 12 external electrons, respectively.

To define the calculation parameters necessary to obtain plausible results numerous preliminary test calculations have been performed. Some basic lattice parameters such as lattice constant, bulk modulus, cohesive energy, and vacancy formation energy assessed basing on these calculations have been found to be in a good qualitative agreement with the ones reported in the experiments and other theoretical studies.

The cut-off kinetic energies should be set to at least 800 eV, the k-point sets in the Brillouin zone should be at least 7×7×7 k-mesh for supercells (SCs). The supercell models used in the calculations are cubic, with the extension of $4a_0 \times 4a_0 \times 4a_0$ containing 64 atoms, respectively, while the calculated optimized lattice constant has been found to be 3.448 Å [3-6].

3 Results and Conclusions

The results of the calculations prove that vacancies play a crucial role in the formation of the ODS nanoparticles in ODS steels as they play essential role in migration of impurity atoms inside fcc-Fe lattice (oxygen, titanium and yttrium) and stabilize defect complexes.

The smallest binding energies in the configurations when O atoms occupy the substitute positions have been found when two Y or two Ti atoms as well as Y and Ti atoms are positioned as the 1NN. The binding energies between the defects very moderately increase with the growth of the distance between two Y or Ti atoms in $Y\text{-}O_{Fe}\text{-}Y$ or $Ti\text{-}O_{Fe}\text{-}Ti$ configurations as well as Y and Ti atoms in $Y\text{-}O_{Fe}\text{-}Ti$ configurations when two Y or Ti atoms as well as Y and Ti atoms are 2NN, respectively.

A pattern between the binding energies and the displacements of the defect atoms is established: the larger of the displacement of the defect atoms towards each other during the relaxation, the larger is their binding energy.

The distance between the defect atoms has decreased more in the calculated $Y_{Fe}\text{-}O_{Fe}\text{-}Ti_{Fe}$ compared with $Y_{Fe}\text{-}O_{Fe}\text{-}Y_{Fe}$ configurations, which means that the local expansion of the crystalline lattice caused by the induced defects is lower. This might explain the smaller average size of YTiO particles comparing with Y_2O_3 particles.

References

[1] Kresse G, Furthmüller J 2012 VASP the Guide (Release 5.2.12) University of Vienna
[2] Kresse G, Joubert D 1999 Phys Rev B **59** 1758-75
[3] Gopejenko A, Zhukovskii Yu F, Vladimirov P V, Kotomin E A, Möslang A 2010 J Nucl Mater **406** 345-50
[4] Gopejenko A, Zhukovskii Yu F, Vladimirov P V, Kotomin E A, Möslang A 2011 J Nucl Mater **416** 40-4
[5] Gopejenko A, Zhukovskii Yu F, Vladimirov P V, Kotomin E A, Möslang A 2012 *Proc. NATO ARW „Nanodevices and Nanomaterials for Ecological Security" (Eds. Shunin Yu N and Kiv A E, Springer:* Dordrecht, 2012) 149-60
[6] Gopejenko A, Zhukovskii Yu F, Kotomin E A, Mastrikov Yu A, Vladimirov P V, Borodin V A, Möslang A 2016 Phys Status Solidi B **253** 2136-43

Hole-Transporting Materials for solar cells. Quantum chemistry study

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Abstract

This work is devoted to quantum chemistry study of Tröger's base (TB) derivatives, synthesised for solar cells. TB with enamine-linked diphenyl branches could be titled as the most promising hole-transporting materials (HTM). For several derivatives, ground state geometry was established, and electronic excitation behaviour was estimated. Analyse of molecular charge redistribution allows concluding the significance of TB: dynamics between switch-on, switch-off states could be realised by manipulating HOMO and LUMO.

Keywords: Tröger's base, TB; hole-transporting materials, HTM

1 Introduction

Tröger's base (TB) represents the nonplanar compound with a tetracyclic structure - bicyclic aliphatic unit fused with two aromatic rings as presented in Figure 1. Due to V-shaped structure, TB and its analogues are applicable as ligands with well-expressed functional possibilities. Presence of interactive groups at functional place R allows to start a host–guest chemistry interaction, which occurs between the TB and other molecules [1]. TB could be used as the functional core for synthesis of materials which exhibit hole-transporting (HT) properties and high charge mobility [2]. Chromophore carrying analogues of the TB have displayed unique NLO properties and can be used as very stable molecular switches [3].

This work is devoted for quantum-chemistry study of structure and electronic properties of most-promising hole-transporting materials (HTM) based on TB [4]. Several structures HTM1–HTM3 containing TB with enamine-linked diphenyl branches are presented and discussed – see Figure 2.

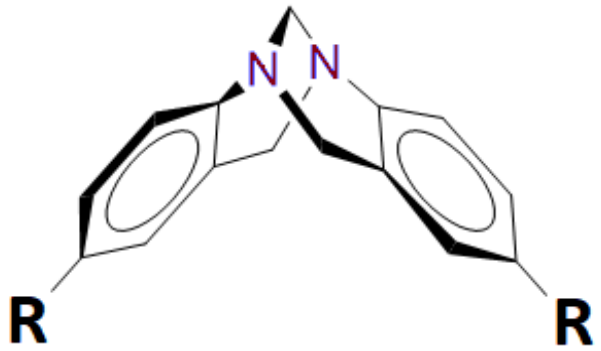

Figure 1 Tröger's base (TB)

2 Overview

Quantum chemistry study was provided using Gaussian-09 package [5]. Ground state geometry optimization was done using density functional method B3LYP and 6-31G(d) base with polarization functions. PCM model was used for including the surrounding effect (in that case THF). According to geometry optimization data, it was established that central methanodiazocine unit orientates the aromatic rings in a nearly perpendicular fashion, making TB a rather rigid V-shaped molecule, its angular orientation of aromatic rings creating a hydrophobic cavity. Also, additional fragments such as methyl or methoxy groups increase the chaoticity within the enamine-linked diphenyl branches to shorten the length of π-conjugation within them.

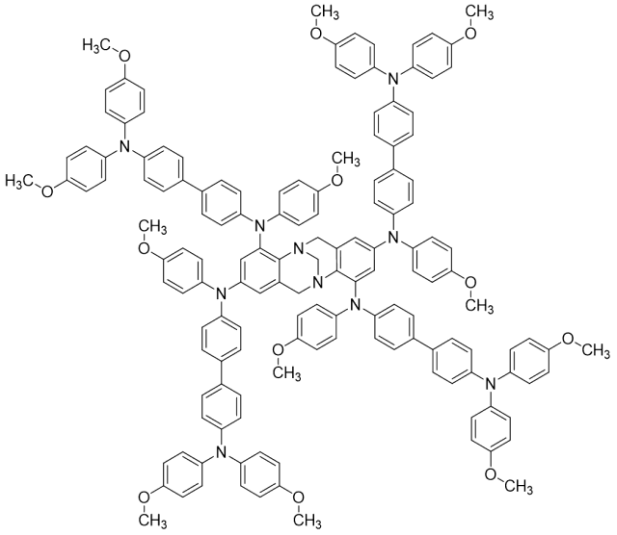

Figure 2 HTM3 structure based on TB with enamine-linked diphenyl branches

Electronic excitations were established using Gaussian-09 package be means of semiempirical TD method (for singlets only) in the framework of B3LYP/6-31G(d). Excitation energies, corresponding wavelengths and oscillator strengths were calculated for low lying spectroscopic states $S_0 \rightarrow S_1$, …, $S_0 \rightarrow S_6$.

Generally, for HTM1-HTM3 structures, the singlet S_1 electronic state could be populated by means of two one-particle transitions, nextHOMO→LUMO and HOMO→LUMO, favouring charge delocalization in the left fragment (more chaotic). In this case, the TB fragment plays an important role as a bridge fragment, containing two nitrogen atoms, built-up from two related hexagons consisting of carbon atoms and nitrogen atoms connected by a one-valence junction. Owing to the spatial orientation of hexagons having a circa 105 deg angle, a π-conjugated system occurs along the entire molecule, from the left to the right fragment.

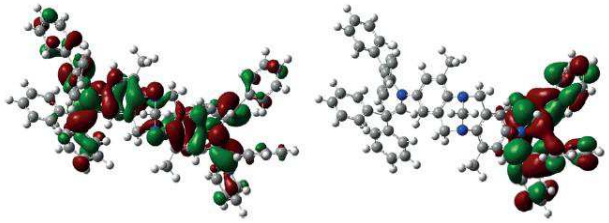

Figure 3 HTM1 structure. Electronic transition $S_0 \rightarrow S_1$. Charge redistribution process by populating the first excited electronic state between HOMO (left) and LUMO (right)

Figure 3 shows a typical charge redistribution process for HTM1 structure at electronic transition $S_0 \rightarrow S_1$. By populating the first excited electronic state S_1, the first and second central nitrogen atoms from TB are associated to the π-conjugated systems, expanded by enamine-linked diphenyl branches, on the left and right sides, respectively. A separation line goes through the central structural peak represented by the $–CH_2$ group, connecting two nitrogen atoms. Owing to a nonstandard off-plane angle of fragment orientation (105 deg), a π-conjugated system occurs along the molecule. From classical molecular electronics perspective, TB acts as a switch (HOMO distribution corresponds to switch-on, LUMO to switch-off). After excitation, charge localization is limited by a nitrogen in the right enamine-linked fragment, indicating the establishment of a radical cation [2].

3 Conclusion

TB with enamine-linked diphenyl branches could be titled as the most promising hole-transporting materials (HTM). For several derivatives, ground state geometry was established, and electronic excitation behaviour was estimated. Analyse of molecular charge redistribution allows concluding the significance of TB: dynamics between switch-on, switch-off states could be realised by manipulating HOMO and LUMO.

References

[1] Goswami S, Ghosh K, Dasgupta S 2000 Troger's Base Molecular Scaffolds in Dicarboxylic Acid Recognition Journal of Organic Chemistry **65**(7) 1907–14
[2] Ramrez C, Pegoraro C, Trupp L, Bruttomesso A, Amorebieta V, Vera D, Parise A 2011 Phys. Chem. Chem. Phys. **13** 20076
[3] Sergeyev Sergey, Didier Delphine, Boitsov Vitaly, Teshome Ayele, Asselberghs Inge, Clays Koen, Vande Velde Christophe M L, Plaquet Aurélie, Champagne Benoît 2010 Symmetrical and Nonsymmetrical Chromophores with Tröger's Base Skeleton: Chiroptical, Linear, and Quadratic Nonlinear Optical Properties A Joint Theoretical and Experimental Study. Chemistry – A European Journal **16**(27) 8181–90
[4] Braukyla T, Xia R, Daskeviciene M, Malinauskas T, Gruodis A, Jankauskas V, Fei Z, Momblona C, Roldán-Carmona C, J Dyson P, Getautis V, Nazeeruddin M 2019 Inexpensive Hole-Transporting Materials Derived from Tröger's Base Afford Efficient and Stable Perovskite Solar Cells Angewandte Chemie **131** 11388-94
[5] Frisch M J, Trucks G W, et al 2013 Gaussian 09, Revision D.01 Gaussian, Inc., Wallingford, CT

QUATTRO-20: advanced tool for estimation of the recurrent sequences

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Abstract

QUATTRO-20 as advanced tool for estimation of the recurrent sequences was created and tested. Several visualization methods such as final state diagram, distribution of Lyapunov exponent and CobWeb plot are included in package. Novel graphical technique of stability condition was presented and discussed.

Keywords: logistic map, discrete form of logistic equation, stability condition

1 Introduction

Stochastic processes are present in many fields of biology (population dynamics, host-parasite interactions), sociology (growth of population), economics (market activity), cryptography etc. [1] Modelling of stochastic processes is related to the usage of recurrence relations [2]. Evolution of physical/social/biological systems must be estimated in the framework of stability behaviour, and primary importance of such task is related to obtaining the various dynamical regimes of the certain system. One of the classical examples of recurrent relations is well-known logistic equation

$$x' = r \cdot x \cdot (1 - x). \quad (1)$$

Discrete form of logistic equation (1) allows to generate the sequence of terms as the function of the preceding terms:

$$x_{t+1} = r \cdot x_t \cdot (1 - x_t), \quad (2)$$

where X_t represents the current term and parameter $r > 0$ represents the rate of population growth [2], [3]. Logistic map (2) represents parabolic function $F(x)$ at certain r.

Chaotic behaviour of dynamical system could be estimated using Lyapunov characteristic exponent $\lambda(r)$ which gives the rate of exponential divergence related to the initial condition:

$$\lambda(r) = \lim_{t\to\infty} \frac{1}{t} \sum_{k=0}^{t-1} \ln\left|F'(x)|_{x=x_k}\right|, \quad (3)$$

Distribution of Lyapunov exponent characters the chaotic dynamics as well as various forms of stabilization or synchronization [4]. Positive values of Lyapunov exponent indicates chaotic behaviour of sequence according to sensitive dependence on initial x0. A negative value of it indicates absence of chaotic dependence on initial x0. Several classical visualization methods such as final state diagram, distribution of Lyapunov exponent and CobWeb plot allow estimation of different aspects of sequence dynamics.

For learning purposes, program package QUATTRO-20 [5] as an advanced tool was created and tested for estimation of the quantity and quality of recurrent sequences. Discrete form of logistic equation (2) was used as a model sequence. Previously mentioned visualizations methods are included in package. In addition, final state diagram was re-examined due to stability condition.

2 Overview

Let's consider the function $F(x)$ according to Equation (1):

$$F(x) = r \cdot x \cdot (1 - x). \quad (4)$$

We are interested in existing the fixed points x^* when $x^* = F(x^*)$. Locally stable attractors at x^* could be found from following stability condition [3], [6]:

$$\left|F'(x)|_{x=x^*}\right| < 1. \quad (5)$$

Actually, this condition must be checked for $F(x)$, $F^2(x)$, $F^3(x)$, $F^4(x)$ where

$$F^n(x) = F(F^{n-1}(x)), n = 2,3,4. \quad (6)$$

Estimation has to be divided into two parts.

Firstly, analyse of behaviour of function $F'(x)$ for x in interval [0, 1], and for r in (0, 4] with step 0.01 is shown in Figure 1.

Secondly, analyse of behaviour of recurrent formula (2) for the certain x_0 and for r in (0, 4] with step 0.01, is shown

in Figure 2.

Values of first derivative of different functions were plotted as maps in Figure 1: $F(x)$ (top left), $F^2(x)$ (bottom left), $F^3(x)$ (top right), $F^4(x)$ (bottom right)

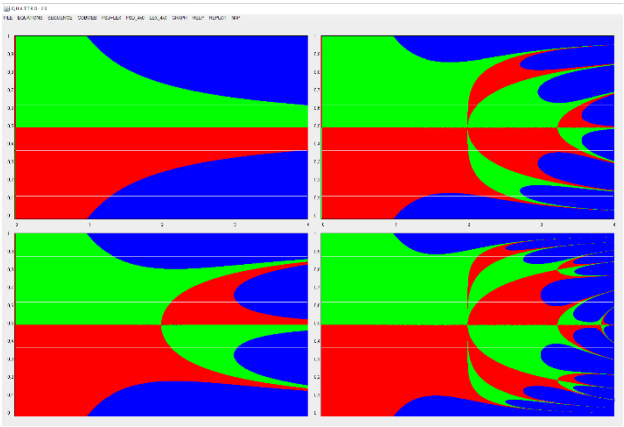

Figure 1 Map of first derivative of F(x) (top left), $F^{(2)}(x)$ (bottom left), $F^{(3)}(x)$ (top right), $F^{(4)}(x)$ (bottom right) on parameters r at horizontal axis and x on vertical axis. Red area represents the derivative values in interval (0,1), green – (-1,0) and blue – all the rest.

where parameter r is on horizontal axis and x on vertical axis. Red area represents the interval where values of corresponding derivative are positive and less than 1, green area – are negative and greater than –1 and blue area – all the rest values. Figure 2 represents final state diagram (top left), distribution of Lyapunov exponent (bottom left), CobWeb plot (top right), and solution of equation $x = F(x)$.

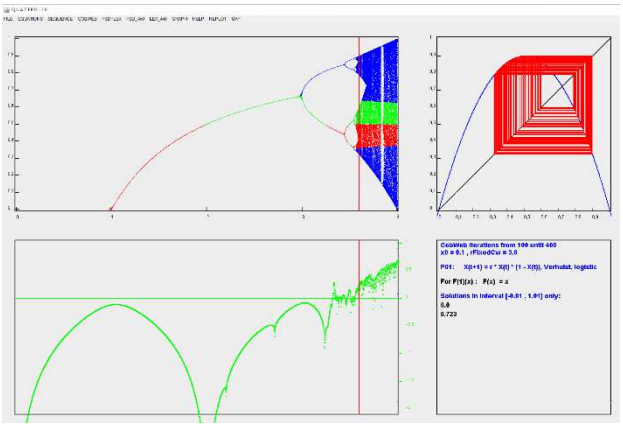

Figure 2 Different visualisations of F(x): final state diagram (top left), distribution of Lyapunov exponent (bottom left), CobWeb plot (top right), and solution of x=F(x) (bottom right). Parameter r at horizontal axis and x on vertical axis. Red, green and blue areas of final state diagram according to stability conditions as in Figure 1

(bottom right) for value r=3.6. Red vertical segment at final state diagram (at r=3.6) corresponds to the segment of the oscillations in the CobWeb plot. Iterations from requested interval [100, 400] are presented in red, another interval [1, 100) – in white (quite invisible). Construction and interpretation of CobWeb plot is widely described in [3].

3 Conclusion

Advanced tool for estimation of the recurrent sequences QUATTRO-20 allows understanding the various aspects of chaotic system dynamics. Described package could be successfully used for other functions of recurrent sequences.

References

[1] Cencini M, Cecconi F, Vulpiani A. 2010 Chaos. From Simple Models to Complex Systems.
[2] Heinz-Otto Peitgen, Hartmut Jurgens, Dietmar Saupe 1992 Chaos and Fractals New Frontiers of Science – Springer-Verlag.
[3] Kozmina Y 2018 Discrete Analogue of the Verhulst Equation and Attractors Methodological Aspects of Teaching – Innovative Infotechnologies for Science, Business and Education **24** 3-12
[4] Pikovsky A, Rosenblum M, Kurths J 2001 Synchronization. A Universal Concept in Nonlinear Sciences Cambridge: Cambridge University Press
[5] Kozmina J, Gruodis A 2020 QUATTRO-20. Advanced tool for estimation of the recurrent sequences WinApi program - Vilnius, Riga
[6] Pearl J 2000 Causality: Models, reasoning and inference Cambridge, UK: Cambridge University Press

Development of a mobile application for placing objects in augmented reality

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Abstract

Augmented reality is the technology that expands our physical world, adding layers of digital information onto it. Unlike Virtual Reality, AR does not create the whole artificial environments to replace real with a virtual one. AR/VR technologies are growing very vast, the market is projected to reach $5B by 2025, according HackerNoon [1]. With both ARKit and ARCore available to public, augmented reality is now enabled on over 500 million devices.

Keywords: augmented reality, virtual reality, ar, arcore, technologies

1 Introduction

Augmented reality in retail may act to bring better customer engagement and retention, as well as brand awareness and more sales. Providing product data with 3D models of any size or color – one of the best ways to help customers make wiser purchases.

Buying furniture can be difficult, as items rarely looks the same on display in the store, or in the online staging, as they do when they become part of your space, so it was necessary to develop software that would make it possible to view furniture in your interior before purchasing it.

ARCore is Google's platform for building augmented reality experiences. Using different APIs, ARCore enables your phone to sense its environment, understand the world and interact with information. ARCore uses three capabilities to integrate virtual content with the real world as seen through the Android phone's camera [2]:

- Motion tracking, which allows the phone to understand its position relative to the real world
- Environmental understanding, which allows the mobile device to detect the size and location of horizontal, vertical and angled surfaces
- Light estimation, which allows the mobile device to estimate lightning conditions

ARCore can detect flat surfaces, like table or the floor, and can also estimate the average lightning in the area around it.

2 Overview

This work is aimed to improve and personalize customer needs, by being at the forefront of modern technology like augmented reality. The benefits from AR for business:

- Showcasing – furniture store may offer customers to see how a table of a bed would look like in their house
- Trials free of risk – with AR people can place a bookshelf in their rooms in a few taps on a phone. The risk of product return and logistical expenses is minimized
- New marketing opportunities – AR offers new ways to promote brand, to offer product information, to present new products, to offer helpful 3D experiences
- Clearer understanding of products – AR visualization works much better than both photos and videos with text description
- Save time and resources – augmented reality in real estate may significantly lower the numbers of exploratory visits

Augmented reality suits the furniture business perfectly. People want to see virtual interior design ideas in real time, and AR provides them with such ability.

3 Conclusion

Augmented reality is a fresh direction in the mobile industry, which has great potential and more and more companies are paying attention to this technology and adjusting their businesses to make their customers' lives better and easier. Giants like Google and Apple are investing huge amounts in the development of these technologies, so the technology of augmented reality is backed up and will only develop further.

References

[1] Predictions for the Future of Augmented Reality https://hackernoon.com/predictions-for-the-future-of-augmented-reality-63c7b8c9d794
[2] ARCore overview https://developers.google.com/ar/discover

Implementation of a network printers monitoring system in enterprise "BelieveIT"

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Abstract

Today, companies often think about climate change and cost reduction, so most of their documents are converted from paper to electronic environments, even we are already accustomed to getting bills in our e-mails rather than in mailboxes. Of course, this is a more natural-friendly solution and a more cost-effective solution, we can reduce the cost of delivering printers and mail, but there are some documents that are not implemented electronically, so printers are also stored in large companies, most often configured as network printers through print servers, because using one printer for one employee would not be economically justified at all.

1 Introduction

Printers, though they are not so friendly to nature, are nowhere to be lost. For a daily home user, maybe printers are no longer up to date, but they have been widely used in a variety of firms, and still all documents cannot be digitized. Often printers are not purchased at the same time - same models, manufacturers, types. There may be many and different printers in one company, but it is a headache for servicing personnel, it must be accompanied in some way by parts depreciation and toner use, it is not so problematic if there are no more than ten printers in the company, but if we look at a company with more than a hundred printers at different sites, different models and manufacturers, servicing staff, it is difficult track when, which printer will end and what materials should be purchased in a timely manner.

2 Overview

The aim of this work is to introduce a monitoring system for network printers into the company. By holding on to these tasks:

- Exploration of the existing infrastructure to implement the network monitoring solution
- Explore potential monitoring solutions
- Compare and analyze possible solutions
- Make a cost calculation system for implementation
- adjust the system to the needs of the company and to the desired purpose
- Introduce the selected monitoring solution

3 Decision

Because BelieveIT has more than two hundred network printers in general, different offices, different manufacturers and models are currently using different programs from printer manufacturers to remotely monitor printer resources, but these programs are not automated and are many for different printers. Our goal is to look at different open source monitoring systems, compare their choices to one of the most responsive and automated solutions, if all the printers can be monitored.

4 Conclusion

The introduction of such a system will lead to costs, but after deployment is expected to improve the timing of incident, the administrator will have a notification from a specific printer about the rapid use of toner, which will give time to order the toner directly in advance, and the administrator will be able to replace it in a timely manner, which means that large purchased material reserves will not be needed and the customer will be satisfied on time. a replacement, in an existing situation, is initiated by the customer and there is a waiting time because the administrator may be in one object, a warehouse in another, and a customer in another.

Continuous integration and delivery

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Abstract

Modern medical organizations produce and accumulate huge amounts of data. The quality of medical care, the general standard of living of the people, the level of development of the country as a whole and each of its territorial subjects in particular depend on how effectively this information is used by doctors, managers and governing bodies. Therefore, the need to use large, and still constantly growing volumes of information in solving diagnostic, therapeutic, statistical, managerial and other tasks, determines today the creation of information systems in medical institutions.

Keywords: Medods, medix, medmis, automation, medical information systems, implementation

1 Introduction

Leading medical organizations are actively introducing decision support systems that, using methods of intelligent data processing, help specialists in the tasks of making diagnoses, prescribing a course of treatment, and predicting the development of diseases. Information from the systems for maintaining electronic case histories that accumulate large amounts of heterogeneous information generated by a medical organization: indicators of patient health, examination results, data on medical procedures, etc., comes to the input of decision support systems. Moreover, in one organization there may be several medical systems at once, the data in which are stored in different formats that correspond to different standards. Usual, each system, is designed to solve a narrow range of problems, for example, to treat a specific disease or conduct a specific diagnosis [1].

For a more efficient way to develop and use medical systems, an ERP system has been developed. According to the classification adopted in the European Union, the ERP system for medicine consists of 3 types of components:

- medical information system that performs the functions of administering patient flows, billing, electronic medical record;
- auxiliary information systems, such as a hospital pharmacy, diet food, clinical laboratory, systems for archiving and transmission of images (PACS), systems for accumulating data from bedside equipment;
- financial and economic system (accounting, salary and personnel).

All 3 components of the ERP system are data sources for calculating the cost of medical care. ERP systems use a process approach to the automation of medical organizations.

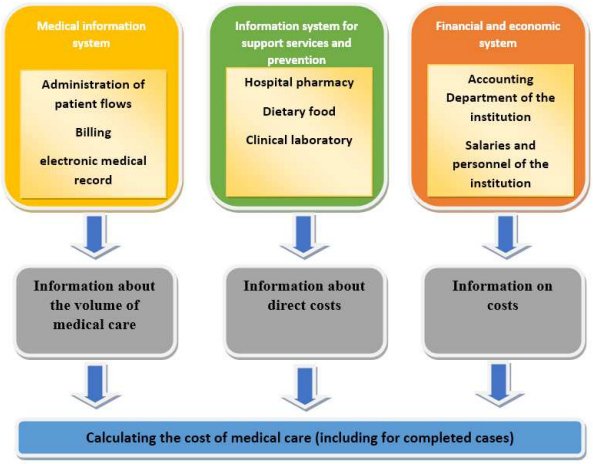

Figure 1 process approach to automation of medical organizations

The main advantages of the ERP system:

- process approach to automation of medical organizations;
- coordination of finances, resources (material, labour) and the quality of medical care for their coordinated management;
- monitoring the cost of medical care and costing [2].

2 Overview

This graduate work discusses the positive and negative points on the following topics:

- the old approach to the development of software for medical information systems with insufficient functional capabilities and limited security of both the privacy of the patient and medical services in general.
- commercial instruments of medical institutions
- the options for introducing modern information

systems relevant both for the present and for the foreseeable future are being considered.

3 Decision

As an example of real projects, such already-existing medical systems will be reviewed:

- Medods;
- Medix;
- Medmis.

In all proposed platforms, there is real experience of use in many medical centers of different countries. Each software solution is based on the needs of medical staff and facility management.

Projects have a minimalistic and intuitive interface that allows you to master management in the shortest possible time. The systems are divided into logical modules that are interconnected, which opens up the possibility of protecting information and controlling the data stream as a whole.

The main disadvantage of using the proposed tools is their location in cloud storage, which can lead to the leak of personal data of patients and the loss of information of the medical institution as a whole, however, the platforms have a technical solution for their location on an internal server, that allows you to store data exclusively within the walls of medical centers.

4 Conclusion

Information technology can be successfully applied in various fields of modern medicine. For example, in the field of patient safety, modern automated systems can strengthen the quality and safety control of medicines and medical services, reduce the chances of medical errors, provide ambulances with prompt communications and access to vital patient information. Modern technological solutions are a way to provide free access to health services regardless of the patient's place of residence, significantly increase the availability of high-tech medical services, medical expertise. All the factors listed in the work prove the need to transfer medical institutions to modern medical information systems.

References

[1] Health_informatics https://en.wikipedia.org/wiki/Health_informatics
[2] Medical information systems (MIS) _ market_russia http://zdrav.expert/index.php/Статья:Медицинские_информационные_системы_(МИС)_рынок_России
[3] MedixCRM is Safe and effectiveclinic management system https://medix.pro/cases/

The use machine learning interpreter for the development of decision support system

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Abstract

Multi-criteria decision support systems (MCDSS) use expert knowledge that gives a subjective nature to the decision-making process. The complexity of expert judgment increases significantly with an increase in the number of parameters considered. These shortcomings lead to the search for other decision support methods that would be less sensitive to the opinion of experts and could process large amounts of data with a large number of heterogeneous properties. A supervised learning provides this opportunity. We propose the general schema of incorporation machine learning (ML) methods and ML interpreters to decision support process.

Keywords: machine learning, multi-criteria decision support system, machine learning interpreter, SHapley Additive exPlanations (SHAP).

1 General

Traditionally, MCDSS use knowledge of experts that are consolidated to form a solution. The methods of obtaining knowledge include: AHP (analytical hierarchy process) [1], PAPRIKA (Potentially all pairwise rankings of all possible alternatives) [2], PROMETHEE (Preference Ranking METHod for Enrichment of Evaluations) [3], TOPSIS (method for the solution) [4], ELECTRE [5]. The solutions listed above are used to form the solution, as well as Weighted Linear Combination (WLC), Ordered Weighted Averaging (OWA) [6], Bayesian networks [7, 8], fuzzy logic [9], etc.

Despite the solid theoretical baggage, for MCDSS, using the knowledge of experts, there is more or less characteristic subjectivity in the decision-making process. In addition, with the increase in data volumes and the number of features taken into account, the complexity of expert assessment itself increases significantly. For example, the AHP technique requires $k = \frac{[\![(n]\!]^2 - n)}{2}$, pairwise comparisons for n features, which can significantly complicate the work with n> 100. These shortcomings make it necessary to look for other decision-making support methods that would be less sensitive to the opinions of experts and could process large amounts of data with a large number of heterogeneous features. Supervised learning method provide this opportunity. However, until now, the use of machine learning models encountered the problem of "black boxes", that is, the inability of many algorithms to give explanations to the result obtained. Only recently obtained results in the development of explanatory systems [10, 11] allow not only to apply them to assess the weight of machine learning model features, but also, in our opinion, to use them in the decision support process.

Our approach, which may be called MCDSS based on the explanation of "black boxes" (MCDSS&BBE), consists of the following key elements (Figure 1).

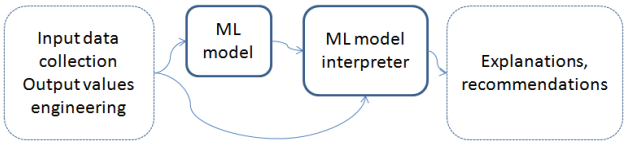

Figure 1 MCDSS&BBE workflow schema

First, we collect input data and determine the target parameters.

Second, we build a non-linear model based on supervised learning method (ML model), in which we take into account the maximum possible number of features.

Third, we estimate the weight of the contribution of the features to the result achieved by the model as a whole and by the individual object (ML model interpreter).

Fourth, we use interpretation results to develop recommendations.

That is, the model is interpreted to answer the question "Why do we have one or another result of classification or regression?". The answer to this question for an individual object is essentially some recommendation for changing parameters in order to increase the values of target parameters.

We tested this approach using the SHapley Additive exPlanations (SHAP) [11] interpreter to make recommendations in the field of school education according to National Educational Database (NEDB).

References

[1] Saati T L, Andreychikova O N 2015 Ob izmerenii neosyazayemogo. Podkhod k otnositel'nym izmereniyam na osnove glavnogo sobstvennogo vektora matritsy parnykh sravneniy Cloud of science **2**(1) 5-39 (In Russian)
[2] Hansen P, Ombler F 2008 A new method for scoring additive multi‐attribute value models using pairwise rankings of alternatives Journal of Multi‐Criteria Decision Analysis **15**(3-4) 87-107
[3] Brans J P, Vincke P 1985 Note A Preference Ranking Organisation Method: (The PROMETHEE Method for Multiple Criteria Decision-Making) Management science **31**(6) 647-56
[4] Lai Y J, Liu T Y, Hwang C L 1994 TOPSIS for MODM European Journal of Operational Research **76**(3) 486–500
[5] Figueira J, Mousseau V, Roy B 2005 ELECTRE methods Multiple criteria decision analysis: State of the art surveys 133-53
[6] Yager, Ronald R 1988 On ordered weighted averaging aggregation operators in multicriteria decision making IEEE Transactions on systems, Man, and Cybernetics **18**(1) 183-90
[7] Abaei, Mahdi M, et al 2017 Developing a novel risk-based methodology for multi-criteria decision-making in marine renewable energy applications Renewable energy **102** 341-8
[8] Mukhamediev R I, Mustakayev R, Yakunin K, Kiseleva S, Gopejenko V 2019 Multi-Criteria Spatial Decision Making Support System for Renewable Energy Development in Kazakhstan IEEE Access **7** 122275-88 doi: 10.1109/ACCESS.2019.2937627
[9] Charabi, Yassine, Gastli A 2011 PV site suitability analysis using GIS-based spatial fuzzy multi-criteria evaluation Renewable Energy **36**(9) 2554-61
[10] Ribeiro M T, Guestrin S S C 2016 Local Interpretable Model-Agnostic Explanations (LIME): An Introduction A technique to explain the predictions of any machine learning classifier
[11] Lundberg, Scott M, Lee S 2017 A unified approach to interpreting model predictions Advances in Neural Information Processing Systems 4765-74

Intelligent unmanned aerial vehicle technologies

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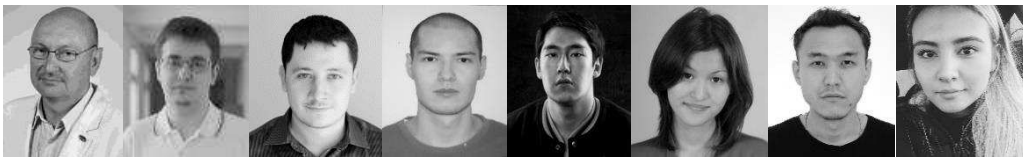

Abstract

We consider the economic and technological prerequisites for the use of Intelligent Unmanned Aerial Vehicle Technology (IUAVT) in an urban environment to solve the following problems: monitoring hazardous geophysical processes, environmental pollution monitoring, monitoring of technical and engineering structures, traffic monitoring. We discuss research problems and the main limitations that need to be solved to use IUAVT effectively.

Keywords: unmanned aerial vehicles, urban environment, environmental pollution monitoring, monitoring hazardous geological and geophysical processes, machine learning.

1 General

Successes in urban management are usually associated with the collection and practical application of large amounts of data, including spatially distributed resources and objects for monitoring and process control. This data can be collected using stationary systems, platforms with low mobility (for example, using cars) and several types of highly mobile platforms (spacecraft, aerial photography, unmanned aerial vehicles (UAVs)). Among listed technologies, UAVs have very serious advantages in obtaining data of a small and partly medium scale in terms of efficiency, cost, and resolution (Table 1).

Table 1 Applications of spatially distributed data acquisition systems

Type of machine	Radius of action	Cost	Operativeness	Resolution and cost	Main limitations	Source
Satellites	Unlimited	27$/km^2-Geo 44$/km^2- Geostereo	Up to 60 days Up to 100 days for stereo shooting (Note 1)	0.46 m for panchromatic photographs, 1.86 m for multispectral.	Resolution, especially for multispectral photographs. Minimum scale 1: 10000 (for panchromatic images). A more accessible view of Geo satellite images requires a digital elevation model obtained from other sources.	[1, 2]
Airplanes and helicopters	150 km on average	Depends on the area 2200 $ / km2 with an area of 5km2, 30 $ / km2 with an area of 750km2.	5 days and more (note 2)	Up to 0.04 m	High cost of rent for flights, very high cost of shooting in case of small area.	[3, 4]
UAV	On average 10 km	Depends on area 750 $ / km2 with an area of 5km2, 15 $ / km2 with an area of 750km2	1 day	Up to 0.04 m	Limitations on payload weight and flight time, control requires a high-bandwidth communication channel. Weather dependent.	[1, 3, 5]

It is necessary to solve the problem of developing technologies for data collection using highly mobile platforms and data processing to support decision-making in the city management system.

The use of such data is relevant when specialists deal with spatially distributed technical or natural systems. Such systems in the city include a significant group of human life support systems, transport, technical and architectural structures, etc. Such problems could be solved with the help of intelligent technologies, which include machine learning and decision support systems. In this regard, the set of solutions combining artificial intelligence systems and UAV-based platforms will be called Intelligent Unmanned Aerial Vehicle Technology (IUAVT).

We consider the economic and technological prerequisites for the use of UAV-based data acquisition systems in an urban

environment to solve the following problems:

- Monitoring hazardous geophysical processes;
- Environmental pollution monitoring;
- Technical and engineering structures monitoring;
- Traffic monitoring.

We determine research areas and problems that need to be solved to use them effectively.

One of the significant components of the IUAVT is computer vision, which should solve the tasks of object identification (cv1), object verification (cv2), object recognition (cv3), determining the distance to objects and their visible characteristics (speed, size, etc.) (cv4).

The most advanced algorithm for solving the cv1 problem is the YOLO algorithm [6]. An example of the Use of such network for traffic evaluation in Almaty has shown in Figure 1 provided by the Flycam [7].

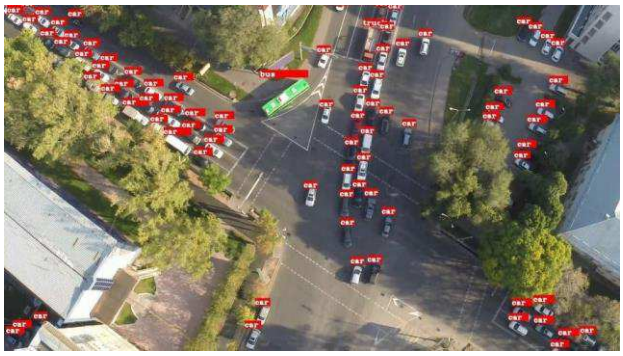

Figure 1. Recognition of traffic objects in Almaty

To solve problems cv1, 2, 3, the Siamese networks [8] are effectively used, when two images are processed by two identical pre-trained networks. As a result, image vectors are calculated, then compared with each other using the triple component loss function (Triplet loss). Methods for solving the cv4 problem depend on the subject area and technical support.

The main limitations of the IUAVT are [9]:

- Limited flight time;
- Weather dependence;
- Limited payload;
- Limitations in solving computational problems on board of the UAVs;
- Legal restrictions on the use of UAVs in urban conditions;
- To solve highly specialized problems, it will be necessary to create specialized data sets and models of neural networks;
- Control problems.

2 Conclusion

Therefore, due to mobility, efficiency and relative cheapness, UAVs are becoming an important tool for ensuring the sustainable development of megacities and improving the urban environment. Using intelligent UAVs to solve the above problems of urban management is determined by economic and social preconditions.

Although, in the process of applying IUAV, methods of overcoming technical limitations (limited battery capacity, significant dependence on weather conditions, limiting the payload weight), solving data processing problems (pattern recognition and classification for special cases, processing large volumes of data) and control (flight indoors and without a GPS signal, flight of a UAV group) should be proposed.

References

[1] Kadnichanskiy S A 2009 Sravnitel'nyy analiz materialov tsifrovoy AFS i kosmicheskoy s"yemki dlya sozdaniya i obnovleniya kart Geoprofi **4** 4–8 (In Russian)
[2] GeoEye-1 Satellite Sensor (0.46m) https://www.satimagingcorp.com/
[3] satellite-sensors/geoeye-1/ 20 mar 2020
[4] Babashkin N M, Kadnichanskiy S A, Nekhin S S 2017 Sravneniye effektivnosti aerofototopograficheskoy s"yemki s ispol'zovaniyem bespilotnykh i pilotiruyemykh aviatsionnykh system Geoprofi **1** 14–9 (In Russian)
[5] Aerofotosyemka https://sovzond.ru/services/aerophotography/ 20 mar 2020 (In Russian)
[6] Professional'naya aeros"yemka https://wifi.kz/catalog/aerialsurvey/ 20 mar 2020 (In Russian)
[7] Redmon J, et al 2016 You only look once: Unified, real-time object detection Proc. of the IEEE conference on computer vision and pattern recognition pp 779-88
[8] TOO "FlyCam" PROIZVODSTVO BPLA V RESPUBLIKE KAZAKHSTAN https://www.flycam.kz last accessed 20 mar 2020 (In Russian)
[9] Taigman Y, et al 2014 Deepface: Closing the gap to human-level performance in face verification Proc. of the IEEE conference on computer vision and pattern recognition pp 1701-8
[10] Shakhatreh H, et al 2019 Unmanned aerial vehicles (UAVs): A survey on civil applications and key research challenges IEEE Access **7** 48572-634

Trend analysis of scientometric indicators

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Abstract

In this paper, we consider scientometric indicators of such a rapidly developing field of research as automatic text processing (natural language processing). Differential indicators of speed and acceleration were used to assess the dynamics of the development of NLP domains. The assessment was based on data from a direct bibliographic database Science. Calculations were performed for the following NLP subdomains: grammar checking, information extraction, text categorization, dialogue systems, speech recognition, machine translation, information search, answers to questions, opinion analysis, intelligent advisers and others. Areas with high growth rates (grammar checking, dialog systems, deep learning) and areas that lost the preexisting dynamics of publication activity growth (automatic summarization, speech recognition, information retrieval) were identified.The proposed indicators allow to visually express changes in the dynamics of scientometric indicators, which may beuseful in assessing the prospects of research areas.

Keywords: bibliometric, scientometrics, natural language processing, citations, differential indicators, D1, D2

1 Introduction

The field of research, combined terms of natural language processing (NLP) or automatic word processing, has caused great and constantly growing interest. Recently, scientific research and a general increased level of calculations have led to a number of breakthrough results in NLP, among which are achievements in the field of machine translation, automatic summation, information retrieval, answer to questions and mood analysis [1]. Selecting particular domainsit is possible to consider how the interest of researchers changes over time, and those areas of research that attract particular attention can be revealed. The number of publications in almost all areas of natural language processing is increasing.It is not enough to predict change of interest in particular domain using only number of publications. Differential indicators that were introduced in [2] are necessary to assess the speed and acceleration of changes in bibliometric indicators which help us to judge more precisely about the possible interest of particular domain in the future. In turn, speed and acceleration may indicate an increase or decrease in the interest of researchers in individual NLP subdomains. In this paper, the number of publications and the number of citations are consideredin differential indicators.

2 Methods and Data

The data was collected and attributed from the point of view of the tasks to be solved as "**NLP tasks**" or "**Tasks**" group as it was introduced in [3] and then distributed to the number of methods ("**Scientific NLP Methods**" or "**Methods**" group) such as: Machine Learning, Neural Networks, Deep Learning, Fuzzy Logic, First order logic, Knowledge representation, Evolutionary computation & Genetic programming, Rule based system, Unsupervised learning, Clustering, Supervised learning, Statistical methods, Bayesian networks, Semantic c networks, Keyword Spotting, Lexical affinity, Ontology, Information fusion, Taxonomy [2].To assess the dynamics of changes in publication activity indicators D1(speed) and D2(acceleration) [2] are used and defined as follows:

$$D1_i^j(t_k) = \beta \times \frac{dn_i^j(t_k)}{dt} + \gamma \times \frac{dc_i^j(t_k)}{dt},$$

$$D2_i^j(t_k) = \beta' \times \frac{d(dn_i^j(t_k)/dt)}{dt} + \gamma' \times \frac{d(dc_i^j(t_k)/dt)}{dt},$$

where n_i and c_i are number of publications and citations respectively, determined using search term $j, \beta, \gamma, \beta', \gamma$ some empirical coefficients that regulate the "weight" of the contribution of the number of publications, the speed and the acceleration of number of publications n_i and the speed and acceleration of number of citations c_i respectively.

In present work, D1 and D2 are calculated separately for publication and citation number. We assume β, γas equal to 1. Due to the peculiarities of the numerical calculation of derivatives, indicators D1 and D2 can only be calculated for previous years. However, we are interested in assessing the dynamics of changes in these indicators in the future, 1 or 2 years in advance. For this, using annual data on publication activity, regression models are constructed. As it is known know, the cost function of the regression model is described by an expression of the form:

$$J(\theta) = \min \quad \frac{1}{2m} [\sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2 + \lambda \sum_{j=1}^{n} \theta_j^2],$$

where m – amount of data, and hypothesis function:

$$h_\theta = \theta_0 + \theta_1 x + \theta_2 x^2 + \theta_3 x^3 + \cdots + \theta_n x^n,$$

regression parameters - $\theta_i \in \Theta$ and regularization parameter - λ. In this case m is a value of BI in the moment 1 to m. The minimization of the cost function is performed by one of the gradient descent algorithms: Conjugate gradient, BFGS, L-BFGS. Having the hypothesis function, we calculate additional values for the number of publications and citations both in the intervals between the available annual values and the predicted values.

3 Results

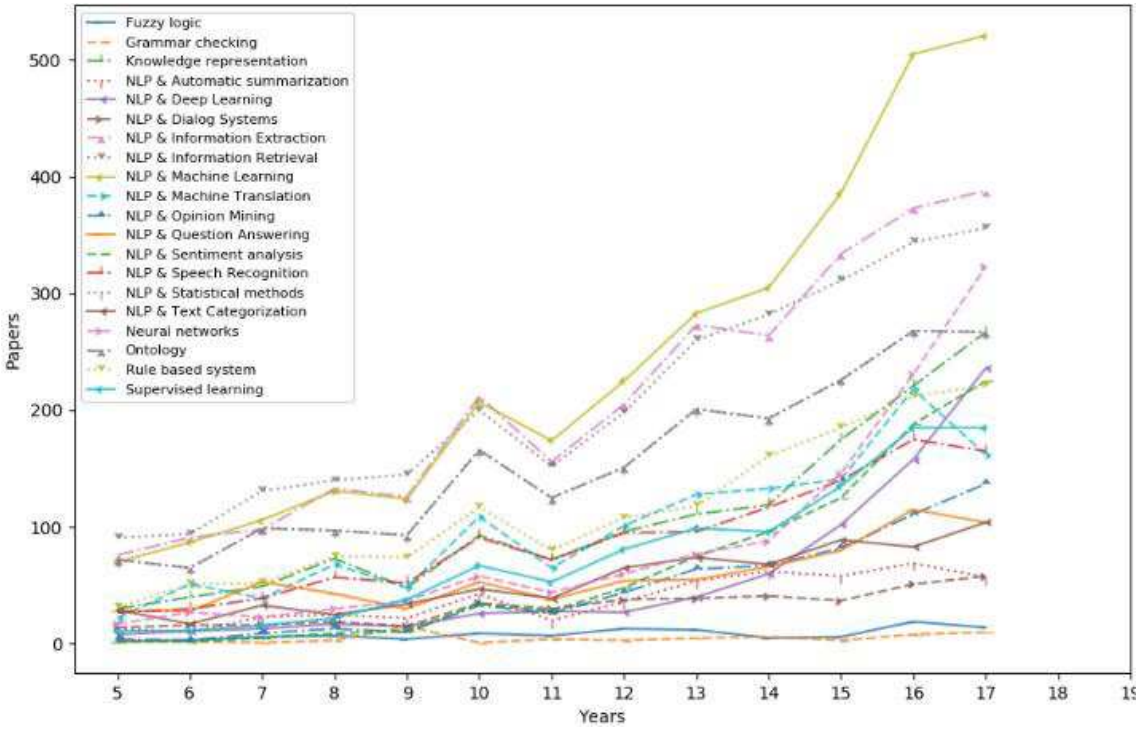

Figure 1 Publication activity

Based on the data above regression was built (Figure 2) in order to make curve more smooth and get additional predicted data for next couple years. Degree of regression was chosen in such way that minimizes mean squared error.

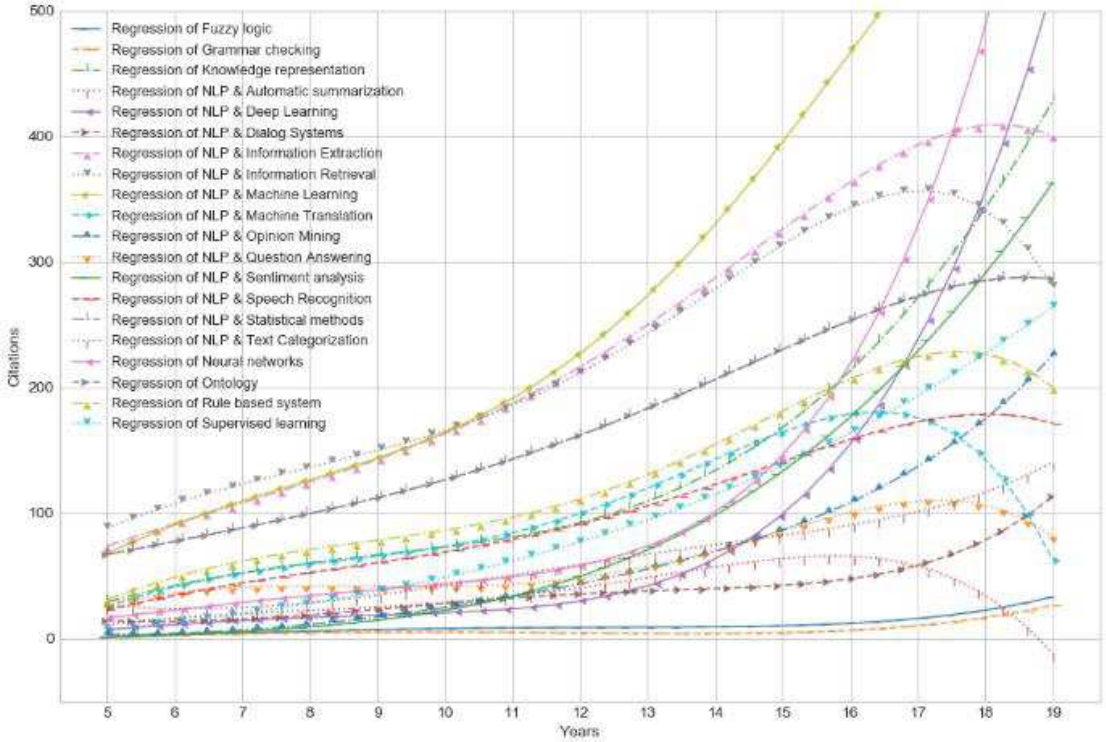

Figure 2 Publication activity Regression

Also, these categories was analyzed by citations count. Below given the graph representing the citations of each category by the year when paper was published.

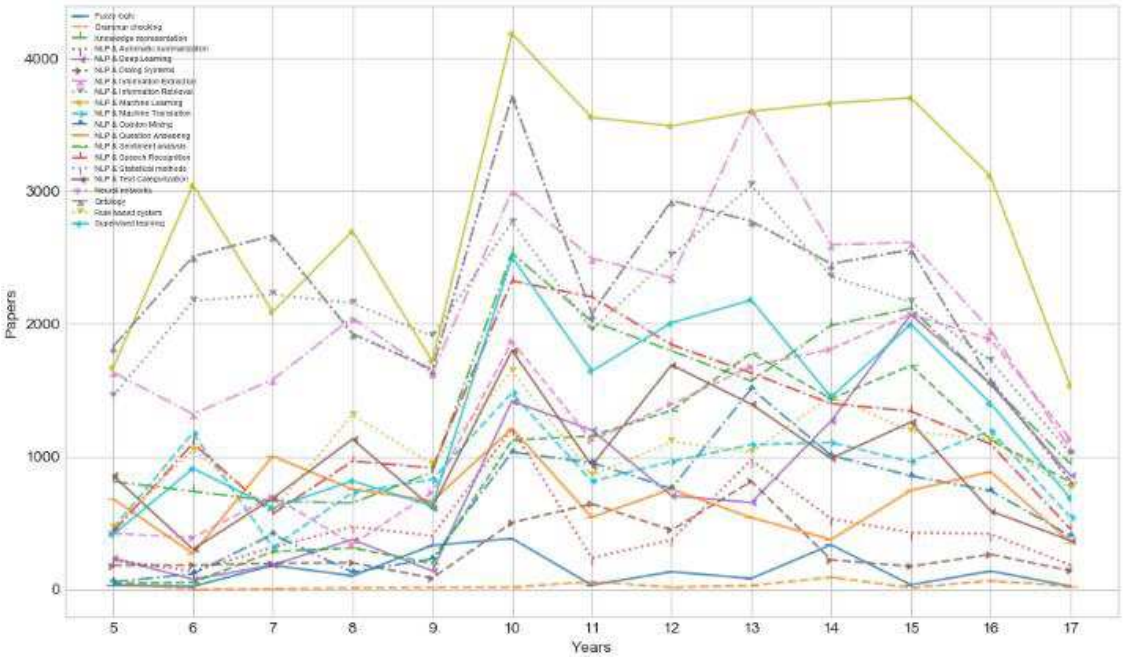

Figure 3 Citations count

It can bee seen from the graph which year's publications were the most citated i.e. most popular.

Next, D1 and D2 indicators are calculated according to the equations (1-2).

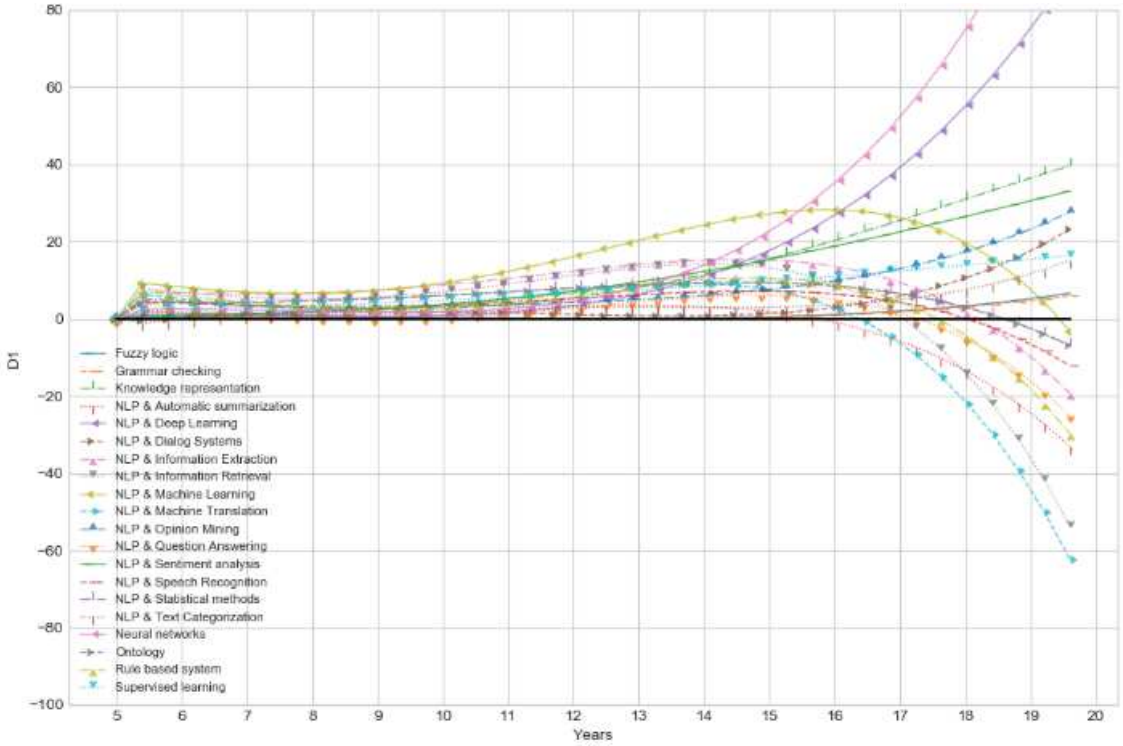

Figure 4 D1 (Speed)

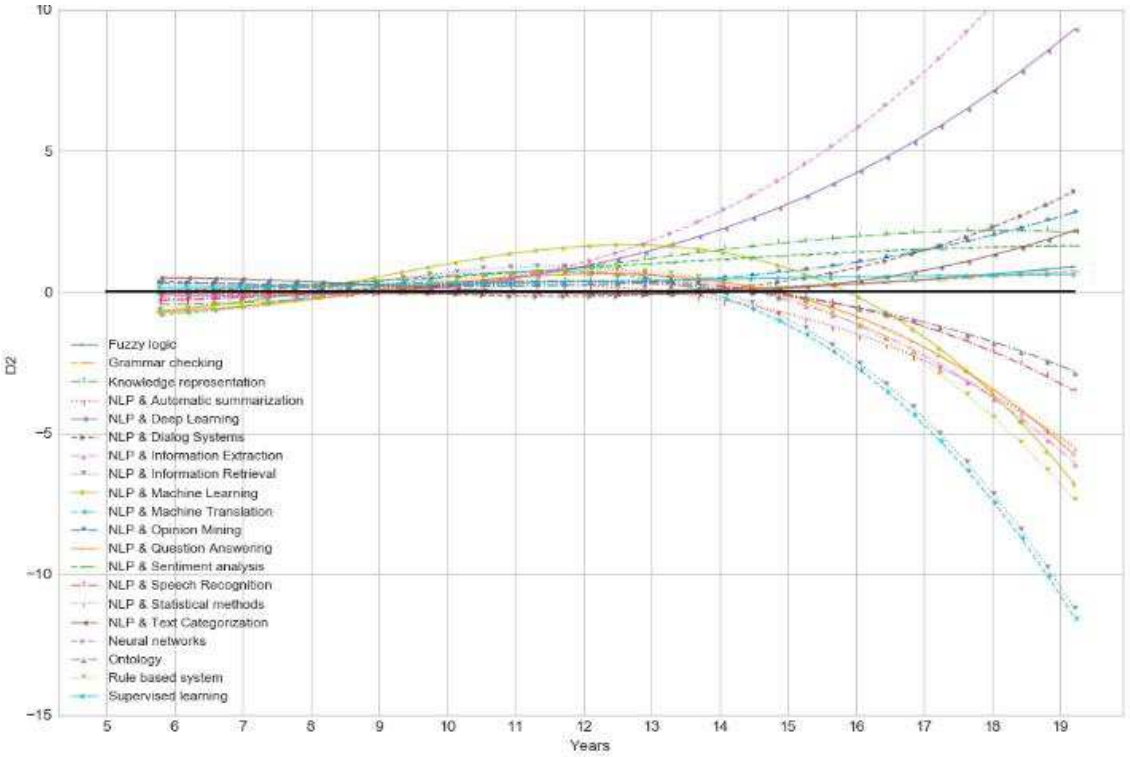

Figure 5D2 (Acceleration)

4 Conclusion

Selecting accurately regression degree and search term coefficients it is possible to analyze and explain growth in publication activity, based on bibliometric indicators, the rate of change of speed D1 and the acceleration of change D2. The positive value of D1 reflects the fact of an increase and D2 characterizes its rate in the growth of publication activity in the field of research. On the other hand, a negative valueindicates a slowdown in publication activity compared to previous periods. According to this indicators we can propose an increasing interest in domains such as NLP&DL, NLP&Opinion Mining, stability of interest in Fuzzy Logic and decrease in NLP &InformationExtraction and Supervised Learning and etc. Such scientometric indicators allows to reveal interest trends in different domains of research from objective point of view.

Acknowledgments

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References

[1] Barakhnin V, Duisenbayeva A, Kozhemyakina O, Yergaliyev Y, Muhamedyev R 2018 The automatic processing of the texts in natural language. Some bibliometric indicators of the current state of this research area Journal of Physics: Conference Series **1117** 012001. 10.1088/1742-6596/1117/1/012001

[2] Muhamedyev R, Aliguliyev R, Shokishalov Z M, Mustakayev R R 2018 New bibliometric indicators for prospectivity estimation of research fields Annals of Library and Information Studies **65** 62-9

[3] Mukhamedyev R I, Kuchin Y, Deni, K, Murzakhmetov S, Symagulov A, Yakunin K 2019 Assessment of the Dynamics of Publication Activity in the Field of Natural Language Processing and Deep Learning In International Conference on Digital Transformation and Global Society 744-53 Springer, Cham.

Development of an automatic registry of errors and queries in a large enterprise

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Abstract

Each company that provides online services is interested in maintaining the quality of these services, because in a competitive environment, customers have the choice to use those services that work faster, better and without interruption. When working with corporate clients, the parties draw up an agreement on the level of service provision, in case of violation of the conditions of which the company providing the service is obliged to compensate for the damage caused.

Keywords: Information technology, information system.

1 Introduction

As a company grows, its corporate IT infrastructure becomes more complex to support and vulnerability, the number of system administrators and support staff grows, so the use of cloud computing is becoming an increasingly popular alternative to its own data center. Of course, the protection of user personal data and the security of company data is one of the main goals of a successful business, but most leaders of cloud service providers guarantee this at the documentary level. It is also possible to create your own corporate cloud environment, access to which will be possible only for company employees.

With the growing popularity of the approach, which consists in dividing a large corporate service into smaller micro-services, the configuration and monitoring of each of them becomes more complicated. To deploy a monolithic application, you only need to create and maintain one launch script, however for each microservice you need to write your own program to create an image, upload it to the server and start the service itself, which greatly complicates the support of the system.

2 General

The development of an automatic registry of errors and requests will ensure the creation of a distributed system for analyzing the quality of services of the corporate IT infrastructure, automatically manage the resources that are provided to the services, create reports for predicting the cost of infrastructure and provide users with the ability to perform analytical queries to the data.

This system should simply and conveniently integrate with all cloud providers and with any companies own IT infrastructure.

To achieve this goal it is necessary:

- consider the advantages and disadvantages of deploying and supporting services in containers, in a virtual environment and on individual company servers;
- to define the concept of "quality of service", to characterize the quality of service;
- give an overview of existing solutions in the field of analysis of quality indicators of cloud IT infrastructure services, an automatic registry of errors and requests;
- develop a system for managing the functionality of IT infrastructure;
- develop a subsystem for collecting service quality indicators;
- create a custom web application for managing and monitoring errors and services in the corporate IT infrastructure.

The first step in developing a system for analyzing service quality indicators is to create a module for monitoring and maintaining them.

Next, it is necessary to calculate the total amount of resources at each point in time on historical data, and then build an analytical model for forecasting these indicators for the future.

Having received the value of the amount of computing resources in the next period of time, you can easily compare it with the total number of reserved resources and get a decision on the need to register new servers to provide resources for all running services.

3 Conclusions

Currently, there are three main competitors on the market offering similar functionality. The main disadvantages of these analogues are that these solutions are created by popular cloud service providers, and therefore the service is integrated with only one cloud service provider.

A system for analyzing the quality of services and an automatic registry of errors and requests is easily integrated into the existing cloud-based corporate IT infrastructure. This system gives users the ability to conveniently access data from a corporate data warehouse, allows you to build and run analytical models, create reports based on historical data and perform interactive data requests.

Upgrading the network infrastructure for an organization

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Abstract

Today almost every enterprise is somehow connected with computers. It's because computer technology facilitates work in various fields and thereby increase the productivity of enterprises. But to get this performance, you need to properly implement its capabilities. For example, to combine computers into a local area network, which will allow combining enterprise divisions and thereby facilitating file sharing between workers, or combining branches of the same enterprise located at a great distance from each other through a VPN channel and thereby enable exchange data between local networks.

Keywords: Information technology, information system.

1 Introduction

The advantage of the local area network is the economic component, because it is possible to share peripheral devices. For example, just connect a printer to a router, configure it as a network, and all users can print documents on it.

Wi-Fi allows you to lay the network in places where it is impossible to do, and also allows you to lay the network without laying the cable, which can in turn reduce the cost of the network.

The purpose of upgrading the network infrastructure for an organization is to make a local network project for the "Information Center" using Cisco equipment and testing, and networking in the CISCO Packet Tracer program.

Using CISCO equipment allows you to get maximum network protection, and also makes the network flexible, through the use of specialized commands that can create VLANs inside the local network, prohibit or provide access to Internet resources.

2 General

A computer network is a communication system between two or more computers. In a broader sense, a computer network is a communication system through a cable or air, computers themselves for various functional purposes, and network equipment.

A computer network is a set of geographically dispersed computers, capable of exchanging messages with each other through a data transmission medium.

The main purpose of a computer network is to provide simple, convenient and reliable user access to shared distributed network resources and organize their collective use with reliable protection against unauthorized access, as well as providing convenient and reliable means of data transfer between network users.

To connect computers to a network, special network equipment and software are required. Beginning with the equipment to the network components, except the actual computers (workstations and servers) there are also cables. A computer network is a communication system between two or more computers. In a broader sense, a computer network is a communication system through a cable or air, the computers themselves for various functional purposes, and network equipment.

To connect computers to a network, special network equipment and software are required. The equipment, network components other than computers themselves (workstations and servers) include cables with structures for their installation and corresponding cable connectors, switches, network cards.

When choosing network equipment, many factors must be taken into account, in particular:

- the level of standardization of equipment and its compatibility with the most common software tools;
- information transfer rate and the possibility of further increase;
- possible network topologies and their combinations (bus, star, ring)
- permitted types of network cable, its maximum length, immunity to interference;
- analysis of the compatibility of the equipment used;
- the cost and technical characteristics of specific hardware.

In the process of upgrading the network infrastructure for the organization, programs such as Microsoft VISIO, EDraw, and CISCO Packet Tracer were used to design the local area network.

The Visio drawing engine is based on a vector editor. That is, in the simple case, without using any more advanced tools, the administrator receiving several graphic primitives (line, curve, rectangle and ellipse), with which he can draw the desired image, paint over its fragments.

EDraw is a great tool for creating and publishing a wide variety of diagrams. EDraw allows users to create UML workflow diagrams, structures, network diagrams, database diagrams and more. The utility can execute the whole range of necessary decisions in only one program.

CISCO Packet Tracer is a data network simulator manufactured by Cisco Systems. Allows you to make workable network models, configure (using Cisco IOS commands) routers and switches, and interact between multiple users (via the cloud). It includes a series of Cisco 1800, 2600, 2800 routers and 2950, 2960, 3560 switches. In addition, there are DHCP, HTTP, TFTP, FTP servers, workstations, various modules for computers and routers, Wi-Fi devices, various cables.

The utility successfully allows you to create even complex network layouts, check for topology operability. Available for free to Cisco Networking Academy Program members.

3 Conclusions

Network design in CISCO packet tracer allowed to design the network in more detail by adjusting the characteristics of workstations, switches, routers, creating virtual networks, and getting detailed information while testing the network using various protocols in the program.

The usage of the word order change algorithm for the identification of emotionally charged texts in Russian

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Abstract

This paper describes the algorithm for the so-called "straightening" of word order, which is used for preprocessing texts with computer analysis methods. "The straightening" improves the quality of the corresponding algorithms. In addition, a sufficiently large Damerau–Levenstein distance between the converted and the source text can be used as a sign of emotional coloring of the text, which is used, for example, to give it the character of political manipulation.

Keywords: automated analysis, "straightening" of word order, Damerau–Levenstein distance, emotional coloring of the texts

1 Introduction

One of the most common figures of speech is the inversion – "violation" of the «natural» word order". However, when we use the algorithms for computer analysis of texts, the sentences with inversion can cause the errors. This applies to both "direct" algorithms, since their creators usually proceed from the "natural" word order, and machine learning algorithms, since the main part of sentences in the average corpus of texts that algorithms are trained on has a "natural" word order.

This paper describes the algorithm for the so-called "straightening" of word order, originally designed to adapt the word order in poetic texts for the purpose to use the popular concept of word2vec for their classification [1], as well as machine learning methods on large-volume text corpuses, such as Syntagrus [2]. Of course, this "straightening" improves the quality of computer analysis algorithms for prose texts.

In addition, the word order is important for determination of the emotional color of a text. Our hypothesis is that the quantitative metric of word order bias can be used as a sign of emotional coloring of the text, applied, for example, to give it the character of political manipulation.

The idea of the method is as follows:

1. To bring the text to the "natural" (grammatical) word order which is inherent to scientific and serious journalistic texts.
2. To encode each sentence with a sequence of characters, where each character corresponds to a word.
3. To encode the original text in the same way.
4. To calculate the Damerau–Lowenstein distance for each pair of character sequences [3, 4].
5. Calculate the median value for the entire text.

To calculate the degree of discrepancy in word order, the Damerau-Levenstein distance was used, and not the classical Levenstein distance, since the original algorithm does not contain a transposition operation, i.e., a permutation of characters, and, based on the implementation of point 1, which will be described later, the source text and received text contain the same lexemes, and thus the operations of insertion, replacement and deletion will simply not appear in the calculation.

2 Model for changing word order

The word order depends on syntactic constructions, which are further referred to as syntactic groups – by analogy with the classical work of N. Chomsky [5]. We propose a modification of the general idea of methods for selecting syntactic groups based on the correction of the responses given by the classifier using machine learning, with a probability below a given threshold using the so- called statistical classifier.

We have considered the following basic models:

1. The multi-layer perceptron.
2. The XGBoost − the most effective implementation of gradient descent.
3. The logistic regression.

To get the best result on a small corpus it was suggested to use the ensembling of these methods together with data preprocessing:

1. The selection which is based on the probability threshold value (in our case, the threshold value was taken to be 0.86).
2. The stacking – the usage of a meta-algorithm over the results of classifiers (in this problem – the logistic regression over the previously specified algorithms).

The calculation results are presented in Table 1.

The table shows that the best results are obtained by the multi-layer perceptron with data preprocessing by selecting a probability threshold value with a statistical classifier.

TABLE 1 Chunking methods comparison

Combination method	Second classifier	Avg	Max	Min
Stacking with Statistic classifier	XGBoost	0.9	0.91	0.89
	MLP	0.91	0.92	0.87
	Logistic regression	0.88	0.89	0.87
Threshold-based combination with statistic classifier	XGBoost	0.91	0.93	0.9
	MLP	0.92	0.94	0.9
	Logistic regression	0.88	0.89	0.87

3 The algorithm of the changes of word order

The "word bag" approach works well for the text classification tasks. This approach assumes that the presence or absence of words matters more than the sequence of words. However, there are problems when we use it: when recognizing entities, identifying parts of speech, and so on, the sequence of words is no less important. The conditional random fields (CRF) come to the rescue here, because they use sequences of words, not just individual words. Below is a formula for CRF, where y is the hidden state (for example, part of speech), and x is the observed variable (in this example, it is an entity or other words around it):

$$p(\mathrm{y}|x) = \frac{1}{Z(x)} \prod_{t=1}^{T} \exp\{\sum_{k=1}^{K} \eta_k f_k(y_t, y_{t-1}, x_t)\}.$$

The CRF model is an undirected graph model that takes into account the words that occur not only before an entity, but also after it. The parser divides text into syntactically related parts of a sentence. The next step is to pre-process training and testing data to extract the attributes that express the characteristics of words (elements) in the data.

We trained the classifier on a standard set of features for selecting syntactic groups. In our case, it all comes down to the problem of multi-class classification, where the objects are the words in sentences, and the target variables are the BIO-tags. The following attributes were selected:

- the morphology of the word-object;
- the morphology of words to the left of the object word;
- the morphology of words to the right of the object word.

The context ±2 was selected, i.e. the morphology of two tokens before and after was considered from the specified word.

It was suggested to use the Python shell for CRFSuite for the task of highlighting of the syntactic groups. The training corpus was automatically converted according to the templates to the CRFsuite format, which in this case is used to get the attributes specified by the template, and then the logistic regression is applied to the feature matrix. This method showed 87 % accuracy in the test sample, and the group found as a whole is considered correctly found, not just individual tags which are found correctly.

The algorithm that allows for the so-called "straightening" of word order is based on the algorithm for text selection of syntactic groups and on the usage of the results of its operation as the input of a recurrent neural network, the experiments were conducted using a neural network with long short-term memory(LSTM) [6] and the CRFSuite utility.

The algorithm demands next preparation steps:

1. Syntax chunker that we describe above training on modified corpus of SynTagRus which contains also a different variants of word order, equivalent to unordered n-grams used in [7] so the word order entropy is taken into account by synthetic data addition.
2. By the pymorphy2 [8] module usage, the morphological analysis is performing and corresponds each word with its syntax features and sends it to input of recurrent neural network.

The steps of the algorithm:

1. A recurrent neural network works as a classifier that matches each group and its context (a window in 2 groups before and after) with an offset from -2 to 2, which corresponds to where the word needs to be shifted. A value of 0 means that the word is in its proper place.
2. A Python script takes probabilities into account and dynamically rearranges the syntactic groups.
3. A neural network of similar topology also classifies the words within groups by displacement class, based on their morphological properties.
4. A Python script, taking probabilities into account, dynamically rearranges words by analogy with syntactic groups.

As two examples of texts for testing the algorithm from the site https://tengrinews.kz/ two rexts were chosen which are deliberately colored emotionally, since it operates on the resonant topic of AIDS, and deliberately unemotional about the assignment of titles to the highest leaders of the Kazakhstan national security committee. The calculations using the algorithm showed that the Damerau-Levenstein distance for the first example is 6, for the second example is 0.

4 Conclusions

This paper describes the algorithm for the so-called "straightening" of word order, which is used for preprocessing texts with computer analysis methods. "The straightening" improves the quality of the corresponding algorithms. In addition, a sufficiently large Damerau–Levenstein distance between the converted and the source text can be used as a sign of emotional coloring of the text, which is used, for example, to give it the character of political manipulation.

Acknowledgments

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References

[1] Mikolov T, Chen K, Corrado G, Dean J 2013 Distributed representations of words and phrases and their compositionality Advances in neural information processing systems 3111-19
[2] Dyachenko P, Iomlin J, Lazurskiy A, Mityushin L, Podlesskaya O, Sizov V 2015 The current state of the deeply annotated corpus of texts of the Russian language (SynTagRus)
[3] Дяченко П, Иомдин Л, Лазурский А, Митюшин Л, Подлесская О, Сизов В 2015 Современное состояние глубоко аннотированного корпуса текстов русского языка (СинTarРус) Proceedings of the Institute of Russian language. Named after V. V. Vinogradov (6) 272-300 (in Russian)
[4] Damerau F 1964 A technique for computer detection and correction of spelling errors Communications of the ACM **7**(3) 171-6
[5] Levenstein V 1965 The binary codes with the correction of drops, inserts and substitutions of characters Reports of the Academy of Sciences of the USSR *Доклады Академии наук СССР* **163**(4) 845-8 (in Russian)
[6] Chomsky N 2014 The minimalist program MIT press
[7] Hochreiter S, Schmidhuber J 1997 Long short-term memory Neural Computation journal **9**(8) 1735-80
[8] Barakhnin V, Kozhemyakina O, Pastushkov I 2017 Automated determination of the type of genre and stylistic coloring of Russian texts ITM Web of Conferences https://doi.org/10.1051/
[9] itmconf/20171002001
[10] Korobov M 2015 Morphological analyzer and generator for Russian and Ukrainian languages International Conference on Analysis of Images, Social Networks and Texts 320-32

SEO - Oriented Bulk WEB Parser

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Abstract

Today, online translators have gained their popularity, including thanks to the rich choice of languages - despite the fact that people over time are becoming more educated, and learn more languages, to have at an important moment from a professional or household point of view, an application capable of translating a few lines into the desired language in two clicks. Even English, the most widely spoken language in the world, sometimes requires such programs. The reason that translators are mostly created as online resources is that they have sophisticated word gluing algorithms to translate complete sentences, and have an extensive database that, in the years when translators first appeared, was simply impossible for the average person to store because of too little physical memory of the speakers. Since then, online translators are still popular, as the Internet is used by most people in the world, which means that a translator will always be conveniently available for use. Also, translators are popular in professional environments - including SEO. SEO - this is the direction, or rather the process of placing sites in the top of search engines to gain popularity.

Keywords: SEO structure, Translator, Parser, WEB development

1 Object of study

The object of the study was a resource capable of optimizing translation systems to simplify thematic tasks in SEO structures, in particular, to translate multiple texts at a time. One of the ways to promote the site and output to the top search engines is to create a grid of sites aimed at disseminating information about the project. One of the stages of creating such sites is filling it with authentic content, as it directly affects its effectiveness. Also, along with authenticity, it is necessary to monitor the constructive component of the content, despite its relevance to the topic. There are several ways to search for content for such purposes, one of which is to search for sites that fill the relevant topics in another language. This method is one of the most effective, as translated texts are more likely to be unique to search engines, thus increasing their relevance. This means that it makes sense to deal with its practicality for quick implementation.

2 Subject of study

This project is focused on the processing of found content on sites, in particular translation and layout in a convenient format for easy processing and export to the necessary services for further processing. The package translator is aimed at managers - specialists involved in creating meshes and filling sites with content, it simplifies the work on translation. Under normal conditions, each article required for the project should be translated individually and additionally checked for syntax errors. This project will accelerate this process during the translation phase. It will be possible to translate several articles at once by inserting several links into the field and all articles from the list will be translated. You can also choose a tariff - Google translator or Deepl - each of them has its advantages and disadvantages. The translated articles will be conveniently collected in archive from where it will be possible to check up on uniqueness and to take in Google Docs for the further check on syntactic errors, and also publications on the domain by means of CMS chosen by the user. Content on sites is located in HTML layout format - the page elements themselves are located in tags. The main tags in which the necessary materials are located - the tag "<p>" - in other words, "paragraph", as well as tag headings "<H1> - <H5>", they are all located in a peculiar hierarchy. The project has parser properties - the script will pull the text out of the specified page and translate it in the translator, depending on which one you choose, and you will get the translated text. Texts in the archive, each text will be saved in a ".docx" document.

3 Project counterparts and their comparison

Advantages of search engines over the project:

ADVANTAGES					
My project	**Google translate**	**deftpdf.com**	**radugaslov.ru**	**deepl.com**	**onlinedoctranslator.com**
Translation of text on web resources	Many languages	Translates files, "docx", or "pdf".	Reverse translation	Better translation quality	Translates all basic formats of Microsoft Word
Several translation databases	Voicing translation	Allows saving files in your online account for future use	Voicing translation	PC Application	
Easy choice of text structure	Offline application				

Disadvantages of the search engine counterparts on the project:

DISADVANTAGES					
My project	**Google translate**	**deftpdf.com**	**radugaslov.ru**	**deepl.com**	**onlinedoctranslator.com**
Unsuitable for translations of several words or sentences. Not suitable for offline document translation	Machine translation	Unsuitable for translations of several words or sentences.	Few translation languages available	Few translation languages available	Unsuitable for translations of several words or sentences.

4 Conclusion

This development will allow to use translation more effectively in the professional field - SEO, thanks to which it will be possible to quickly implement the tasks associated with the translation of texts.

Test automation of web-applications developed on Sitecore Content Management System

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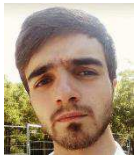

Abstract

Currently, software test automation is developing rapidly, since it becomes more and more important for businesses to know exactly whether the application's concrete version is of high quality to deliver it to the end users. Content management system (CMS) is used as a basic technology on large projects, since it provides an ability to set up appropriate content for different web-site versions fast. As a result, it is important to optimize the testing process of a software product developed based on the Sitecore CMS in order to accelerate testing, exclude human factors, release human resources and increase test coverage.

Keywords: test automation, content management system, test automation tools

1 Introduction

The type and size of a project are a few amongst the most important criterions used to select technologies for development and testing of web sites. Moreover, the project's difficulty, development speed, specialists hiring costs, existence of available tools for development, agility of applied solutions, project's development tendencies, detailed documentation creation, application support costs, ability to run application on different platforms, or to integrate with other solutions etc. are also considered as significant influences on technologies selection.

Nowadays, the use of frameworks (existing environments for developers with debugged and tested templates and tools) and CMS designed to organize websites, other information resources on the Internet, or individual computer networks are powerful testing tools for created websites. In general, CMS is used as a ready-made solution where a content manager only should customize the content, but based on the framework, anyone can create an own CMS for the specific business need of the project. One of such systems is Sitecore CMS. Sitecore CMS uses the ASP.NET platform and runs IIS (Internet Information Services), which opens many opportunities for web application development and testing [2].

2 Overview

The work addresses the issues of optimizing web site testing processes using test automation frameworks and Sitecore CMS tools. In its turn, the main question covered in the paper are connected with determination of the most appropriate tools needed for development of flexible and fast framework with automated scripts that will have to test and specify the quality of the end product continuously.

3 Decision

According to the selected technologies, there was conducted an analysis of the most effective testing tools. C# programming language, Visual Studio 2017 development tool, Selenium Web Driver as UI tool, SpecFlow BDD tool, Sitecore API library were tools and programming language were selected to create the test framework for feature capabilities testing with the participation of content manager.

The test framework architecture developed after the issue analysis contains the following modules and layers:

- Core is the framework module specifies web driver configuration, web driver and web element extensions, various configuration classes, custom wrapper classes over waiters, etc.;
- SpecFlow Tests is a test layer that contains the '.feature' files and the implementation steps for them;
- Test Model is a framework module that consists of several layers. The first one is a Page Object layer that helps to encapsulate the work of individual page elements, reduces the size of the code written and makes it easy to maintain it (if, for example, the design of one of the pages is rewritten, only the relevant class describing this page should be changed). The second one is a Page Fragment layer that contains classes describing the components placed on pages;
- Service module contains classes responsible for interacting with page elements, as well as classes that are responsible for assertions. This layer maps business logic with pages, and page components described in Test Model. Therefore, such an approach makes it easier to map steps described as humanized phrases with test methods written as code in programming language;

- Sitecore layer is responsible for interacting with the Sitecore API, which is required to test the correctness of an application's content-side functionality.

To optimize the process of continuous testing, the concept of continuous integration and delivery (CI/CD) is implemented as a conveyor, which allows running different types of tests at each stage (integration aspect) and finish it with code deployment to the actual product, which end users receive (delivery part) [3]. At the same time, a dedicated CI server organizes a service that includes obtaining a code from the repository, project drafting, tests run, finished project deployment to the test environment, and reports generating and sending. Jenkins Open Source Continuous Integration tool was selected to configure CI/CD processes, supporting real-time code testing and individual changes to the codebase reporting.

4 Conclusion

Test automation is an integral part of testing constantly developing and delivering web-applications based on content management systems such as Sitecore.

In its turn, it is very important to select the correct tools to conduct fast and productive testing of a particular version of the application.

Visual Studio 2017, C# programming language, Selenium Web Driver, SpecFlow, and Sitecore API library are the most suitable tools that can help to build architecture of test automation framework and develop fast and stable test scripts.

References

[1] Concepts, Structure and Variety of Websites. Automated Development of Websites http://www.ndu.edu.ua/liceum/web.pdf
[2] Sitecore Content Authoring https://doc.sitecore.com/users/92/sitecore-experience-platform/en/content-authoring.html
[3] Reminniy O 2013 Automated Functional Testing Patterns of User Interfaces

Fraud detection approaches in ecommerce

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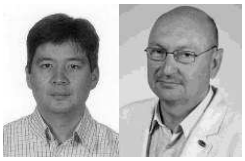

Abstract

Ecommerce industry has grown rapidly in last decades and it is still developing. Companies provide online services and products for customers. Cardholders can make purchases without need to be present at the point of sale. This characteristic of ecommerce is used by fraudsters to perform unauthorized transactions. Despite the fact that a lot of research is done in the area of fraud detection and many methods implemented the fraud is still a big threat. In the paper we analyse the current situation in this field and provide ideas for further improvements.

Keywords: ecommerce, fraud detection, machine learning

1 Introduction

Ecommerce transactions can be made online without presence of cardholder and card itself (CNP – card not present). There are methods for proving the identity such as user authentication, accepting electronically scanned documents or contacting with clients by phone. These methods are used by companies but have drawbacks that out of scope of this paper. Another approach is to use fraud detection (or fraud monitoring) system to recognize the abnormal transaction.

2 Overview

Fraud detection system is a component of online payment service that participate in the process of financial transaction. As an input this component has a data related to transaction such as amount, location, card number (also called pan) etc.

After processing the fraud detection system marks the transaction with the status: good, bad or suspicious. In case of a good status the payment system accepts the payment, in case of bad status the transaction is rejected and in case of suspicious status the transaction is hold until resolving (Figure 1) [1]. The process of resolving is time consuming as done usually manually by fraud specialists.

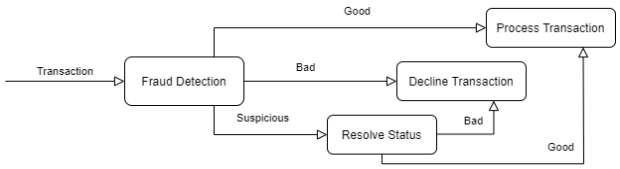

Figure 1 Fraud detection component

3 Rule-based approach

First fraud detection systems used rule-based approach. Earlier implementations were based on explicit constraints (also called limits) that represent different types of rules (generally with weights). Examples of such rules are white/black list, limits for amount, number of transactions etc.

Rule-based approach later was evolved in using of machine learning algorithms that can build rules in internal structure. The "state of the art" is using algorithms based on tree [2]. The rule-based approach is a popular solution. It is easy to understand and implement. In addition, it has a great performance.

The main problem with this approach is accuracy and lack of adaptation to changes in transaction environment. In case of rule-based approach we usually have a significant number of true negative results what means we reject many "good" transactions.

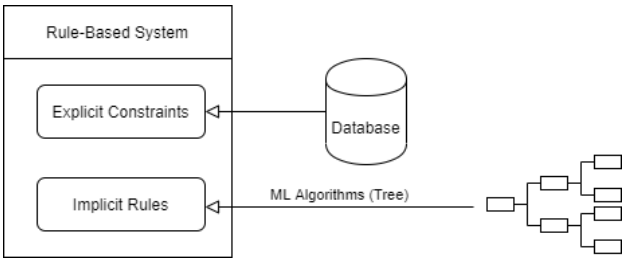

Figure 2 Rule-based approach

4 Pattern recognition

As next step of evolution the fraud detection systems start using pattern recognition approach. First, they used different statistical methods [3].

Nowadays, the behavior analysis is the winner. Best fit

for this approach is using a deep learning (Figure 3) [4]. The main issue of this approach is that financial system cannot trust deep learning algorithms as there is no clear information how the system come up with the result.

In the end, the payment system can recognize only two statuses from pattern recognition system: either good and suspicious or bad and suspicious (it depends on configuration of accuracy of machine learning algorithm).

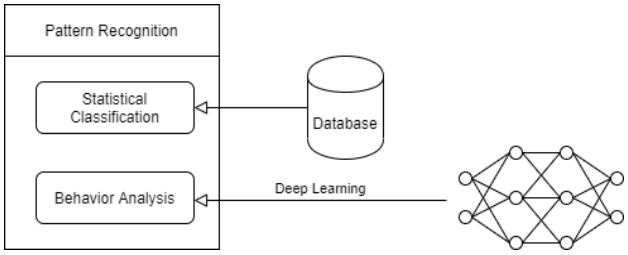

Figure 3 Pattern recognition approach

5 Addressing issues

A lot of research done by science community to deliver better solutions and address existing issues of rule-based and pattern recognition approaches [5]. The goal is to configure system in a way when it gives the best balance between accepting good transactions and declining bad transactions.

One of the approaches is to use algorithms based on cost (including cost of financial damage, cost of transaction processing, cost of missed client loyalty etc.) [6]. Another approach is to use probabilistic algorithms to cut the number of suspicious transactions [7]. Finally, we can represent the fraud detection system as a combination of three layers: rule-based, pattern recognition and filtering components (Figure 4).

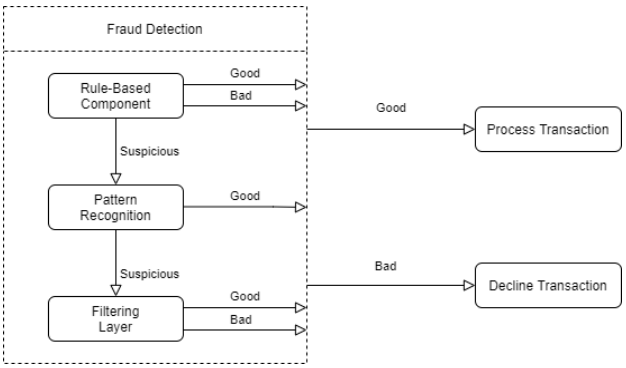

Figure 4 Fraud detection system components

6 Conclusion

We plan to analyse methods to decrease the number of transactions with suspicious status. The main idea is to use pattern recognition layer as a maximizer function for bas transactions (high recall) and filtering layer as reducer of suspicious transactions. One of the approaches is to use explainable AI approach [8, 9].

References

[4] Delamaire L, Abdou H, Pointon J 2009 Credit card fraud and detection techniques: a review Banks and Bank Systems **4**(2) 57-68
[5] Save P, Tiwarekar P, Ketan N, Mahyavanshi N 2017 A Novel Idea for Credit Card Fraud Detection using Decision Tree International Journal of Computer Applications. **161** 6-9
[6] Bolton R J, Hand D J 2002 Statistical Fraud Detection: A Review. Statist. Sci. **17**(3) 235-55
[7] Patidar R, Sharma L 2011 Credit card fraud detection using neural network International Journal of Soft Computing and Engineering (IJSCE) **1** 32-8
[8] Samaneh S, Zojaji Z, Ebrahimi Atani R, Monadjemi A 2016 A Survey of Credit Card Fraud Detection Techniques: Data and Technique Oriented Perspective
[9] Chan P, Stolfo S 1998 Toward Scalable Learning with Non-uniform Class and Cost Distributions: A Case Study in Credit Card Fraud Detection
[10] Falaki S, Alese B, Adewale O, Ayeni J, Aderounmu G, W O I 2015 Probabilistic Credit Card Fraud Detection System in Online Transactions International Journal of Software Engineering and its Applications **6**
[11] Farbmacher H, Loew L, Spindler M 2019 An Explainable Attention Network for Fraud Detection in Claims Management Technical Report, University of Hamburg
[12] Nguyen Q, Wai L, Divakaran D M, Low K, Chan M 2019 GEE: A Gradient-based Explainable Variational Autoencoder for Network Anomaly Detection 10.1109

Application for forecasting sport events

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Abstract

Human needs to be always up to date bring information technology to a direct line for the creation of new devices and gadgets. The inconvenience of operating computers and laptops leads to the appearance of various mini-computers, smartphones and communicators, which are based on the same operating system. The leading positions today are occupied by the Android and iOS platforms. But these platforms can work fully only under one condition - if mobile applications have been developed for them.

Nowadays, sport has become an integral part of our lives. Moreover, each of us may have a different attitude to sports: someone prefers to watch it on TV, someone is involved in some kind of sport or general physical training, but someone prefers to bet.

1 Introduction

Sports betting is the most popular form of gambling. It occupies 40% of the gambling market. According to the Statista portal, every resident of the United States over 18 at least once bet on sports. People bet among themselves since ancient times. In ancient Greece, spectators bet on the outcome of the Olympic Games, in ancient Rome - on the victory of gladiators and charioteers. There were no bookmakers then: the audience made a bet directly. Currently, betting is possible even with mobile phones. Sports betting is a gambling and rather exciting occupation; beginners in this business often start on their own: first bets, first wins and first defeats. The whole process resembles an exciting game, but with a risk, stay in the black or lose everything.

The purpose of this thesis is to develop software for the iOS / Android platform an information application for displaying the forecast of sporting events.

Tasks: to study and improve knowledge in the development of applications for mobile devices, as well as to develop the above program. Get familiar with multi-threaded applications and platform features.

The subject of development is software methods and development methods for predicting sports events.

The design of the necessary software product must be organized with support for adaptive design to correctly display all the functionality on various devices of the iOS/Android platform and with support for the minimum available update.

Development Tasks:

- study of the subject area of sports forecasts;
- study of existing software solutions in this area;
- formation of the problem statement;
- analysis of the requirements for the sports forecasting software system;
- software system design;
- software implementation of a sports forecasting system;
- testing of the developed sports forecast system.

2 Overview

Analysis of a sporting event is a comprehensive work on the analysis of all available statistical and news data related directly or indirectly to this event.

The merit of sports predictions. On most sites involved in such activities, sports forecasts come out every day. This allows them a huge selection daily. In addition, each forecast is supported by analytical calculations confirming this point of view. All users can view forecast statistics. On its basis, you can verify the quality of the forecast of any specialist.

Disadvantages of sports forecasts. Forecasts for sports are not reliable. No one can give one hundred percent prediction as the competition in modern sports is at the highest level. This is precisely the main drawback. It is worth noting the fact that for some people this process can be addictive, so you should approach this activity wisely. Features of the subject area is to provide the user with the opportunity, in real time, to track sporting events, to receive forecasts for these events (Football, UFC).

The application should solve the following problems:

- Alerting the user about upcoming sporting events;
- display of full information about events;
- display of the results of all forecasts;
- provide predictions to the user for upcoming matches;
- provide the user with a personal account and its history of selected forecasts;

3 Decision

During the analysis of analogues, the following requirements were identified:

- The application must have adaptation for different

mobile versions of the iOS / Android platform;
- The application should show and update forecasts in real time;
- The application should be accessible with the introduction of the minimum necessary set of information;
- The application should have a convenient and intuitive interface and design that ensures comfortable work with the application.

The application will predict using a special algorithm that will predict instead of cappers.

4 Conclusion

When writing a graduation project, the main problem of the software product being developed was identified, the goals and objectives of development, the subject and object of development were formed. To understand the developed product, information about this area of its advantages and disadvantages was displayed. 2 analogues of the future software product were reviewed, their pros and cons were agreed upon, then development goals were set, and a new, intuitive interface and design was designed to ensure comfortable work with the application.

References

[13] What are sports predictions? E-source: https://www.finanbi.ru/prognozy-na-sport-931

[14] History of bets for sport. E source: https://forklog.com/sp/betting/

Electronic journal of student performance in the discipline

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Abstract

Today, there are many interesting and exciting things in the world. Starting from incredible natural phenomena, ending with artificially created, created by human. The modern world is a manifestation of the human mind and intelligence. In order to reach today's standard of living in terms of comfort and technological development, humanity had to learn. It is no secret that teaching is one of the fundamental foundations of life. I can say with certainty that if it weren't for the ancient Greek schools and stuff, we would probably not know by now what a computer, a smart phone, the Internet and much more are. Every year, the education system around the world is developing. New teaching methods are being introduced. The learning process is closely intertwined with various gadgets to facilitate learning. Particularly popular now is distance learning, when a person is physically unable to attend a lesson at school or university. In such circumstances, it is very important to control the success of one or another student's studies, because without a clear understanding of how the students are studying, the learning will not be effective. This work will solve the main problems with monitoring student learning.

1 Introduction

An electronic journal as a monitoring tool is quite useful. Until recently, paper journal were used in the world, which had considerable drawbacks [1].

The following disadvantages include:

- Paper is easily spoiled (burning, whether it can be spoiled by moisture).
- What is written on paper is not easy to correct wrongly.
- Teacher should always carry a paper journal; the problem is that there can be many students (different classes, groups, streams).
- The disadvantage is that backing up such storage media takes a lot of time.

Advantages include the use of a paper Journal is a physical method of storing information, and in the case of complete absence of electricity, or the Internet from it you can get information, I think. But in today's world, there's a great alternative recently, it's an e-journal. If all educational institutions of the world switch to the electronic form of keeping record of student learning success, this would not only simplify the work of the teachers but also help to optimize their work.

Advantages of e-journals:

- All data is stored in a database that simplifies the storage and backup process.
- Data can be accessed from anywhere in the world and any device that has a browser and an Internet connection.
- Data is easy to correct in case of incorrect data entry.
- Students can easily find out about their grades.

The disadvantages are that in the absence of electricity (if accessed from a computer) or absence of Internet connection, access to the data will not be possible.

2 Overview

The features of the subject area are to create a web application (or site) through which students will be able to view the grades that they receive for certain subjects. There is also a need for teachers to be able to enter and edit data in the database.

The implementation of such an electronic journal should solve the following problems:

- Make it easier for students to get information about their grades.
- To provide teachers with a convenient tool for work, to simplify their work.
- Provide educational institutions with a tool to help them dispense with paper.

But it will not do without the minuses in this subject area. The fact is that in order to give the opportunity to use the electronic journal to other educational institutions, I will have to rent a server and create a complex database system, so that all the information is organized by each educational institution. This, in turn, complicates the process of registering teachers in the system, as one teacher can work in several educational institutions. Therefore, in order to avoid these difficulties and to simplify the development process, I made the decision to put my work (application, site, program code) into free access on GitHub. That way, everyone can take advantage of this e-journal and customize it for themselves, and maybe even improve it.

3 Decision

During the analysis of analogues, the following requirements were identified:

- must have a user-friendly interface (adaptation of the interface for PCs and mobile devices if possible)

- data storage must be reliable
- there must be a user logon system

4 Conclusion

When writing the first part of the graduation project, the problems of the developed software product were determined, the development goals, the subject and the object of development were formed. To understand the developed product, information about this area of its advantages and disadvantages was displayed.

Development goals were set in order to form the functionality of an optimal project that would have fewer disadvantages and more advantages.

References

[1] E-journal - Wikipedia https://en.wikipedia.org/wiki/Electronic_journal

Development of an online store selling books

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Abstract

With the advent of the Internet in Ukraine and the world, development has begun in the field of electronic business and online commerce. Today it is possible to buy almost all goods and services on the Internet. The most popular sites are online stores and online trading platforms. Market placements are quite widespread around the world. Many large networks and small firms strive to conquer the market, get additional profit using this opportunity. Therefore, the idea of an online store for selling books is of great practical importance.

Keywords: Information technology, information system, web site.

1 Introduction

Today it is possible to use a large number of tools and technologies to implement an online store. In particular, acceptable means of implementation are such programming languages as JavaScript, PHP, Java, Python, HTML, and various combinations of these languages.

The stages of creating an online store design should be divided into the following:

1) statement of the problem;
2) creating a site structure;
3) creating a sketch of web pages;
4) layout of web pages;
5) integration of the finished design.

An important design element is color. To select the right color, color harmonies are usually used, representing specially selected colors that combine perfectly with each other. However, individual selection of colors is possible according to the design project. For the online bookstore, colors have been selected that are associated with books. Such associations will cause the users of the online store positive emotions and a desire to purchase any book.

2 General

Today, the choice of IT solutions is a very important and complex process, in which it is necessary to rely on knowledge in the field of information technology and the power of software computers.

The first thing you need to create an online store website is to select a CMS.

CMS is understood as an information system or computer program for providing and organizing a joint process of creating, editing and managing content (content) [2].

The main functions of the CMS include:

- providing tools for creating content, organizing collaboration on content;
- content management: storage, version control, adherence to access mode, document flow control;
- publishing content;
- presentation of information in a form convenient for navigation, search [3]

The web menu is one of the most important functional parts of the site. It should consist of a structured set of links to site pages, and each link should display a menu item.

For the user, the menu is a navigation tool, so it should be well structured. Consist of simple and understandable item names.

The site menu needs to be developed in accordance with the concept of usability. Namely, the simplicity and usability of the site.

It must be borne in mind that due to the large assortment of the store, both men and women are buyers.

In the assortment of the store there are goods of such categories as: books, magazines, collections of articles, printed materials.

Based on this, under these items it is necessary to provide a submenu. A submenu should consist of items dividing products into categories. Separately, it is necessary to implement the items new products and goods at a discount.

Many people are not sure about online purchases and they have a lot of questions. So that the client is completely confident in the choice, it is advisable to develop an additional menu. It will contain links to informative pages with answers to frequently asked questions on the network when making purchases in online stores. It must display basic information about delivery, customer reviews, quality of goods, warranties available in the store, types and methods of payment.

Further, the organization of the sale of books and book products through an online store was decomposed into the following blocks:

- viewing the site;
- product search;
- view product information;
- adding goods to the basket;
- placing an order;
- receipt and payment of goods.

Then the checkout process was decomposed into the following processes:

- check the basket;
- indicate contact details;
- send an order;
- confirm the application.

3 Conclusions

Currently, the Internet has become one of the main tools for doing business. The lack of geographical barriers to advertising their products and services and their distribution, attracts new businesses to the Internet business. At the same time, Internet business remains a relatively new phenomenon

for Ukrainian entrepreneurs, and extensive foreign experience cannot always be successfully applied in Ukraine.

Soon we will have the opportunity to make all purchases without getting up off the couch, and this will help online commerce. In the near future, all areas of trade and services will be implemented through such web projects as market place.

References

[1] High Availability and Failover Systems http://wm-help.net/books-online/book/54998/54998-4.html
[2] Martin J 2014 Planning the development of automated systems M.: Finance and statistics 253
[3] Mazurkevich A, Elova D 2014 PHP: a p*rogrammer's handbook* Moscow 187

Credit scoring using machine learning algorithms

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Abstract

Credit scoring it is a way to predict borrower's behavior or future possibility of delay using input and historical information. It affects government's economy, thus financial companies should give loans only to responsible and solvent a part of population. Every financial institution has its own scorecard models. Usually, those models are based on logistic regression and decision tree, because of their simple interpretability. Since the data volume grows, variety and types of modern predictive methods develop the possibility of increasing the predictive power of models is growing too. This thesis is going to be about process of building qualitative model and modern optimization methods.

Keywords: Scorecard; Credit; Machine learning.

1 Introduction

Recently, consumer spending has become one of the key factors in macroeconomic conditions worldwide. Therefore, it is important to focus on credit scoring in order to better predict consumer behavior.

Credit scoring is a method that helps to decide whether to provide loans to consumers, it is a probability of person's debt repay in a timely manner, based on person's credit history. People are considered financially reliable when their score is higher. Credit scoring eliminates the human factor and uses only reliable data.

There are two main problems in credit scoring: giving a loan to a bad borrower and refusing to a good one. However, there are many ways to accomplish this problem, and some of them are more effective than others.

Advanced statistical and mathematical methods provide fast and automatic tools that help to make effective decisions. Models based on machine learning algorithms and artificial intelligence are believed to be more effective to support approval process in finance companies. The combination of machine learning methods can make a big contribution to the lending system and will be much more complicated in terms of use. Because machine learning forecasts are more adaptive and flexible to change, they can produce more accurate results. Therefore, the purpose of this thesis is to identify the most reliable and effective method.

2 Methods

The dataset consist of data from personal information, credit bureau, transactions and so on. Because of consumer privacy protection laws, all individual identification data were encrypted. The aim of any machine-learning model is the identification of statistically reliable relationships between input data features and the target variable. The target variable is a binary value, indicating whether an account is delinquent by 90 days or more within 12 months.

The dataset was preprocessed before the final feature selection using several classical methods like Chi-squared, Information Gain and new methods such as Lime/Shad (understanding of parameter's influence on model prediction), PCA (reducing data dimension). The selected features contain information about type of job, experience, number of credits, incomes & expenses, age, and marital status and so on.

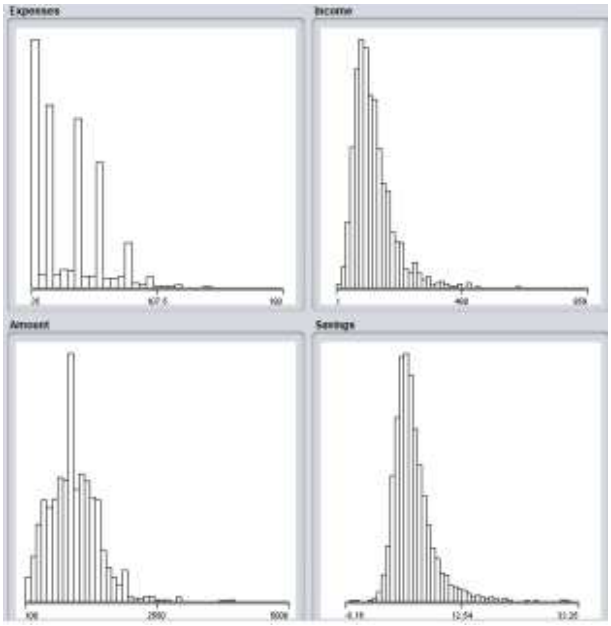


Figure 1 Example of features' distribution

Then data was trained and tested with multiple number of supervised machine learning models, such as Logistic Regression, Decision Tree, Random Forest, Naïve Bayes,

XGBoost, Support Vector Machine. Cross-validation technique was performed and parameters of algorithms were correctly tuned for models' better work. The performance was evaluated using several performance measurements such as accuracy, AUC-score, ROC-curve, Gini, confusion matrix, recall, precision, F-score.

3 Results

The result of the research should propose the best model to predict Credit Defaults.

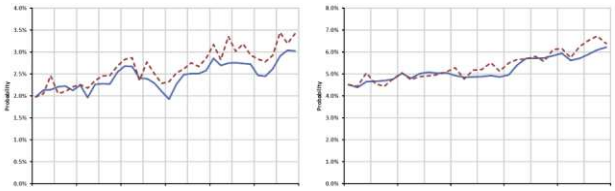
Models were compared by several metrics and after all of the comparisons was selected the best model.

There are given main metrics' results:

Accuracy: XGBoost – 81,2%, SVM – 77%, Random Forest – 75%, Logistic Regression – 74.6%,Naïve Bayes - 69% and Decision Tree - 70%.

AUC: XGBoost – 0.854, SVM – 0.751, Random Forest – 0.774, Logistic Regression – 0.698, Naïve Bayes – 0.685 and Decision Tree – 0.704.

F-score: XGBoost – 87,2%, SVM – 86.3%, Random Forest – 84.9%, Logistic Regression – 82%,Naïve Bayes 76% and Decision Tree - 80%.



SVM XGBoost

Figure 2 Comparing prediction and fact of target

4 Conclusion

XGBoost and SVM have shown the best results comparing with such a popular machine learning models used in credit scoring as Decision tree and Logistic Regression. Applying such methods as preprocessing dataset to avoid imbalance (and as a consequence incorrect result of the models), new optimizing methods in feature selection (reducing over-fitting, improving accuracy, reducing training time) helped to achieve such a good results, when most of the models have a high values of metrics.

From risk management perspective, the aggregation of machine-learning forecasts may have much to contribute to the management of systemic risk.

References

[1] Stein R M 2005 The relationship between default prediction and lending profits: Integrating ROC analysis and loan pricing Journal of Banking & Finance
[2] Baesens B, Gestel T V, Viaene S, Stepanova M, Suykens J, Vanthienen J 2003 Benchmarking state-of-the-art classification algorithms for credit scoring
[3] Hand D, Henley W 1997 Statistical classification methods in consumer credit scoring: A review Journal of the Royal Statistical Society
[4] Galindo J, Tamayo P 2000 Credit risk assessment using statistical and machine learning: Basic methodology and risk modeling applications
[5] Anne Kraus 2014 Recent Methods from Statistics and Machine Learning for Credit Scoring
[6] Foster D, Stine R 2004 Variable selection in data mining: Building a predictive model for bankruptcy
[7] Loh W-Y Fifty Years of Classification and Regression Trees

Digital pseudo random pulse train hardware generator

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Abstract

This paper considers expanding the functionality of the digital noise generator by increasing the number of pseudo-random pulses generated by a generator based on a linear shift register feedback and the creation of a digital generator of a chaotic signal, which, unlike the prototype has a truly random output within the period of 4 * ($2^N - 1$), with a schematic simplicity and a relatively small number of additional logical elements.

Keywords: the Digital generator of pseudorandom pulse string, shift register from a linear feed-back, logical element of XOR, filter of lower frequencies the second order

1 Introduction

For digital noise sources, "digital" noise is a temporary random process that is similar in its properties to the process of physical noise and called a "pseudo-random process". The digital sequence of binary symbols generated by digital noise generator is a sequence of rectangular pulses of pseudo-random duration of pseudo-random intervals between them. The repetition period of the entire sequence significantly exceeds the maximum interval between pulses. A pseudo-random digital sequence of the maximum "length" - M-sequence that has the maximum repetition period is usually formed based on the shift register covered by the linear feedback (eng.Linear feedback shift register, LFSR), in the general case of multi-loop [1]. In this case, each loop (in the feedback chain) of the shift register, consisting of sequentially connected triggers, uses binary adders' modulo2 (logical elements of the XOR. - «exclusive OR»). An LFSR shift register with a certain number of digits can synthesize several types of pseudo-random digital pulse sequences. The repetition period of pseudo-random pulse sequences generated by the LFSR shift register depends on the selected bits for the register feedback [1-4]. By combining options of including XOR logic elements in the feedback loop, you can obtain pulse sequences in different periods and structures.

The maximum period of the generated sequence of the shift register LFSR of bit (length) N is defined as $2^N - 1$. Hence, to achieve an acceptable period of repetition of a pseudo-random sequence of pulses, it is necessary to increase the number of bits of the shift register N [2, 5, 6].

2 Methods

Based on the LFSR shift register, we propose a scheme for a digital generator of a pseudo-random pulse sequence that can be used to create cryptographic encryption algorithms [7, 8]. The scheme for a pseudo-random sequence digital generator based on a shift register LFSR of length N (N = 5) with linear feedbacks and based on a primitive three-term $x^5 + x^3 = 1$, has the ability to increase the period of generated data, pseudo-random sequences of pulses, i.e., the formation of random pulses within a period of 4 *($2^N - 1$), subject to circuit simplicity and a relatively small number of additional elements.

Based on a digital generator of a pseudo-random sequence of pulses, i.e., an M-sequence and an active low-pass filter of the second order of Sallen-Ki, a scheme for an acoustic noise generator is obtained, which is shown in Figure 1.

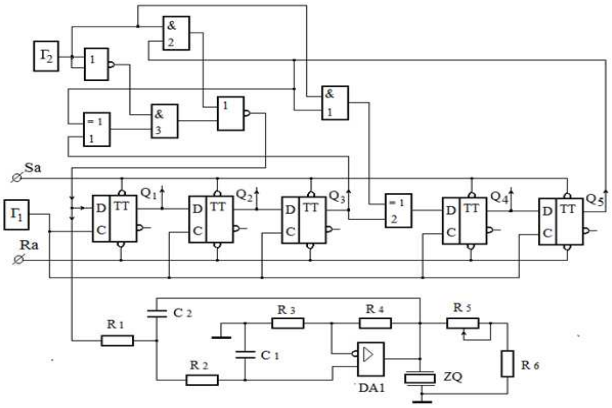

FIGURE 1 Diagram of a digital acoustic noise generator

New elements were added to the LFSR shift register scheme to increase the period of the generated pulse sequence: the second clock pulse generator G_2 , logic elements I_1, I_2 and I_3, the second added modulo two ROX_2, logic elements (LE) OR-NOT and NOT. Introducing new elements and their connections with other elements of the scheme allow increasing the repetition period of the pseudo-random pulse sequence to 4*($2^N - 1$). Thus, the digital acoustic noise generator comprises two clock pulse generators G_1 and G_2 , a G_5 -bit shift register with linear feedback on D-triggers, two adders modulo two, three logic elements 2I, LE 2OR-NOT and NOT, and an active RC low-pass filter (LF) of the second order of Sallen-Ki. It connects

a piezoelectric vibration transducer to the output of the LF filter, which creates an acoustic chaotic noise. Asynchronous D-trigger inputs are connect to the initial setting of the shift register Ra and Sa. It connects these inputs to power supplies that can have voltages of 0 or 5 V.

Consider the operation of a digital acoustic noise generator. A 5-bit shift register with linear feedback on D-triggers is clocked at rectangular pulses supplied with the output of the G_1 clock generator. Using the adder modulo two XOR_1, then through the logic elements I_3 and OR-NOT, a serial signal is fed to the input of the shift register, which is the sum modulo two of the 3rd and last 5th digits of the shift register.

First, using the signals on the asynchronous inputs Ra (Ra =5V) and Sa (Sa = 0V), the shift register will set to zero (you can set the shift register to a single state using the same signals Ra = 0V and Sa= 5 V). Thereafter, the asynchronous inputs set Ra= 5V and Sa = 5V. For the output of the shift register from the null state to the scheme introduced by LE OR-NOT, forming at its output a signal of logical units (if the initial state of the shift register unit, the output LE OR-NOT will be a signal of logical zero), which is input to the D-trigger 1-th digit.

Pseudo-random pulse sequences are generated at the output of the shift register, the duration and interval between them determined by the pulses of the G_1 clock generator (with an operating frequency of 20 kHz). The shift register will generate pseudo-random pulses as a shift register with linear feedback on the Fibonacci configuration [9].

After a time equal to 31*T_1, a signal (pulse) of logical 1 will appear at the output of the clock generator G_2, the duration of which will also be equal to 31*T_1 where T_1 is the period of repetition of the pulses of the clock generator G_1.

Here, the shift register with linear feedback takes the Galois configuration and generates pseudo-random pulses under the influence of the pulses of the clock generator G_1 for a time equal to 31*T_1 [10, 11]. Thus, pulses with a repetition period equal to 2*($2^N - 1$) are fed to the input of the active RC filter of the second order of Sallen-Ki and at its output generates acoustic noise chaotic. A digital acoustic noise generator can have N (in particular, 31) digits. In this case, the number of additional elements is practically not increased, except for bit D-triggers. The clock generator G_2 driving structure of 5-bit shift registers with relatively small amounts of additional elements (OR-NOT, NOT, three LE 2I, and the clock generator G_2) can be compared to known schemes [2, 9, 12-14], to increase the pulse repetition period pseudo-random sequence twice, to make it equal to 2*($2^N - 1$). If N = 31, then the repetition period of 2*($2^N - 1$) will be large enough and at the output of the digital generator, the acoustic chaotic noise will not differ from the random noise.

Furthur, to verify the technical solutions with the help of a program Electronic workbench was a modeled diagram of a digital noise generator according to Fig.1. It gets lot of signals at characteristic points of the digital acoustic noise generator, which presented in below (Figure 2 and Figure 3)

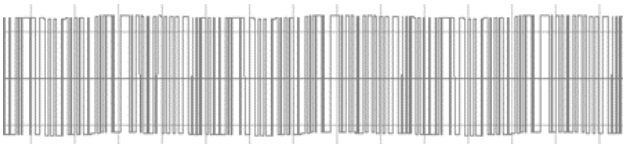

FIGURE 2 Pseudo-random pulses of a digital acoustic noise generator

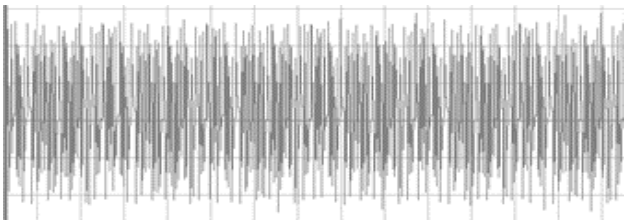

FIGURE 3 Acoustic signals of a chaotic nature at the output of a digital generator

Plot in Figure 2 shows a random sequence of pulses within the repetition period 2*($2^N - 1$), and the plot in Figure 3 illustrates a chaotically changing acoustic signal passed through the second-order active low-pass filter scheme of Sallen-Ki.

As clock generators G_1 and G_2, you can use one scheme of pulse generators on logic elements. For example, the scheme shown in [1, 5].

3 Conclusion

Depending on the logical state of the pulses of the clock generator G_2, the circuit structure changes, first when the pulses of the clock generator G_2 are absent, i.e. the scheme generates pseudo-random pulses as a digital generator of the Fibonacci configuration, and when the pulses of the clock generator G_2 correspond to a logical unit, the scheme generates pseudo-random pulses as a digital generator of the Galois configuration, and therefore, at the output of the shift register, you can get chaotic sets of random sequences for a time equal to 2*($2^N - 1$). At the same time, the output of the active RC of the second-order low-pass filter is Sallen-Ki, i.e. at the output of the digital acoustic noise generator; we get a chaotic signal with a relatively small number of additional logic elements.

The work related to the field of computer technology, information, and measurement radio engineering and can be used to protect speech information from unauthorized access by creating a noise signal through acoustic and electronic- optical channels, as well as in coding systems for generating pseudo-random sequences.

References

[1] Berezkina O M, Koreshkova A A, Ivanov A P 2015 Implementation of the pseudo- random sequence generator on avega FPGAs Penza: Publishing house of the Penza state University **5** 17-20

[2] Pesoshin V A 2007 Generators of pseudo-random and random numbers on shift registers Monogr. / Pesoshin V. A., Kuznetsov V. M.-Kazan: Kazan publishing House, state technical University. UN-TA 296 p.

[3] Zaurbek A, Seilova N A, Dzhuruntaev D Z 2017 Synthesis and simulation of digital pseudo-random impulse sequence generator based on PLIC FPGA Xilinx using CAD Vivado 2016.2 and development of acoustic noise generator scheme for the protection of information Scientific and research journal Computer Modelling & New Technologies ISSN 1407-5806, ISSN: 1407-5814, Latvia, Riga **21**(1) 39-46

[4] Zaurbek A, Zhaibergenova A Zh, Dzhuruntaev D Z 2018 Developing of the project of a random access memory on FPGA with use of a CAD of QUARTUS II and the Verilog language The 16 Th International Scientific Conference 2018. April 26-27, ISMA University of Applied Sciences, Theses

Information Technologies, Management and Society, Riga
[5] Vetrov Yu V, Makarov S B 2011 Cryptographic methods of information protection in telecommunication systems: studies, manual SPb.: Polytech publishing house, UN-TA 174 p
[6] Patent RU 2446444, O06F7/58. publ. 27.03.2012
[7] Russian patent no. 2472286, N03V29/00, publ. 10.01.2013
[8] Zaurbek A, Dzhuruntaev D Z 2018 Functional modeling of the shift register with linear feedback on the FPGA in the CAD environment QUARTUS II using the VERILOG language Almaty: Bulletin of Kaznitu **6**(130) 97-105

Research and development of forecasting models for the activities of oil industry entities

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Abstract

The thesis of the article is devoted to an urgent problem: the development of scientifically based modeling methods in the planning and forecasting of oil and gas production and sales. As you know, in the global market from the successful and efficient sale of oil and gas generally determines the level of economic development of the country that produces and produces this strategic raw material. In this regard, modeling the process of planning and forecasting oil and gas production allows economists at the design stage to determine the best ways to maintain the stability of their implementation at favorable price offers. In this case, of course, from perfection the applied methodology and modeling methods depends on the quality of planning and forecasting. In the thesis of the article, we present the results of a study to further improve the use of one of the most promising econometric methods for modeling the planning and forecasting processes for the production and sale of oil on the sales market, taking into account the peculiarities of the oil industry in Kazakhstan.

Keywords: econometric methods, planning and forecasting oil production.

1 Introduction

The Republic of Kazakhstan is one of the countries with large strategic hydrocarbon reserves and has an impact on the formation of the global energy market. The main national priority that determines the nature of the foreign policy of the leading countries of the world is the reliable provision of energy resources.

In recent years, under the influence of various objective factors, the raw material orientation of the economy of Kazakhstan has been formed, the raw material potential is represented by a variety of fuel and energy resources, among which oil and gas are in the first place.

The oil and gas industry of Kazakhstan, as the basis for the country's industrial development, provides the country with a stable and stable development for a long time, large foreign exchange earnings, and forms the main export block of the economy.

Comparing the statistics of the Agency of the Republic of Kazakhstan for the period from 2002 to 2006, Kazakhstan's crude oil production with world production and with the total production of the CIS countries, presented in Figure I, we can conclude that there is a growth trend in production [1].

According to the Statistics Agency of the Republic of Kazakhstan, in the total industrial production in the republic, crude oil production is more than 16% and 4% falls on the production of oil distillation products [1]. The dynamics of oil production in Kazakhstan is shown in Figure II. In 1998, 25 enterprises engaged in oil production in the Republic of Kazakhstan, the average annual capacity of which in 1997 amounted to more than 30 million tons, but they produced 23 million tons in 1997 when they loaded capacities into three quarters, which amounted to 0.7% of its global production [1].

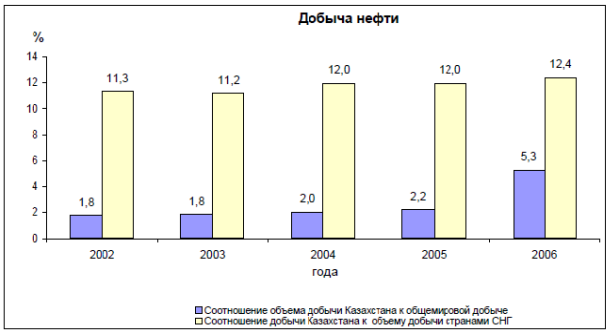

Figure 1 Comparison of crude oil production in Kazakhstan and countries CIS and world production, in % [1]

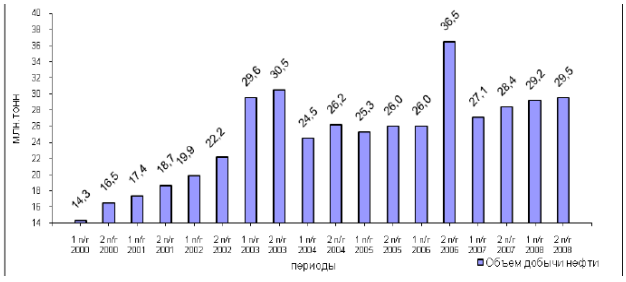

Figure 2 Dynamics of crude oil production in the Republic of Kazakhstan [1]

The procedure which evolves a hypothesis about future events is called Forecasting, and there are a wide variety of forecasting models that predict future events, also they are used in many fields, such as Economics and Science, consequently, the mentioned models are crucial tools in making decisions [2]. An idea of the consequences of an action is provided by ideal forecasts. In addition to this, it serves as a metric for assessing the ability to impact on future events [3].

The task of forecasting and modeling was usually performed either by evolving a model or by implementing methods developed for estimating time series [5]. Various models were applied to forecast data for certain periods [6].

Accurate estimates are required to judge a forecast. The precision of a forecast needs to be analyzed in terms of how the model processes new or raw data that were not previously used to determine the quality of the model [7].

The best indicator for evaluating the model is determined by eliminating the fitting errors associated with classical data prediction. Indistinguishable related predictive downturns suggest inadequate models. Therefore, a good forecasting model should lead to the least number of fitting errors with maximum accuracy.

Econometric methods can improve decision-making opportunities in the face of uncertainty and changes in the levels of factors that have a different impact on the process of economic activity of the oil and gas industry. However, the effective use of these methods for assessing the system of relationships and developing predictive predictions and econometric hypotheses based on it depends on knowledge of the essence of the method. The relationship between performance indicators and various factors of economic activity is caused by the interconnected influence of some phenomena on others. In the study of these relationships, it is necessary to take into account the fact that each individual phenomenon can change under the influence of other phenomena. Therefore, the main methods for assessing relationships and dependencies are regression and correlation analysis and statistical equations of dependencies. But even among these methods, it is necessary to choose a method that most adequately reflects the economic process.

There are two types of time series forecasting models: one-dimensional and multidimensional. Univariate forecasting involves the use of historical data to predict the value of a continuous variable that serves as a response or output variable [8]. Since it provides a quantitative statistical assessment, one-dimensional analysis requires a separate analysis of the results for each corresponding variable in this data set [10]. By Herrera, A.M. and Pesavento, E. (2009) in a one-dimensional analysis, possible relationships between independent variables are not considered [11].

According to Abdel-Aal, R.E. (2008), a one-dimensional time series can give a more accurate forecast than a multidimensional model. By [12], there are the following prediction models such as **Exponential Smoothing (ES), Holt-Winters (HW), and Autoregressive Moving Average (ARIMA)** that use one-dimensional time series.

2 Overview

This thesis of the article focuses on the main decision-making tools, namely time-series-based models. According to [9] an analysis of the accuracy of the **ES** (modification of the least-squares method), **HW**, and **ARIMA** approaches in predicting crude oil prices has been provided and discussed the importance of error conditions in these forecasting models and the significance of achieving minimum errors.

Exponential smoothing (ES) model (modification of the least squares method) allows for obtaining an economic model for the economic time series that characterizes not the average level of the process, but the trend that has developed at the time of the last observations. The essence of the method is that the time series is smoothed out using a weighted moving average, in which the weights obey the exponential law. The **ES** framework for time series φ_t is provided by the following formula:

$\overline{\varphi_t} = \alpha_1 \varphi_t + (1-\alpha_1)\overline{\varphi_{t-1}}$, $0 < \alpha < 1$ *and* $t > 0$ [9].

For ES, the h-step-ahead forecast equation for time series φ_t is as follows: $\hat{\varphi}_{t+h} = \overline{\varphi}_t$, $h = 1, 2, 3, \cdots, \overline{\varphi}_t$ this formula is the forecast based on period t. Also, α_1 is the smoothing parameter [9].

The Holt-Winters (HW) model is a crucial by its own kind. The HW model can be served as an extension of the ES framework. However, it uses a different set of parameters, as opposed to those used in elementary time series, to smooth the slope of values. HW-based forecasting can be performed using three smoothing elements. The HW model is applied to data characterized by seasonality and trend. The **HW** model is given as follows:

$$\overline{\varphi}_t = \alpha_1 \frac{\varphi_t}{S_{t-\delta}} + (1-\alpha_1)(\overline{\varphi}_{t-1} + \beta_{t-1}),\ 0 < \alpha_1 < 1,$$

$$\beta_t = \alpha_2 (\overline{\varphi}_t - \overline{\varphi}_{t-1}) + (1-\alpha_2)\beta_{t-1},\ 0 < \alpha_2 < 1,$$

$$S_t = \alpha_3 \frac{\varphi_t}{\overline{\varphi}_t} + (1-\alpha_3) S_{t-\delta},\ 0 < \alpha_3 < 1\ .\ [9]$$

In the **HW** model, an h-step-ahead forecast of time series φ_t is prohibited as follows:

$$\hat{\varphi}_{t+h} = (\overline{\varphi}_t + h\beta_t) S_{t+h-\delta}\ .\ [9]$$

where $\overline{\varphi}_t$ is the smoothed value for period t, α_1 is the smoothing parameter, φ_t is the actual value at period t, $\overline{\varphi}_{t-1}$ - is the average experience of the series of smoothed values in period $t-1$ β_t and β_{t-1} are the trend estimates, α_2 is the smoothing parameter for the trend estimate, S_t is the seasonality estimate, α_3 is the smoothing parameter for the seasonality estimate, h is the number of periods in the forecast lead period and σ is the number of periods in the seasonal cycle [9].

A series transformation such as identification, approximation, diagnosis, and prediction to a state of stationary covariance leads to **The ARIMA** model. The function representing **the ARIMA** model is denoted by **ARIMA (p, d, q),** which leads to a stationary function **ARMA (p, q)** upon differentiation with respect to time t. The origin of the **ARMA** model is **the autoregressive AR** model of order **p**; **MA**, **the moving average framework** of order **q**; and the expressions for **MA (1), AR (2) and ARMA (3)** are as follows [9]:

$$\hat{\varphi}_t = \theta_1 \varphi_{t-1} + \theta_2 \varphi_{t-2} + \cdots + \theta_p \varphi_{t-p} + \varepsilon_t = \sum_{i=1}^{p} \theta_i \varphi_{t-i} + \varepsilon_t, \quad (1)$$

$$\hat{\varphi}_t = \phi_1 \varepsilon_{t-1} + \phi_2 \varepsilon_{t-2} + \cdots + \phi_q \varepsilon_{t-q} = \sum_{i=1}^{q} \phi_i \varepsilon_{t-i}, \quad (2)$$

$$\hat{\varphi}_t = \sum_{i=1}^{p} \theta_i \varphi_{t-i} + \varepsilon_t + \sum_{i=1}^{q} \phi_i \varepsilon_{t-i}, \quad (3)$$

where θ_t is the autoregression parameter at time **t**, ε_t is the error term at time **t**, and φ_t is the moving-average parameter at time **t** [9].

3 Decision

The **ES, HW** and **ARIMA** models have been implemented in

MATLAB. MATLAB has built-in functions that allow us to definee parameters of the mentioned models randomly. The results of the simulation that were obtained by using the **ES**, **HW** and **ARIMA** methods are shown in Figures 1-3. The forecast trends and the real data have been shown with the confidence interval of 95%. The six different metrics are used to identify an accuracy of the mentioned 3 prediction models [9].

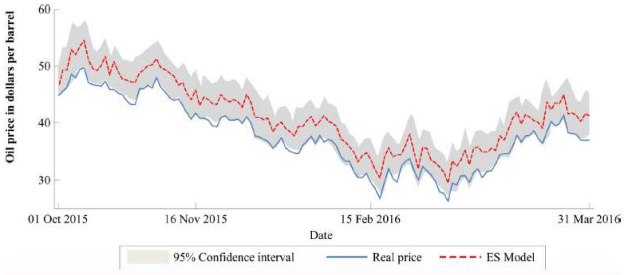

Figure 1. Results of ES model for predicting daily WTI oil prices.

Figure 1 Results of ES model for predicting oil prices

Table 1 Model-accuracy metrics

Table 1. Model-accuracy metrics.

Criteria	Formula	Criteria	Formula
MSE	$\frac{1}{n}\sum_{i=1}^{n}\varepsilon_i^2$	RMSE	$\sqrt{\text{MSE}}$
MAE	$\frac{1}{n}\sum_{i=1}^{n}\lvert\varepsilon_i\rvert$	MAPE	$\frac{1}{n}\sum_{i=1}^{n}\left\lvert\frac{\varepsilon_i}{x_i}\right\rvert\times 100$
U_1	$\frac{\text{RMSE}}{\sqrt{\frac{1}{n}\sum_{i=1}^{n}x_i^2}+\sqrt{\frac{1}{T}\sum_{i=1}^{n}\hat{x}_i^2}}$	U_2	$\frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n-1}\left(\frac{\hat{x}_{i+1}-x_{i+1}}{x_i}\right)^2}}{\sqrt{\frac{1}{n}\sum_{i=1}^{n-1}\left(\frac{x_{i+1}-x_i}{x_i}\right)^2}}$

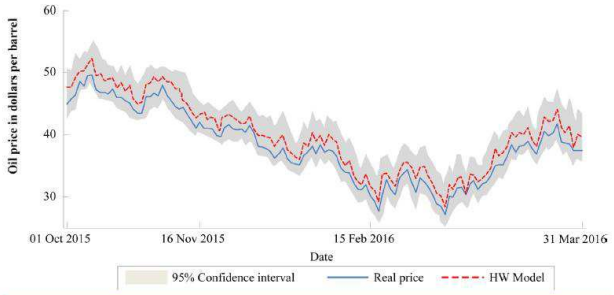

Figure 2. Results of HW model for predicting daily WTI oil prices.

Figure 2 Results of HW model for predicting oil prices

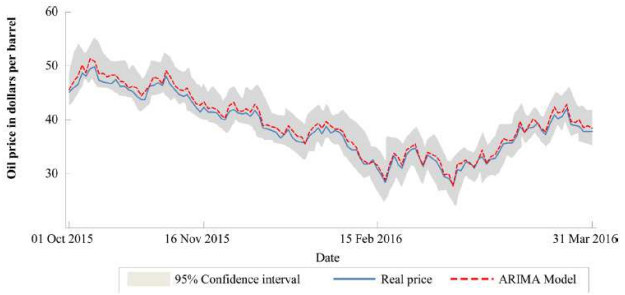

Figure 3 Results of ARIMA model for predicting oil prices

4 Conclusion

In order to make tactical and strategic decisions for the effective management of the oil and gas sector of the economy, it is necessary to choose statistical and econometric methods that contribute to modeling the forecast of key economic indicators and provide a reliable estimate of future indicators. To predict the volumes of crude oil production, it is better to use the moving average method (MA) or **ARIMA** because their average values of standard errors are the smallest, according to the autocorrelation coefficients of the levels of the series of volumes of crude oil production, one can judge the increasing linear trend of future periods. Using correlation regression analysis identified factors affecting export volumes and income from the sale of crude oil.

Time series analyses for oil prices data has been used in the given thesis of the article as well as the patterns of statistical predictors were prohibited above. Three types of univariate time-series models were investigated: **ES, HW** and **ARIMA**. The qualities of the given **ES, HW** and **ARIMA** forecasts by comparing the results of the given models with actual data have been determined. The more accurate forecasts have been obtained by the **ARIMA** (2, 1, 2) model than those of the **ES** and **HW** models. The six model-accuracy metrics have been used to quantify the qualities of the forecasts. As a result, the **ARIMA** (2, 1, 2) is the best of the three methods. Predicting future events based on an appropriate time-series model will help all professionals related to the oil industry make decisions and develop more suitable strategic plans.

References

[9] Data of the Agency of the Republic of Kazakhstan on statistics for 2000-2008
[10] Statistics Agency of the Republic of Kazakhstan for 2000-2008
[11] Tsay R S 2000 Time Series and Forecasting: Brief History and Future Research Journal of the American Statistical Association **95** 638-43
[12] Hetemäki L, Mikkola J 2005 Forecasting Germany's Printing and Writing Paper Imports. Forest Science **51** 483-97
[13] Peralta J, Li X D, Gutierrez G, Sanchis A 2010 Time Series Forecasting by Evolving Artificial Neural Networks Using Genetic Algorithms and Differential Evolution The 2010 International Joint Conference on Neural Networks, Barcelona, 18-23 July 2010, 1-8
[14] Makridakis S, Wheelwright S C, Hyndman R .J 1998 Forecasting: Methods and Applications 3rd Edition, Wiley, Hoboken
[15] Wang X, Guo P, Huang X 2011 A Review of Wind Power Forecasting Models Energy Procedia **12** 770-8
[16] Xiong T, Bao Y, Hu Z 2013 Beyond One-Step-Ahead Forecasting: Evaluation of Alternative Multi-Step-Ahead Forecasting Models for Crude Oil Prices Energy Economics **40** 405-15
[17] Wang X, Smith-Miles K, Hyndman R 2009 Rule Induction for Forecasting Method Selection: Meta-Learning the Characteristics of Univariate Time Series Neurocomputing **72** 2581-94
[18] Tularam G A, Saeed T 2016 Oil-Price Forecasting Based on Various Univariate Time-Series Models American Journal of Operations Research **6** 226-35
[19] Poskitt D S 2003 On the Specification of Cointegrated Autoregressive Moving-Average Forecasting Systems International Journal of Forecasting **19** 503-19
[20] Herrera A M, Pesavento E 2009 Oil Price Shocks, Systematic Monetary Policy, and the "Great Moderation" Macroeconomic Dynamics **13** 107-37
[21] Abdel-Aal R E 2008 Univariate Modeling and Forecasting of Monthly Energy Demand Time Series Using Abductive and Neural Networks Computers & Industrial Engineering **54** 903-17
[22] Makridakis S, Wheelwright S C, Hyndman R J 1998 Forecasting: Methods and Applications 3rd Edition, Wiley, Hoboken

The study of methods of data mining in the field of bank marketing

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Abstract

The aim of the research is to study methods of data mining on the example of data set about results of bank marketing campaign. The data presented at Kaggle.com were used as the initial materials for the analysis. In the course of the study of the initial data set, analysis and correction were made by filling in empty values to avoid a large number of errors, and charts were built for clarity. During the study the following methods of data mining were used: Decision Tree, Random Forest, k Nearest Neighbor, and Adaptive Boosting algorithm was used to increase accuracy. The analyzed data set was studied in order to determine the probability of receiving a positive answer from a client to a term deposit offer. According to the results of the conducted analysis, the preferential dependence of the result on the duration of telephone calls with the client, as well as on his financial possibilities at the time of the research was revealed. The sphere of activity, level of education and age have less influence on the probability of positive answer. The presented data can serve for the marketing department at the bank as a tool for selecting a target audience for campaigns offering term deposits.

Keywords: Data mining, Decision Tree, Random Forest, K Nearest Neighbor, Adaptive Boosting

1 Introduction

Nowadays, the banking sector has a huge number of representatives, which certainly requires development of competitiveness. Today it is not enough to have bright and loud advertising headers, it needs for tools and methods to turn the focus on services. Defining the needs of customers in one or another period of time, the identification of the target segment, forecasting and coordination of possible ways of development - the solution of these issues can be achieved by using data mining.

The purpose of the study is to study methods of data mining. The main task is to identify regularities and main dependencies affecting the result of the advertising campaign of the bank. The work is useful at the beginning of study by most frequently used methods and algorithms. The data set was presented by Kaggle.com. Anaconda 3, Jupiter and Python programming language were used as application software for the study.

2 Theoretical background

Data mining is a set of algorithms and methods to extract useful and practically applicable information and knowledge from data sets. It is based on data preparation - processing, cleaning, addition based on existing data, transformation, as well as the use of statistics, optimization, pattern recognition, visual representation, etc.

The tasks of data mining can be conventionally divided into two types - descriptive and predictive. The tasks of descriptive type include grouping, cluster analysis, sequence search, etc. The predictive tasks include classification, regression analysis, etc.

As noted earlier, data mining is a set of algorithms, including learning algorithms. They are divided into supervised learning and unsupervised learning. The main difference between these two types of algorithms is determined by the need to select input and output vectors. For supervised learning the model is built using predefined parameters. In turn, in unsupervised learning the value of parameters is selected automatically during the process of detecting internal dependencies and regularities between the data.

To solve the problem by applying data mining, you should follow the next steps:

1. task definition;
2. data collection;
3. data preparation;
4. selection of algorithms for data analysis;
5. definition of parameters and training algorithms;
6. model training;
7. analysis of certain regularities.

The subject area of the research is the bank's marketing campaign aimed at attracting customers to sign a term deposit agreement. A marketing campaign is a series of activities carried out by a company for informing, reminding or persuading its target audience about its product or service [1].

A term deposit is a fixed-term investment that includes the deposit of money into an account at a financial institution. Term deposit investments usually carry short-term maturities ranging from one month to a few years and will have varying levels of required minimum deposits [2]. The term deposit agreement provides for the return of the deposit at the end of the term established in the agreement. However, the client has the right to take out the money

before the end of the contract term, considering the prescribed penalties.

In order to study the data set the following methods of data mining were used: Decision Tree, Random Forest, k Nearest Neighbor. They represent supervised learning, i.e. they require the definition of input and output parameters. Below is a summary of the methods.

Decision Tree is a classifier built on the basis of the deciding rules of the "if, then" type, ordered in a hierarchical tree structure [3]. The idea of this method is to form queries that are directed to the data. Decision Tree forms nodes, containing samples from the original data set, belonging to the same class. Its task is to detect parameters with similar values.

Random Forest is a composition of a set of Decision Trees, which makes it possible to increase accuracy in comparing to a single tree [4]. The prediction is the result of aggregation of the responses of the set of trees. Random Forest works on the basis of two concepts - sampling is random, random sets of parameters are selected when divided into nodes. The trees are trained independently of each other. The result is a class for which most trees have voted.

The k Nearest Neighbor method (k-NN) is a metric algorithm for automatic classification of objects or regression. It is used to solve the classification problem. It classifies objects into a class that owns most of k closest neighbors in the multidimensional attribute space [5]. It is one of the simplest algorithms for teaching classification models. This algorithm is applied to large multidimensional samples.

In addition to the classification algorithms described earlier, the AdaBoost algorithm (hidden from adaptive boosting) was used. This is an algorithm that builds a composition from the basic training algorithms to increase their effectiveness during training [6]. Its function is to have each next classifier built on objects that are poorly classified by previous classifiers.

For practical realization of the research Python programming language was chosen. Python is a high-level general-purpose programming language focused on improving developer's performance and code reading [7]. The main advantages of the language are that it is quite simple, easy to understand and learn, its standard library includes a large number of useful functions.

3 Practical realization

3.1 INPUT DATA

For application of data mining methods, it is necessary to follow algorithm of actions. At the first stage the purpose of studying is set. The main question is whether the client will sign a term deposit agreement during the bank's marketing campaign. The offers were made through telephone calls with the bank's clients.

The second stage - data collection, in this case - uploading of the data provided on Kaggle.com.

The data set contains the main characteristics describing the customers and information on interaction with them, which is shown in Figure 1. The data set contains 31647 records, on the basis of which it is possible to obtain results with high accuracy.

```
bank.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 31647 entries, 0 to 31646
Data columns (total 18 columns):
ID            31647 non-null int64
age           31647 non-null int64
job           31647 non-null object
marital       31647 non-null object
education     31647 non-null object
default       31647 non-null object
balance       31647 non-null int64
housing       31647 non-null object
loan          31647 non-null object
contact       31647 non-null object
day           31647 non-null int64
month         31647 non-null object
duration      31647 non-null int64
campaign      31647 non-null int64
pdays         31647 non-null int64
previous      31647 non-null int64
poutcome      31647 non-null object
subscribed    31647 non-null object
dtypes: int64(8), object(10)
memory usage: 4.3+ MB
```

Figure 1 Data set

Table 1 describes the values in the data array.

Table 1 Data set information

Name	Info
ID	Unique customer ID
age	Customer's age
job	Type of activity
marital	Marital status
education	Education
default	Are there any debts, default on the loan?
balance	Balance of funds
housing	Housing loan
loan	Consumer loan
contact	Type of communication with the customer
day	Monthday of contact
month	Month of contact
duration	Contact duration in seconds
campaign	Number of customer contacts in this company
pdays	Number of days since last contact
previous	Number of customer contacts in previous company
poutcome	Was the previous company successful?
subscribed	Has the customer signed a term deposit agreement?

3.2 THE MODIFICATION OF DATA

There are no null values in the present dataset, but when each column is analyzed individually, ‘unknown’ values were identified. There are four columns where ‘unknown’ values are found:

1. job (206 out of 31647);
2. education (1314 out of 31647);
3. contact (9177 out of 31647);
4. poutcome (25929 out of 31647).

So, by finding the mean and median values a part of null values for the ‘education’ column was filled in. Columns ‘poutcome’ and ‘contact’ have too many empty values, they should be removed. The column ‘job’ has a small number of unknown values, which can not essentially influence the research results.

3.3 THE RESEARCH OF DATA SET

For visual representation of dependencies, correlation, the heatmap chart was used - Figure 2.

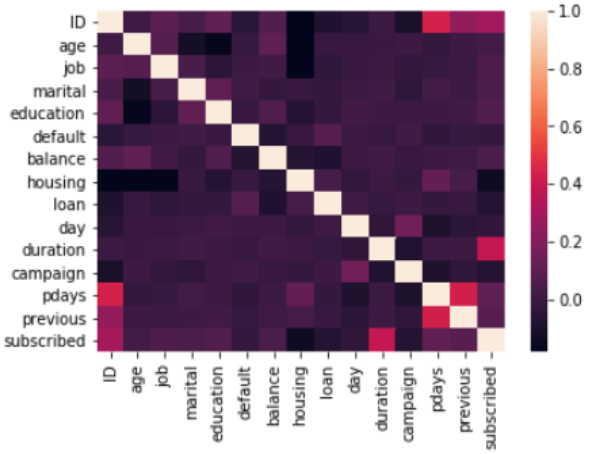

Figure 2 Heatmap

According to the chart, the parameter 'subscribed' depends most of all on the duration of contact with the client. Education, job, marital status, balance and age have less influence.

Based on the assumptions about the parameters that influence the client's decision and the correlation graph, charts have been built. In Figure 3, you can see that the number of signed contracts is greater if the telephone calls with the client was longer. This can be due to the personal qualities and communicative abilities of the manager, his client focus.

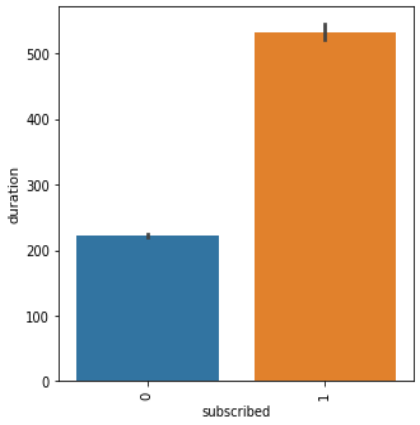

Figure 3 The dependency 'subscribed – duration'

The next parameter that affects the decision of the client is his current balance of the bank account - the more he is, the higher the probability of agreement. The chart of the dependency of the parameters is shown in Figure 4.

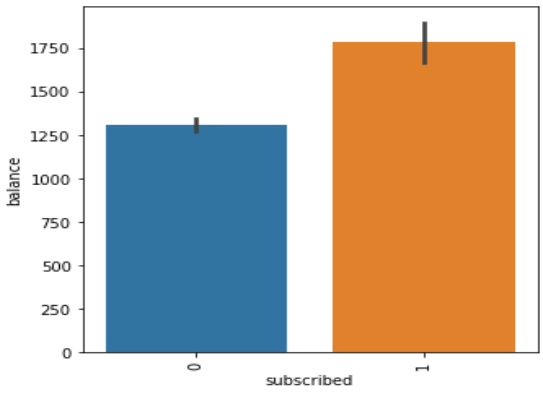

Figure 4 The dependency of 'subscribed – balance'

As the chart in Figure 5 shows, clients with higher education are more likely to sign a term deposit agreement.

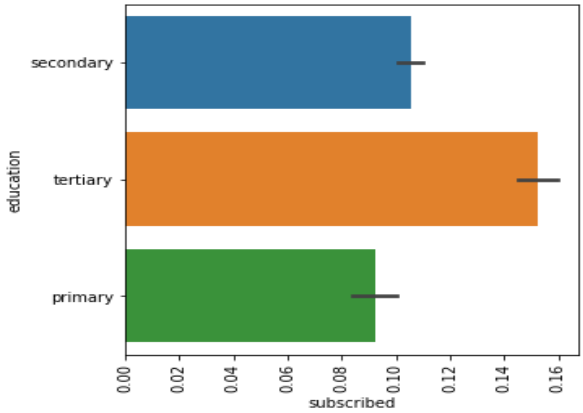

Figure 5 The dependency of 'subscribed – education'

Figure 6 shows a graph of the relationship between the age of the client and his decision in response to the bank's offer. This graph shows a pattern that in most cases a term deposit agreement is signed by young people between 18 and 25 years old as well as older people over 60.

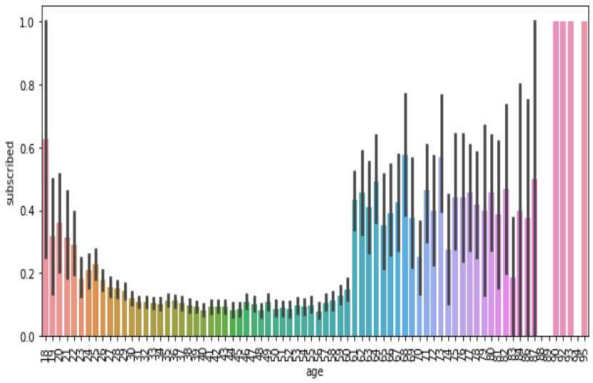

Figure 6 The dependency 'subscribed – age'

Figure 7 shows the relationship to the previous chart. It shows that students (in most cases young people under 25) and retired people over 60 are more likely to invest in a term deposit.

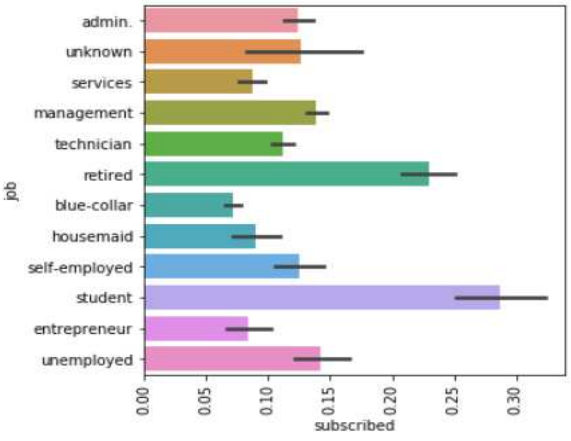

Figure 7 The dependency 'subscribed – job'

The relationship between marital status and signing a deposit agreement is shown in Figure 8. Single clients are more likely to use the term deposit.

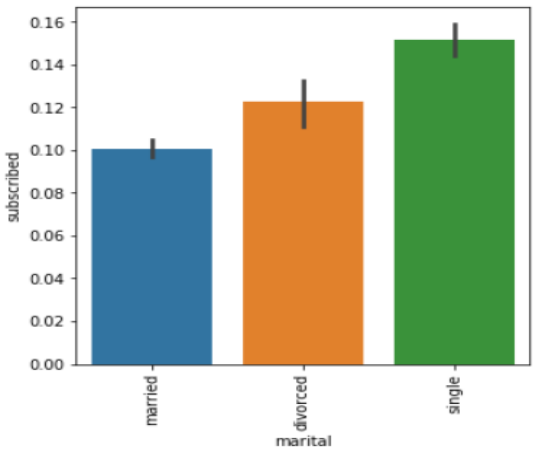

Figure 8 The dependency 'Subscribed – marital'

The next stage in the research of the data set was the application of supervised learning algorithms. Taking into account the identified dependencies and relationships, the input and output parameters for using the algorithms were selected. The dependent parameter is "subscribed". The parameters that have an influence were selected as follows: 'age', 'job', 'duration', 'education', 'balance'. With the help of these algorithms, the accuracy of the predicted result - positive answer to the bank offer - is determined.

When using Decision Tree, the following accuracy indicator was obtained - Figure 9.

```
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score
from sklearn import metrics
clf = DecisionTreeClassifier()
clf = clf.fit(X_train,y_train)
y_pred = clf.predict(X_test)
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.833070036861506
```

Figure 9 Decision Tree

Figure 10 shows the result of determining accuracy using Random Forest.

```
rdmf = RandomForestClassifier(n_estimators=20,
                              criterion='entropy')
rdmf.fit(X_train, y_train)
rdmf_score = rdmf.score(X_test, y_test)
rdmf_score_tr = rdmf.score(X_train, y_train)
print(rdmf_score)
```

```
0.8769878883622959
```

Figure 10 Random Forest

Using the k-Nearest Neighbors algorithm, the following accuracy was determined, as shown in Figure 11.

```
knn = KNeighborsClassifier(p=2,
                           n_neighbors=10)
knn.fit(X_train, y_train)
knn_score = knn.score(X_test,
                      y_test)
print(knn_score)
```

```
0.8814112690889943
```

Figure 11 k-Nearest Neighbors algorithm

The Adaptive Boosting algorithm was used to increase the accuracy of calculations. When Decision Tree was applied to the following result was received, which is shown in Figure 12.

```
ada = AdaBoostClassifier(DecisionTreeClassifier(max_depth=10),
                         random_state=42).fit(X_train, y_train)

print("Decision tree accuracy: %.2f" % clf.score(X_test, y_test))
print("AdaBoost accuracy: %.2f" % ada.score(X_test, y_test))
```

```
Decision tree accuracy: 0.83
AdaBoost accuracy: 0.87
```

Figure 12 Adaptive Boosting

4 Conclusions

As the result of the research, information about the factors that influence customers decisions was obtained. A correctly selected target segment increases the effectiveness of the campaign and increases the profit from it. Term deposits are more likely to be of interest to customers with the following parameters ordered by the correlation value:

1. Age groups under 25 and over 60 years of age;
2. Has a tertiary education;
3. Has a large bank account balance;
4. The marital status - single.

Besides the considered personal characteristics of customers, the result of contact with customers is significantly influenced by the duration of the contact. This may be the result of certain communication abilities of the bank manager, as well as his focus on the needs of the client. This factor can be used as a recommendation for development and training of managers in the field of relationships with clients.

References

[1] Marketing campaign definition **E-source:** https://www.mbaskool.com/business-concepts/marketing-and-strategy-terms/14292-marketing-campaign.html 15 March 2020
[2] Term deposit definition **E-source:** https://www.investopedia.com/terms/t/termdeposit.asp 15 March 2020
[3] Decision trees **E-source:** https://wiki.loginom.ru/articles/decision-trees.html 21 March 2020
[4] The implement and parsing the random forest algorithm in Python **E-source:** https://tproger.ru/translations/python-random-forest-implementation/ 23 March 2020
[5] Method K-nearest neighbor **E-source:** https://wiki.loginom.ru/articles/k-nearest-neighbor.html 23 March 2020
[6] AdaBoost algorithm **E-source:** http://www.machinelearning.ru/wiki/index.php?title=AdaBoost 28 March 2020
[7] Python programming language **E-source:** https://web-creator.ru/articles/python 28 March 2020

Micro and nanoelectronics

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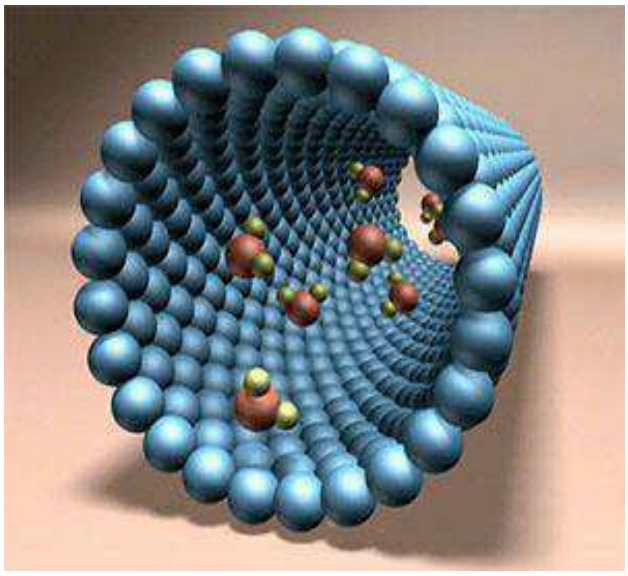
Keywords: electronic, nanoelectronics, semiconductors, micro - and nanoelectronics, process of technology.

Nanoelectronics is a field of electronics engaged in the development of physical and technological foundations for creating integrated electronic circuits with characteristic topological dimensions of elements of less than 100 nanometers.



The term "nanoelectronics" is logically connected with the term "microelectronics" and reflects the transition of modern semiconductor electronics from elements with a characteristic size in the micron and submicron region to elements with a size in the nanometer region. This process of technology development reflects Moore's empirical law, which states that the number of transistors on a chip doubles every one and a half to two years.

However, a fundamentally new feature of nanoelectronics is related to the fact that quantum effects begin to prevail for elements of such sizes. A new nomenclature of properties appears, and new attractive prospects for their use open up. If, when switching from microelectronics to nanoelectronics, quantum effects are largely parasitic (for example, tunneling of charge carriers interferes with the operation of a classical transistor with decreasing dimensions), then electronics using quantum effects is the foundation of a new, so-called nanoheterostructured electronics.

It must be emphasized that although the direction of training "Electronics and Nanoelectronics" belongs to the group of specialties "Electronics, Radio Engineering, Communication", the curriculum of the direction fully complies with the standards of classical university education. For a potential applicant, this circumstance should be of fundamental importance, since he not only masters the chosen specialty, but receives fundamental training in the field of physics and the physical foundations of micro- and nanoelectronics. First of all, these are classical and quantum solid theory, physics of semiconductors and low-dimensional systems. A separate block in the curriculum of the specialty includes disciplines in quantum informatics and quantum computers, the physical implementation of which is one of the priority tasks of Nanoelectronics.

Dynamic topic modelling

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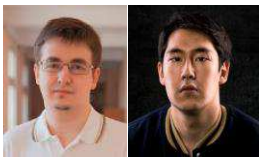

Abstract

Nowadays topic modelling is actively developing field in many industries. For instance In fintech companies, topic modelling is used for clustering transactions and detect latent interests of holders, in recruiting industry topic models can be used in ranking candidates CV, etc. Many of these applications can create impressive value for companies. One of the interesting research areas is dynamic approach to topic modelling, which can be applied to objects related to some point in time (for example news publications). The key idea is to perform separate topic modelling on different time intervals in order to find which topics continue to exist in time and to what extent and how the content of the topics change.

Keywords: topic modelling, bigartm, nlp

1 Introduction

Today, topic modelling is an important part in modern natural language processing tools, this algorithm uses a matrix of unique words and documents, called corpus, and formally, decomposes current matrix, with many specific restrictions on received matrices. New dimension of resulting matrices is searched hidden topic space.

In the variety of modern implementations of topic modelling BigARTM is considered to be state-of-the art model [1], implemented as a cross-platform library with Python API and parallel processing, main advantage of BigARTM, is a stack of regularization techniques.

Topic modelling on documents with timestamps can be performed in order to analyze how topics persist and transform in time. The main issue here is to create an algorithm to map topics from different topic-modelling, considering each topic as a weighted bag of vectors of words. This issue the main scientific problem of the research, since currently existing algorithms for comparing two weighted bags of words have significant flaws: for example, WMD is a very low-performance algorithm, while Jaccard distance is low quality, since it doesn't take vector semantic representation into account.

2 Decision

One of the ways to detect topic transformations, on a timeline is building nested topic models, and trying to connect topics in every iteration. There are a number of parameters which need to be optimized, such as how big should be the overlay for the selected volume of topic modelling, how we should find connections between topics, etc. In these cases, there are logical heuristics, for example in big overlapping value, links between topics will be more symbolic and less semantic, while large volume of topic models and low number of topics will lead to links between topics will be too predictable.

3 Conclusion

Dynamic topic modelling is a nontrivial problem in the natural language processing ecosystem, and can have different applications in industry, for example media analytics [2], fakes detection [3] or smart news aggregation algorithms.

The main scientific interest of this problem is represented by finding an optimal topic-mapping algorithm, optimizing time intervals and interval steps for different practical problems. Visualization of the results is also an interesting engineering problem.

Acknowledgments

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References

[1] Vorontsov K V, Potapenko A A 2014 Additive regularization of topic models Machine Learning, Special Issue on Data Analysis and Intelligent Optimization

[2] Mukhamedyev R, etc. 2019 Assessment of the dynamics of publication activity in the field of natural language processing and deep learning. Proceedings of the International Conference on Digital Transformation and Global Society (St. Petersburg, JUNE 19–21, 2019). Springer, Cham. 130–5

[3] Barakhnin V B, Kuchin Ia I, Muhamedyev R I 2018 On the problem of identification of fake news and of the algorithms for monitoring them Proceedings of the III International Conference on Informatics and Applied Mathematics (Almaty, Kazakhstan, The Institute of Information and Computational Technologies, September 26-29, 2018) 113–8

Automatic texts similarity metric for large datasets

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Abstract

The similarity of texts is an essential part that is applied in many natural language processing tasks such as text retrieval, automatic summaries, plagiarism detection and many other where is necessary to catch any semantic relation of texts. There are several approaches that is close to evaluate effectively the true relation of texts. However, some of them are computationally costly and can be used only for small datasets, whereas others are might be fast but not as accurate as it desired. This thesis is aimed to consider other metrics that could be accurate and yet computationally effective to be applied for large datasets.

Keywords: semantic similarity, texts similarity

1 Introduction

The detection of similarity of words, texts or documents is a key element for further broadly used tasks such as topic modelling, texts classification or even recommender systems. Different approaches should be used depending on the task formulation. For simple query tasks might be enough to use feature-based metrics like Jaccard similarity [1] that demonstrates how much common features (words) contribute relatively to the distinct features.

However, Jaccard similarity does not differentiate homonym words, which have the same spelling but different meanings, or synonym words that have identically same meaning but different spellings. That is why a more popular and efficient approach to use is vector-based words. The main idea is that each word can be represented as a vector and then to utilize distance metrics such as Euclidean or Cosine to evaluate how close the words are, where the smaller distance denotes a stronger relation of words. The state-of-the-art vector representations are Bag of Words [2], Term Frequency - Inverse Document Frequency [3] or embedding methods such as Word2Vec [4] or Bert [5].

In [4] was presented a new metric called Word Mover Distance which based on Word2Vec embedding and minimizes a total distance between two group of words placed in two sentences/documents. The main disadvantage of this method is that its complexity time is $O(p^3 \log(p))$. Thus [4] presented an alternative WMD with relaxed boundaries with some reduction in accuracy.

The 2019 was called the year of Bert [5] which is a new stare-of-the-art model and it is based on transfer learning that uses pre-trained models and allows to fine-tune them under a specific task. The main highlight of Bert that order of words does matter. However, in practice it does not always gives promising results as it is not very clear what is the optimal way of extracting embedding of words.

2 Decision

So, this paper suggests to develop a different method that will look to all possible pair of words from two texts/documents and based on some decision function decide whether they are similar enough to contribute to the total similarity of two documents. Moreover, considering the weights of each word in regards to the document it located in or in regard to the whole corpus would play an essential role. This method is very flexible since as input it takes any desired word vectors or embeddings and it could be tuned further by choosing weights depending on the task. In addition, there can be chosen many versions of decision function to evaluate what gives the best result. By this, we will take an advantage of state-of-the-art embeddings and be able to apply for large datasets as it requires less computational time compared to WMD.

3 Conclusion

In this thesis we made a review of the most popular methods in texts similarity, discussed pros and cons of each of them and proposed the view of another method that could outperformed the popular methods and be applied for Big Data.

References

[1] Hamers L, et al. 1989 Similarity Seasures in Scientometric Research
[2] Wallach H 2006 Topic Modelling: Beyond Bag-of-Words
[3] Aizawa A 2003 An information theoretic prospectice of tf-idf measures
[4] Kusner M, et al. 2015 From word embeddings to distances
[5] Devlin J, et al. 2018 Pre-training of deep bidirectional transformers for language understanding

The use of vector quantization as a decomposition method for the restoration of the image of faces

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Abstract

Image restoration is defined by estimating an original image from data that has been degraded in some way. Degradation regularly includes blurring the original image and noise distortion. Restoring the original image from degraded observations is of paramount importance and can be applied in several scientific fields, including medicine and diagnostics, military surveillance, satellite and astronomical images, remote sensing, automatic authentication in industry and many other areas. Image restoration provides a good understanding of the image when it undergoes further image processing techniques.

In variety of tools and approaches it is hard to find the proper way of image restoration. This work is an attempt to present of the results, compare of the restoration algorithms and show the advantages of VQ (Vector Quantization) algorithm.

Keywords: vector quantization, image restoration, compression

1 Introduction

Visual data transmitted within the shape of advanced pictures is getting to be a major method of communication within the advanced age. Pictures are created to record or show valuable information. However, due to defects within the imaging and capturing handle, the recorded picture constantly speaks to a corrupted form of the first scene. The fixing of these defects is pivotal to numerous of the consequent picture preparing errands. A wide run of debasements such as clamor, geometrical corruptions, brightening and color flaws and blur.

The field of picture rebuilding which is now and then alluded to as picture deblurring or picture deconvolution is concerned with the reproduction or estimation of uncorrupted picture from obscured and boisterous one. Picture rebuilding is related with minimizing or indeed expelling artifacts due to obscuring and commotion. Obscuring which may be a direct shape of debasement can happen due to camera deblurring or due to movement. This venture concentrates on the Examination and Comparison of algorithms of picture reclamation calculations.

It can be watched from the comes about gotten that with no clamor data, the Wiener and Regularized channels execution in realizing the corrupted picture was destitute. Be that as it may, the Lucy- Richardson channel had a great execution, in spite of having no data approximately the commotion within the picture. With clamor data, the Wiener and Regularized channels did an awesome work at reestablishing the picture. Be that as it may, the Wiener channel is much superior at the obscure than the Regularized channel. In spite of having no clamor data, the Lucy-Richardson channel performs or maybe well at evacuating the corruption from the PSF (obscure within the case) but not the clamor. In this manner, having a great PSF, the Wiener and Regularized channels will perform superior where the commotion data is accessible while, the Lucy-Richardson channel performs superior in obscures disposal and not especially the clamor. The quantization method is more suitable as a decomposition method for image restoration. The experimental results in the article ‘‘Image Compression by Visual Pattern Vector Quantization, (Feng Wu, Xiaoyan Sun)” fully demonstrate the advantages of the quantization technique. It can even surpass JPEG over 1.7 dB. More importantly, the visual quality of the reconstructed image in the proposed scheme in the article is very good even at very low transfer rates.

2 Conclusion

In conclusion compared methods we need to find the best method individually according to the problem. We present the results with advantages of each methods with different defects. However, Vector Quantization is one of the powerful and perspective method for reconstruction and compression of the image. But there are still many aspects to be investigated in the future, such as adaptive up-sampling, enhanced indexing method, large-scale visual pattern learning, and so on.

References

[1] Lagendijk R L, Biemond J 1999 Basic Methods for Image Restoration and Identification Information and Communication Theory Group, Faculty of Information Technology and Systems Delft University of Technology, The Netherlands
[2] Banham M R, Katsaggelos A K 1997 Digital Image Restoration IEEE Signal Processing Magazine **14**(2) 24–41
[3] Admore Gota, Zhang Jian Min 2013 Analysis and Comparison on Image Restoration Algorithms Using MATLAB International Journal of Engineering Research & Technology (IJERT)
[4] Lam E Y, Road P 2004 A Nonlinear Image Restoration Framework using Vector Quantization

Image reconstruction by gradually increasing the number of principal components

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Abstract

Recently, breakthrough works have appeared devoted to the reconstruction of images based on methods and algorithms for image restoration. Such methods and algorithms are orders of magnitude superior to classical refractive analogues, significantly inferior in the quality of the resulting images due to the strong optical distortions inherent in diffraction optics. In this work, we will show an analytical overview of image reconstruction methods that can significantly improve the quality of the resulting images during reconstruction (restoration). An effective method of image analysis is the method of principal components and neural networks. The proposed reconstruction process consists of a preliminary stage of colour correction of the image and elimination of chromatic blur based on reverse convolution and convolutional neural networks.

Keywords: the reconstruction of images, algorithms, reconstruction methods, neural networks.

1 Introduction

At present, biometric technologies are actively developing, aimed at obtaining and using human biometric data in order to identify him.

A system using such technologies can be applied in various fields: passport control systems at airports and other large transport hubs, electronic commerce systems, surveillance systems to reduce terrorist threats and search for people [1, 2].

The relevance of the research is to investigate the tasks for image restoration by gradually increasing the number of main components. And the use of neural networks is promising for this task.

Effective methods of image analysis are the method of principal components and neural networks. The method of principal components is one of the powerful and universal means of analysis, which, without discarding specific features, allows you to take into account only the most significant combinations of their values. When using the method in the problem of image recognition, each image is decomposed into a linear combination of eigenvectors, which are called the main components. In this case, the main components can be represented as images. For example, if images represent faces, the principal component method is often referred to as the eigenface method (Figure 1) [3].

Thus, the image analysis of the principal component method can be performed as follows: for example, we have a set of images, where each of which we will describe as x, and where i is the image number (i = 1,2,3...n). The dimension of the vector designated as x_i. And so all images can be represented as a matrix X.

Figure 1 Photo reconstruction (eigenface)

2 Overview

In this paper, we conduct an analytical review of one of the image reconstruction methods:

- The method of the number of principal components.
- Image analysis by the method of principal components.

3 Conclusion

In conclusion, doing an analytic overview of the methods and the image reconstruction algorithm, we must find the best method individually according to the problem. And in the reconstruction of images, the method of Principal Components is the most effective. To confirm the practical significance of the proposed experiments, experimental studies will be conducted on various bases.

References

[1] Kukharev G A 2001 Biometric systems: Methods and means of *recording a person's personality* St. Petersburg: Polytechnic 240 s

[2] Zhao W, Chellappa R, Rosenfeld A, Phillips P J 2001 Face recognition: a literature survey National Institute of Standards and Technology, Technical Report #7478 USA

[3] CUFS dataset **E-source:** http://mmlab.ie.cuhk.edu.hk/archive/facesketch.html (date: 25.04.2015)

Information systems for business

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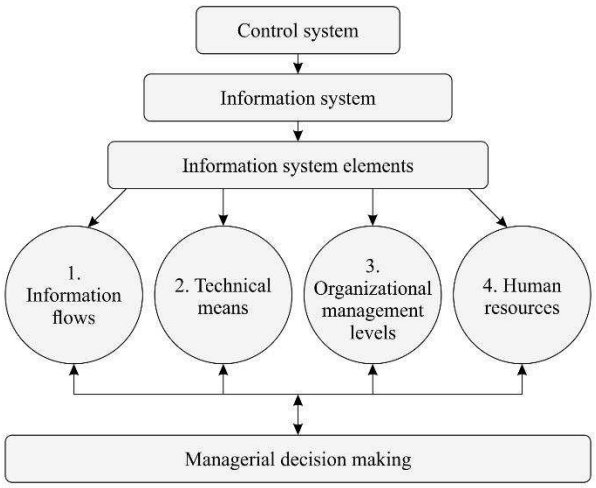
Keywords: information systems. business, processing data, knowledge in information system, online, TV, pandemic

Every year the amount of Internet users increases rapidly around the world. For the most part, e-commerce serves as a significant helper between different companies in competitive struggle directly. There are a large number of achievements in the field of information systems with which it becomes possible to carry out engineering and business process. A well-known fact is that the maximizing profits is the main goal of any business. Accordingly, the existing information systems should be developed very well in order to have an opportunity to achieve the company's goal. The development of information system is directly connected with the improvement of corporate business models. In modern days, the difficulty of collecting and managing information is growing continuously. Consequently, this will require more and more time and basic skills of managers which are not enough.

As a rule, each developer tries to integrate the maximum set of functional opportune into their system. The information system is provided by: technical means: methods, models, information processing algorithms, programs, cooperation documentations e.g. between personals and technical facilities.

From the other element of the information, it can be distinguished 4 main ones:



In the same way, informational systems in business should cover structural units, which are participate in managing informational flows. For example nowadays against a background of a pandemic the virus, well known as "crown virus", I think, the world in the field of business should change vastly. Because now many businesses immediately fell to the zero, to the very bottom. Well for example public catering industry. The sphere is numbed everywhere, well, it's closed all over the world. But they found another way of keeping on their business, they have already started working online. By turning on the TV you can see food delivery. And if you watch TV insatiable you want to eat again, it's the result of good and quality advertising of the product. And in the same way, in the field of fitness, online courses have already begun to re-stablish. I think all this well develop in the future. And how far this pandemic came into our world us unknown to anyone. And understand while scientists create the vaccine, the business must be very flexible. Well for this, the business information system must be developed. Accordingly, information technologies and systems penetrate into all spheres of human activity, without exception: science, education, production and others.

Therefore, a modern specialist should have versatile knowledge about the appointment of types of principles, as well as processing data, and knowledge in information system.

Photovoltaic power forecasting

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Abstract

An analysis is made, based on both foreign and Russian studies of modern methods for short-term solar power plants (SPP) performance forecasting. The actuality of such forecasting in connection with the requirements of grid operators and the rules of electric energy market has been confirmed. The calculation of forecast error effect on SPP financial losses was carried out both for the forecast and actual generation values of the two Russian SPPs appearing in price bids, and for model cases corresponding to a decrease in the deviation of forecast values from actual by 1.3; 2 and 3.9 times

Keywords: solar power plants, power forecasting, financial losses, forecast errors

1 Introduction

One of the energy system reliable operation conditions is a balance of capacity and energy. Solar power plants (SPP) cannot, as a rule, guarantee the electric power generation at a precisely specified time, therefore, the forecast of the energy generated and supplied to the network is extremely relevant. Due to the increase in the solar generation share in the total volume of generated electricity, in a number of countries over the past few years, studies have been initiated in the field of short-term and medium-term photovoltaic power forecasting.

In the Russian Federation according to the Rules for the Wholesale Market of Electric Energy and Power the permissible deviations of actual production from the hourly planned volumes for SPP must not be more then 10% of the installed capacity of actually generating equipment. But there are no normative methods for forecasting SPP energy production, and in domestic scientific literature the topic of short-term forecasting of SES performance within the framework of the Russian energy market functioning has not been seriously developed (a small number of papers performed mainly in various universities have been published [1, 2, 3]). However, this issue is becoming increasingly important for organizations operating solar power plants being created in the Russia (Hevel Energy Group, Solar Systems company group etc.).

2 A brief overview of modern methods for predicting the performance of SPP

Over the past decades, a number of methods have been formed for forecasting the energy generated by SPP including approaches based on the numerical weather forecasts, the statistical (regression) methods, persistent models, and hybrid methods. It should also be noted the tendency to use – in addition to the deterministic ones – probabilistic methods, which are, in many respects, more adequate to the requirements of power networks. This work provides a detailed analysis of modern methods for photovoltaic power forecasting.

The choice of forecasting methods and the initial data for them are determined mainly by the forecast horizon:

- statistical models and methods of machine learning (for short-term forecasting);
- meteorological models based on satellite observations and sky cameras (for medium-range forecast);
- numerical weather forecasts (NWF) (for long-term (more than 6 hours) forecasts).

Among the most widely used and developed should be considered the following deterministic methods for predicting the performance of SES:

- persistent models which are the simplest models and considered as the first stage of the forecast; they assume the constancy of solar radiation conditions (and photovoltaic power production) at the present time and the moment for which a forecast is made;
- PV forecast based on calculation of solar power based on numerical weather forecast, first of all, in terms of solar radiation arrival, the main error of this method being determined precisely by the error of the NWF;
- machine learning methods.

The best result in terms of forecast accuracy is provided by hybrid methods that combine the last two approaches.

In addition to the deterministic ones, probabilistic forecasts of the solar power plant generating are being developed, which determine the range of probable values of the solar radiation, the generation of SPP, as well as the probability of each forecast. Probabilistic forecasts can provide information to network operators for a more reasonable reservation of electric capacity taking into account the SPP generation uncertainty.

The final result of the productivity forecast methods development should be a reduction in financial losses of, which are determined, in addition to forecast accuracy, by the electricity market rules adopted in a particular country.

3 Features of forecasting the production of SPP in the Russian market of energy and capacity

In 2013, Russia started subsidizing renewable energy facilities connected to the Unified Energy System, including the solar power plants.

Electricity generated by SPP is sold at wholesale market prices, and the schedule for energy supply is consistent with the dispatch control of the region's networks a day ahead. However, the main source of funds for SPP is payments for the capacity, similarly to conventional power plants, but for facilities based on renewable energy sources, the fee for 1 kW is higher, which makes it possible to pay off the plant construction.

Estimates show that in such a case payments for the supply of capacity account for up to 99% of solar power plant revenue. The described scheme differs from most foreign countries, where the increased tariff (feed-in-tariff) for the purchase of energy from SPP is mainly used.

Novadays this procedure for subsidizing SPP in the Russian Federation eliminates the financial losses of the solar power plants from the inaccuracy of forecasting the production of SPP and reduces the necessity of creating forecasting tools. Nevertheless, these tools need to be created and adopted, since a change in the current order is possible in the coming years.

The price bid for the day ahead is the central and most important in the Russian wholesale market of energy and capacity. It is an hourly forecast of the station's productivity for the next day, submitted before 13:30 Moscow time on the previous day. It should be noted that the deviations of forecast from real productivity no-penalty is ± 10% of installed capacity. Given that in climatic conditions of Russia capacity factor for solar plants exceeds 20% rarely, in terms of average generated power "no-penalty range" is approximately ± 50%. As a result, loss of profits arises from the fact that:

- excess produced energy is paid at the rate of 1ruble/MWh, and at each "extra" megawatt-hour worked out the SPP loses (P_{mpda} - 1), where P_{mpda} is the market price for the day ahead;
- shortage of energy leads to financial losses, which are determined by the difference in market prices for the day ahead and prices in the balancing market. Both price parameters are determined for each connection point and change every hour, i.e. are unique to each SPP.

To analyze the impact of production forecast errors on the financial performance of a solar power plant, we used data on price indicators and the generated energy of two solar power plants with an installed capacity of 15 and 75 MW (Samara region of the Russian Federation, Solar Systems company group). Calculation of financial losses from non-fulfillment of dispatch schedule by solar power plants was carried out on the base of predicted and actual values of generated energy. Photovoltaic energy forecasting was made based on numerical weather forecasts. Model scenarios were also considered when the deviations of forecasts from the actual plant productivity were reduced by 1.3; 2 and 3.9 times. In this case, the financial results of the forecast refinement have been evaluated. As a measure of the forecast error, the root mean square error was chosen. The calculation of the SPP productivity was carried out using the TRNSYS software and showed that a 2-fold decrease in the forecast error leads to a 5 ... 9-fold reduction in financial losses. Thus, to reduce financial losses from non-fulfillment of the SPP dispatch schedule to reasonably low limits, it is necessary to reduce the forecast error by 1.5 ... 2 times.

4 Conclusion

The existing measures in the Russian Federation to support grid stations on renewable energy sources lead to the fact that the main source of funds for generators is payments for the supply of capacity (up to 95 ... 99% of revenue), and not power. This procedure of subsidizing reduces the financial losses of the generating organization from the error in photovoltaic energy forecasting. Nevertheless it does not reduce the significance of developing forecasting methods that are adequate to the physical and geographical conditions of the Russian Federation, since a change in the current order of electric market in relation to solar and wind plants. Analysis of the effect of production forecast error on the solar power plant financial indicators, based on a forecast of the performance of two Russian solar power plants and data on their actual production for the same period showed that a 2-fold decrease in forecast errors leads to a 5 ... 9-fold decrease in losses from non-fulfillment of the dispatch schedule.

Acknowledgments

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References

[1] Engel E 2016 Forecasting the generation of electrical energy from a solar power plant based on a recurrent neural network (Prognozirovaniye vyrabotki elektricheskoy energii solnechnoy elektrostantsii na osnove rekurrentnoy neyroseti) Mater. IX Intern. Conf. MLSD'2016: Moscow 436-9 (in Russian)
[2] Vorotyntsev D, Tyagunov M 2018 Vestnik MEI **4** 53-7 (in Russian)
[3] Snegirev D, Eroshenko S, Valiev R, Khalyasmaa A 2017 Possibilities for the algorithmic implementation of solar power generation short-term forecasting (Vozmozhnosti algoritmicheskoy realizatsii kratkosrochnogo prognozirovaniya vyrabotki solnechnykh elektrostantsiy) All-Rus. Sc. Conf. Manag. Probl. Techn. Syst. St. Petersburg: "LETI" **1** 236-9 (in Russian)
[4] Reddy S, Priya S S, Carollo A J, Kumar S H 2020 International Journal of Ambient Energy **41**(1) 105-11

Some possible directions of improving quality of logging data interpretation using machine learning

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Abstract

The interpretation of geophysical data is a complex and poorly formalized task. To solve such problems, machine learning methods have been successfully used. The classification can be improved with the help of additional information, for example, data from a neighbouring borehole. The paper formulates directions for further research, which can improve the quality of interpretation of logging data, as well as solve a number of important problems of uranium geotechnology.

Keywords: Uranium Mining, Lithology, Machine Learning, Classification, Artificial Neural Networks

1 General

In Kazakhstan uranium is mined via in-situ leaching, which is one of the low-cost and ecologically safe mining methods [1]. Moreover, the cost efficiency of uranium ore mining strongly depends on accuracy of geophysical data and its interpretation. Most of the collected data generated via electricity-based methodology such as apparent resistance (AR), spontaneous polarization potential (SP), and induction (IL) logging. Logging results are usually presented in the form of diagrams, which in turn used by experts to extract information about bedding rock layers, and perform lithological classification describing borehole throughout its depth. This manual process of data processing has inevitably slow rate of data generation and low accuracy. In addition, as shown in [2] these assessments are rather biased and inconsistent.

There is a number of publications focused on tasks and issues related to automatic interpretation of log data from uranium deposits. For example, results of analytical testing with ANN as an approach for log data classification can be found in publications [3-5], while several ML methods and their comparative results - described in publications [6,7]. There, it was shown that feedforward neural network demonstrates a much better classification's quality when compared to k-nearest neighbor (k-NN) or support vector machine (SVM) algorithms. Furthermore, results from a combination of ML algorithms applied to a similar underlying task was reviewed in publications [8, 9]. The most complete study of various classifiers was carried out in the work [10].

In the paper several of classifiers have been tested on the dataset, consisting of logging data and expert assessments on 36 boreholes from "Inkai" uranium deposit in Kazakhstan. Since the classification result for ANN and LSTM depends on the initial initialization, in order to increase statistical reliability, training and evaluation of the results were carried out five times. That is, each model of these two types of classifiers was re-initiated, trained and evaluated. The full results of computational experiments are given in Appendix [11].

The table below show the results for different dataset folders. It can be seen that the accuracy of the classification significantly depends on the dataset splitting into folders, in addition, the performance of classifiers differs significantly (Table 1).

In general, we can conclude that the prospects of using ANN, LSTM and XGBOOST for rock classification based on logging data. But this is only one of the tasks, one of the stages of the technological process. The main factors determining the profitability of mining, the scheme of mining the technological unit are the estimated reserves of uranium, as well as the most complete information about the host rocks, in particular their filtration properties and the location of the confines.

In this regard, in order to successfully solve technological problems, increase the profitability and environmental friendliness of production, it is necessary to improve the quality of interpretation, taking into account all available data, including the relative position of the wells, as well as reliably determine the filtration properties of the rocks in the interwell space.

In this regard, we can formulate possible directions for further research:

- Formation of a new large dataset (several thousand wells);
- Determining the applicability of classifiers for a large dataset;
- Development of an algorithm for using data from the nearest borehole to increase quality of interpretation (The most obvious approach involves

feeding of all data on a neighboring borehole, together with the coordinates and expert estimates to the input of the network along with the data of the borehole being interpreted);

- Development of a methodology for determining the filtration properties of the host rocks based on all logging data and hydrogeological data obtained at the exploration stage based on machine learning;
- Development of an algorithm for interpolating the filtration properties in the interwell space. To do this, you can use geological sections along exploration profiles (wells are arranged in a row) and try to predict lithological codes and filtering coefficients for a well, based on data from neighboring wells;
- Given that errors in the determination of some permeable rocks have practically no effect on the practical applicability of classifiers for lithological interpretation, while errors in the identification of impermeable rocks are critical, it is necessary to develop a classification quality assessment metric that takes into account these features.

Acknowledgments

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Table 1 Results of classifiers

Test	**ANN**				**SVM**				**LSTM**				**XGBOOST**				**KNN**			
boreholes	Acc	Prec	Recall	F1	Acc	Prec	Recall	F1	Acc	Prec	Recall	F1	Acc	Prec	Recall	F1	Acc	Prec	Recall	F1
0-5	0,573	0,521	0,573	0,519	0,576	0,538	0,576	0,515	0,463	0,436	0,463	0,442	0,547	0,523	0,547	0,506	0,388	0,315	0,388	0,321
6-11	0,507	0,542	0,507	0,439	0,497	0,538	0,497	0,420	0,398	0,477	0,398	0,409	0,528	0,554	0,528	0,491	0,444	0,473	0,444	0,364
12-17	0,531	0,470	0,531	0,462	0,550	0,448	0,550	0,462	0,460	0,441	0,460	0,434	0,525	0,481	0,525	0,453	0,432	0,368	0,432	0,348
18-23	0,553	0,534	0,553	0,515	0,529	0,460	0,529	0,465	0,463	0,474	0,463	0,463	0,550	0,536	0,550	0,515	0,452	0,448	0,452	0,383
24-29	0,371	0,326	0,371	0,312	0,379	0,301	0,379	0,323	0,399	0,381	0,399	0,367	0,395	0,372	0,395	0,343	0,365	0,365	0,365	0,292
30-35	0,479	0,443	0,479	0,445	0,458	0,427	0,458	0,415	0,479	0,496	0,479	0,462	0,507	0,509	0,507	0,495	0,401	0,415	0,401	0,335
MEAN	**0,502**	**0,473**	**0,502**	**0,449**	**0,498**	**0,452**	**0,498**	**0,433**	**0,444**	**0,451**	**0,444**	**0,430**	**0,509**	**0,496**	**0,509**	**0,467**	**0,414**	**0,397**	**0,414**	**0,341**
DISP	**0,0052**	**0,0067**	**0,0052**	**0,0056**	**0,0051**	**0,0077**	**0,0051**	**0,0042**	**0,0013**	**0,0017**	**0,0013**	**0,0014**	**0,0033**	**0,0042**	**0,0033**	**0,0042**	**0,0012**	**0,0035**	**0,0012**	**0,0010**

References

[1] Yashin S A 2008 Underground borehole leaching of uranium in the fields of Kazakhstan Mining Journal **3** 45-49 (In Russian)
[2] Kuchin YA I, Mukhamediyev R I, Yakunin K O 2019 Kachestvo klassifikatsii dannykh v usloviyakh protivorechivosti ekspertnykh otsenok Cloud of science **6**(1) (in Russian)
[3] Development of methods of data boreholes interpretation by using artificial neural network 2011 (On request of "Geotehnoserviss" ltd)
[4] Kuchin Y I, Muhamedyev R I, Muhamedyeva E L, Gricenko P, Nurushev Zh, Yakunin K 2011 The analysis of the data of geophysical research of boreholes by means of artificial neural networks Computer Modelling and New Technologies **15**(4) 35-40
[5] Muhamedyev R I, Kuchin Y I, Muhamedyeva E L 2012 Geophysical research of boreholes: Artificial neural networks data analysis Soft Computing and Intelligent Systems (SCIS) and 13th International Symposium on Advanced Intelligent Systems (ISIS), Joint 6th International Conference on IEEE pp 825-9
[6] Amirgaliev E, Isabaev Z, Iskakov S, Kuchin Y, Muhamediyev R, Muhamedyeva E, Yakunin K 2014 Recognition of rocks at uranium deposits by using a few methods of machine learning Soft Computing in Machine Learning, Springer, Cham, pp 33-40
[7] Muhamedyev R I et al 2015 Comparative analysis of classification algorithms Application of Information and Communication Technologies (AICT, 9th International Conference on IEEE, pp 96-101
[8] Muhamediyev R, Amirgaliev E, Iskakov S, Kuchin Y, Muhamedyeva E 2014 Integration of Results of Recognition Algorithms at the Uranium Deposits JACIII **18**(3) 347-52
[9] Muhamedyev R, Iskakov S, Gricenko P, Yakunin K, Kuchin Y 2014 Integration of results from Recognition Algorithms and its realization at the uranium production process 8th IEEE International Conference AICT pp 188-91
[10] Kuchin Y I, Mukhamediev R I, Yakunin K O 2020 One method of generating synthetic data to assess the upper limit of machine learning algorithms performance Cogent Engineering **7**(1) 1718821 https://doi.org/10.1080/23311916.2020.1718821
[11] Appendix Results of computational experiments 2020 https://drive.google.com/open?id=1al9QqJGydtAwNzapWribV3rBPzkSPdvC 22 mar 2020

Investment project analysis under conditions of uncertainty

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Abstract

Investors today equipped with abundant amount of analysis tools to evaluate comprehensive financial data. However, an incompleteness of historical data or presence of data with probability nature of business financial states cannot be handled with existing approaches of investment analysis. This work examines methods of the game theory with nature for analyzing investment project scenarios under conditions of uncertainty. As the methods of game theory, the criteria of Maximax, Hurwitz, Laplace, Wald, Savage and Bayes were used to determine the most effective investments depending on investor's chosen strategies. As a result, an algorithm is proposed for selecting the most promising investment project based on the ranking and game theory methods.

Keywords: game theory, investment analysis, investment strategy

1 Introduction

When evaluating investments, investors often have to calculate the future values of certain, mainly financial, variables. The basis for predicting possible future results is mainly the historical data of current or similar projects. Also, in practice, to assess investments, one uses the most plausible option to calculate the behavioral model of the project. Using this method, analysts exclude the possibility of alternative results for each of the variables of the investment project and assume that the variables are accurate. [1]. But taking into account the realities of the business environment and the existence of uncertainties, the investment assessment is accompanied with analytical tools like scenario or sensitivity analysis. These analysis methods are designed to assess the economic benefits and feasibility of investment projects. In these methods, the level of price inflation, the level of currency devaluation and other uncertain attributes are reflected. But the likelihood of each of the proposed scenarios in many situations remains uncertain for investors. Even with the knowledge of the probability distribution of scenarios, a large number of scenarios and investment projects makes it difficult for an investor to make an effective decision. At this stage of the analysis, a mathematical theory of strategies called game theory comes to the rescue. There are a sufficient number of examples of classical decision rules under uncertainty, such as the Wald criterion [3], the Hurwitz criterion [4], the Savage criterion [5], the Laplace criterion [6], the Maximin criterion [7], the Maximax criterion and others. Although these criteria imply decision making under conditions of uncertainty, among them there are rules using probabilistic calculus [7], which helps to make a more accurate conclusion. The final step is to use the ranking method of investment projects for each of the described criteria. Of all the known ranking methods, the most practical is the Borda voting method [8].

2 Overview

This work describes methods of investment projects analysis:

- Game theory with nature
- Borda count method

As a result, proposes algorithm for investment project analysis under conditions of uncertainty.

3 Decision

The net present value (NPV) is one of the most commonly used financial indicator of investment effectiveness. For each of the project there are 3 scenarios of NPV has to be defined with basic, maximum and minimum values. [2] For every NPV value of every investment project the game theory methods with nature to be used to examine different investment strategies. Criteria of Maximax, Wald and Savage consider optimistic and pessimistic strategies, whereas Hurwitz, Laplace and Bayes requires distribution laws of financial attributes. For the effectiveness of considering all kinds of distribution of random variables, it is proposed to use the universal formula "gamma" distribution. Final step is to do scoring of investment criteria scenarios using the Borda count method. As a result, investor is provided by choice between one of the criteria of game theory methods with nature or aggregated value of all used methods to make effective investment decision.

4 Conclusion

Using standard methods of scenario analysis is not enough to make an effective choice of investment projects, since the investment strategy is limited to base selection approaches. Today, investors need a more complete approach with the ability to comprehensively analyze investment strategies due to the consideration of financial risks and heterogeneity

of the business environment. In this regard, the methods and rules associated with the decision under condition of uncertainty are come to help and the proposed algorithm opens up new perspectives for an in-depth analysis of investment projects.

References

[1] Savvides S 1994 Risk analysis in investment appraisal Project Appraisal **9** 3–18
[2] Brzakovic T, Brzakovic A, Petrovic J 2016 Application of scenario analysis in the investment projects evaluation Ekonomika poljoprivrede 501–13 doi:10.5937/ekopolj1602501b
[3] Wald A 1951 Statistical Decision Functions Journal of the American Statistical Association 130 doi:10.2307/2280105
[4] Hurwicz L 1951 The generalized Bayes minimax principle: a criterion for decision making under uncertainty y Cowles Commission Discussion Paper **7**
[5] Savage L 1961 The foundations of statistics reconsidered, in Studies in Subjective Probability Wiley 173–88
[6] Render B, Stair R M Jr, Hanna M E 2006 Quantitative Analysis for Management (9th ed.) ISBN: 0-13-153688-5 752 Pearson Prentice-Hall, NJ
[7] Bischoff E 2006 Quantitative Analysis for Management (9th ed.) Journal of Modelling in Management **1**(2) 184-5 https://doi.org/10.1108/17465660610703503
[8] Hayashi T 2008 Regret aversion and opportunity dependence Journal of Economic Theory 242–68 doi:10.1016/j.jet.2007.07.001
[9] Shukaev D N, Lamasheva Zh B 2016 Analiz i vybor obyektov raspredeleniya investitsiy Mezhdunarodnyy zhurnal prikladnykh i fundamental'nykh issledovaniy 130–4

Multi-criteria analysis of investment projects based on the ranking method

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Abstract

Today's business environment is becoming more challenging than ever and it brings new complexities in choosing the right investment projects for investors. Some standard financial analytical instruments do not seem to work effectively lately. Therefore, there is a growing need for new ways of handling arising business challenges. This work proposes a hybrid algorithm for the analysis of investment projects that combines the analytical hierarchy process and ranking method according to Borda count. The study shows that the hybrid approach can add a new horizon to the analysis of the investment projects and provides investors with an alternative mechanism to maximize expected profitability.

Keywords: analytic hierarchy process, Borda count, decision making, investment analysis

1 Introduction

When making an investment decision, the investor considers many alternative options for investment projects. The investor's task is to choose the most effective investment project. To choose an investment that will meet the goals of the investor, it is necessary to evaluate the projects. For a complex analysis of the investment projects, it is necessary to consider all possible financial assessment indicators, but this approach creates complexity for the investor. Therefore, it is necessary to simplify and streamline the approach of a comprehensive analysis of investment projects. One solution to this problem is to use the analytic hierarchy process. The analytical hierarchy process was developed by T. Saati [1] and is a method of organizing information for making complex decisions. This method has found wide application in making multi-criteria decisions, planning and allocating resources, as well as in resolving conflicts [2–5]. The analytic hierarchy process method can be used to rank the investment project evaluation criteria to subjectively determine the most important evaluation criteria as shown in figure 1.

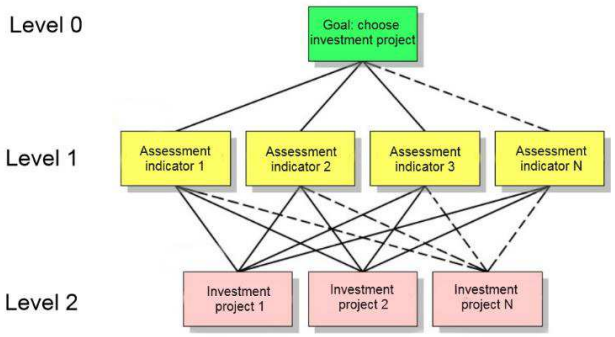

Figure 1 – Structure of decision making hierarchy

An alternative solution for making effective decision is to rank investment projects by investor's preference. In this case, it is recommended to use the method of ranking by Borda count [7]. As a result, aggregated points of all financial assessment indicators of investment projects would provide the winner project.

2 Overview

This work describes methods of investment projects evaluation:

- Analytical hierarchy process
- Borda count method

As a result, proposes hybrid algorithm of analytical hierarchy process and Borda count.

3 Decision

In order to consid er priority levels of financial assessment indicators as well as their values, hybrid approach is developed to combine two subjective decision making methods. Thus, investment projects selection approach consists of two phases. The first phase determines the weights of each of the financial indicators using the hierarchy analysis process. The second phase ranks investment projects based on the Borde Count method taking into account their indicators weights. This approach considers the following variables: financial indicators of the investment project with calculated values, the number of investment projects and investor's preferences towards projects' financial indicators. The set of financial indicators of investments, in turn, consists of net present value, internal rate of return, return on investment, payback period and index of profitability.

4 Conclusion

This hybrid approach offers an effective problem structuring method for subjective investment analysis, which supports the selection of weighting criteria for financial evaluation and ranking projects in descending order by investor's preference. This algorithm can be used as a financial tool for modeling multi-criteria ranking of investment projects for subjective decision making.

References

[1] Saaty T L 2001 Fundamentals of the Analytic Hierarchy Process. The Analytic Hierarchy Process in Natural Resource and Environmental Decision Making 15–35 doi:10.1007/978-94-015-9799-9_2
[2] Berrittella M, Certa A, Enea M, Zito P An Analytic Hierarchy Process for the Evaluation of Transport Policies to Reduce Climate Change Impacts SSRN Electronic Journal doi:10.2139/ssrn.962379
[3] Aragonés-Beltrán P, Chaparro-González F, Pastor-Ferrando J-P, Pla-Rubio A 2014 An AHP (Analytic Hierarchy Process)/ANP (Analytic Network Process)-based multi-criteria decision approach for the selection of solar-thermal power plant investment projects Energy 222–38 doi:10.1016/j.energy.2013.12.016
[4] Saaty T L, Kearns K P 2014 Analytical Planning: The Organization of System Elsevier
[5] Saaty T L 1986 Absolute and relative measurement with the AHP. The most livable cities in the United States Socio-Economic Planning Sciences 327–31 doi:10.1016/0038-0121(86)90043-1
[6] Shukaev D N, Lamasheva Zh B 2016 Analiz i vybor ob"yektov raspredeleniya investitsiy. Mezhdunarodnyy zhurnal prikladnykh i fundamental'nykh issledovaniy 130–4

Development of the network game "Who am I"

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Abstract

The human brain is constantly at work. People are constantly thinking and reasoning. Consequently, we have invented many ways to relax, such as: music, reading, playing sports and video games. Games are one of the main activities of a baby. We learn the world around us through the game. We use games as a way to relax and communicate with other people once we have grown up. In the era of information technology and the Internet, access to computer games has become incredibly simple. In a couple of mouse clicks it's possible to find an opponent for a game of chess or to participate in a simulated bank robbery. Nowadays, game development is officially considered an art form. Therefore, people who develop games combine both, an artist and a programmer.

Keywords: Information technology, games, computer games, game development.

1 Introduction

Game Development is the art of creating games and describes the design, development and release of a game. It may involve concept generation, design, build, test and release. While you create a game, it is important to think about the game mechanics, rewards, player engagement and level design.

"Who am I" - is a guessing game where players use yes or no questions to guess the identity of a famous person. It makes an excellent ice-breaker, as the game can take as little as ten to fifteen minutes.

This game is going to be made for a group of people who are playing it over the Internet. Main parts that should be developed:

- game process;
- UI/UX;
- network code (game should be working without freezing).

2 General

"Who am I?" is a card game so the whole game process is based on cards. Rules of the desktop game are: each player stick a post-it note on a nearby person, with the name of the person showing. Go around the room and have a player ask the "yes/no" question to the group. The goal is for each player to successfully guess the person written on their forehead. If the player does not guess correctly, the next person gets to ask a question. Continue play until everyone successfully guesses their name, or until time runs out.

Game development is a very difficult and effortful activity. There are a lot of big companies and studios that are doing money only by doing it. At the same time, there are little studios and game developers who are making little games in indie genre.

Stages of game development:

- planning;
- develop gameplay;
- develop beautiful UI;
- make a working prototype;
- testing;
- releasing;

Planning is the most important stage as it would be easier to develop if you plan your aims first. You should minimize cases when you change already written code and logic. In the planning stage, the most basic questions will need to be answered, like:

- What type of video game are we producing?
- Will it be 2D or 3D?
- What are some of the key features it must have?
- Who are its characters?
- Who is our target audience?
- Which platform are we building this on?

Gameplay is the specific way in which players interact with a game. It is, basically, the core code for developers' point of view. Some people might think that writing code is the most difficult part but, if everything were planned well and you have experience, it would not take long.

In my opinion, the second in importance stage is implementing the beautiful UI. No one will play your game without if it looks bad. So as a single developer you will spend hours surfing the net looking for suitable assets or creating them yourself.

Another important thing a game developer should do is try playing his game and answer if he liked it or not. Interacting with the game should be pleasing and make you want to come back.

The most accessible platform for a lightweight game is Internet because all you need is a browser and access to the network. Main programming language of the game that runs inside of the browser is JavaScript and/or PHP.

The inspiration for the idea came from the game called "agar.io". This is a game where you play as a cell and you need to eat other players to grow. The gameplay is in real-time and is very fun.

3 Conclusions

The goal of games is to entertain while the main goal of network games is to interact with other players. Base steps of creating this game are forming the idea and creating a concept. Planned complexity is writing a quality network code so players interactions are without lags and bugs. There might be a lot of enhancement, for example making the game multiplatform (so it could be played on computer, smart-phone, or game-console).

References

[1] JavaScript High Low Card Game Project From Scratch https://www.udemy.com/course/javascript-card-game/

[2] Stages of Game Development https://learn.g2.com/stages-of-game-development

Word Sense Induction: similarity measure to induce word senses

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Abstract

This article presents the developed approach for the problem on word sense induction. The developed approach is based on the application of the developed similarity measure, which determines the level of relatedness of contexts in which target words are used. The application of this approach has been demonstrated in relation to the Russian language, a language with a rich morphology and free word order that complicates the problem under consideration. The approach was tested on the data sets that were used on the first shared task on word sense induction in at the Dialogue Conference 2018.

Keywords: natural language processing, word sense induction, polysemy, homonymy, similarity measure, word embeddings

1 Introduction

One of the tasks in the field of natural language processing, which is used in many applications and has a long history, is the task of word sense disambiguation, the task of determining in what sense a polysemous word is used in the given context. Of particular interest are unsupervised approaches, so called word sense induction approaches, since they do not involve the use of annotated corpora, dictionaries, and it is especially necessary for the Russian language, since for the Russian language there is no currently comprehensive lexical inventory like WordNet for English language.

The statement of this problem is formulated as follows: a set of polysemous words (including homonyms) are given in used various contexts and it is required to group contexts according to senses in which the word is used.

This paper presents the developed approach for the word sense induction problem. The approach uses words embeddings (which are obtained on the basis of models built on neural networks) of words that constitute contexts of target words, and then considers the context of target word as a bag of word embeddings. Next, the semantic similarity of contexts is determined through the developed similarity measure by applying it to contexts represented as bags of words embeddings, thereby finding the level of relatedness between all contexts of target word. Then, the developed clustering algorithm is applied, which, on the basis of the estimated levels of relatedness between contexts, groups them according to senses they define. The resulting clusters determines contexts in according to senses which target word convey and thereby highlight senses that the target words carry in the indicated contexts.

There are a lot of models that can be used to represent words as embeddings, for example, word2vec, Glove. In the given paper the contextualized embeddings model so called ELMO was used to assign to every word its embedding.

The approach was tested on three data sets in Russian that were used in the shared task of word sense induction at the Dialogue Conference (2018). The distinction of the data sets is that the first one is constructed using only polysemous words, the second only homonyms and the third one contains polysemous words and homonyms at the same time. The clustering evaluations was based on the Adjusted Rand Index metric.

2 Conclusion

The paper presented the developed approach on task of word sense induction. The developed approach showed results that were superior on 5% to the best results demonstrated on the data set that uses both polysemous words and homonyms. On other sets, the results were also among the best. So on data set with homonyms the developed approach could surpass the second best on 15% percent according to Adjusted Rand Index.

References

[1] Panchenko A, Lopukhina A, Ustalov D, Lopukhin K, Leontyev A, Arefyev N, Loukachevitch N 2018 RUSSE'2018: A Shared Task on Word Sense Induction and Disambiguation for the Russian Language In Proceedings of the 24rd International Conference on Computational Linguistics and Intellectual Technologies *(Dialogue'2018)*

[2] Peters M, Neumann M 2018 Deep contextualized word representations. NAACL

Creation of a WEB-application for searching a vehicle for cargo transportation

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Abstract

Nowadays, various activities of different companies do not do without very close cooperation with companies that are engaged in cargo transportation for many companies, high-quality, fast, timely delivery of various cargo is one of the most important factors that affect the development and stability of this company. For private companies, a high level of transport services is no less important, because it is a guarantee of confidence and complete peace of mind during the transportation of property. As a result, every year the interest and demand for various cargo transportation is growing and growing.

The service offered by companies engaged in cargo transportation, in addition to the actual transportation of goods, also includes insurance of transported objects, preparation of a full set of documents for this product or cargo (consignment note, invoice, certificates of conformity), as well as, if necessary, its customs clearance.

1 Introduction

"A WEB-application for searching a vehicle for cargo transportation" - this is a web application used by a PC user or any gadget on which you can install the application. The advantages of this proposal: Initially, the path of the goods or cargo originates with the design concept and the best route on which to move the load, compute, and calculate the entire cost of this delivery, preparation of all necessary documentation. Then the transport and loading facilities required for this product are determined. Then the necessary permits are issued, and the movement of goods is monitored from the beginning of the journey to the moment when the cargo is delivered.The client who will use these applications receives:

- The ability to easily choose the right transport for transportation to any city;
- Ability to track the movement of the sent cargo on the map;
- Guarantee of delivery of the goods to the recipient, since payment is made after receiving the goods.

At the same time, you are freed from the long process of agreeing with logistics departments, concluding contracts, bidding with company representatives for the cost of services, and so on. The app will allow you to transport cargo that matches existing vehicles; ability to select the most interesting and profitable orders; guaranteed payment upon completion of delivery.

Using the service, you can organize any transport services – after all, the services are provided by carriers with a variety of trucks

2 Overview

This product makes it easier to find possible vehicles by selecting transport for cargo transportation in Ukraine. Collects the necessary data for further analysis and automatically generates operational reports in accordance with the client's requirements. Automatically plans delivery routes based on existing orders and vehicles, taking into account various restrictions (time Windows, vehicle type, weight, volume, and other cargo parameters). Users can be sure that the cargo will leave the recipient on time, or that the equipment will not be idle. This product can help you transport goods by road without wasting time and effort. And it doesn't matter whether you are the carrier or the customer – both parties benefit from using the service.

With this app you can:

- Free and prompt placement of orders by the shipper.
- Free and convenient cargo search by the carrier via the app for any gadget. Selecting a carrier based on cargo parameters.
- Real-time tracking of cargo location.
- Automatic calculation of optimal routes based on road quality. Recommended fare for transportation with the ability to adjust the rate. Database of qualified carriers.
- Transparent rating of customers and carrier.

3 Decision

Unfortunately, web applications also have weaknesses, which, of course, do not overshadow the advantages. But the latter look less attractive against their background.

For a start, the Internet is now available, unfortunately, not everywhere. And in many areas, the cost of traffic and the width of the Internet channel leave much to be desired.

In addition, there are a huge number of applications that cannot be replaced by browser-based ones (at least in the near future). For example, you can't create complex three-dimensional models in the browser.

Finally, the main disadvantage of web applications is that many users are confused by the fact that their data will be stored and processed somewhere on someone else's server. After all, this can potentially lead to leakage, loss or distortion of information (and in some cases it will certainly lead).

Not everyone will risk posting personal information online.

And one more significant detail. If all programs will work exclusively on a remote server, in the work of which you, of course, can not interfere in any way, then you will probably have to forget about all sorts of "quacks", patches and "left" serials. For any desired commercial software will have to spread "their blood" or look for free options. And this probably won't suit many people.

4 Conclusion

In the process of writing the first stage of the thesis (master's thesis), all the pros and cons of the future product were analyzed, as well as examples of using the application for users, and the main tasks of the product. This product must compete well in the market. To do this, it must be created without drawbacks, so that it wins primarily from its competitors with its plus:

Automatically plans delivery routes based on existing orders and vehicles, taking into account various restrictions (time Windows, vehicle type, weight, volume, and other cargo parameters).

Fifth generation technology transformation and insurgency

Nikunj Patel

Abstract

Right now, an endeavour has been made to survey different existing age of versatile remote innovation as far as their entrances, execution, favourable circumstances and weaknesses. The paper illuminates the advancement and improvement of different ages of versatile remote innovation alongside their criticalness and focal points of one over the other. In the previous barely any decades, versatile remote advances have experience four or five ages of innovation upheaval and development, specifically from 1G to 4G. Ebb and flow explore in portable remote innovation focus on advance execution of 4G innovation and 5G innovation. As of now, the 5G term isn't formally utilized. In 5G inquire about is being made on the advancement of World Wide Wireless Web (WWWW), Dynamic Ad-hoc Wireless Network (DAWN) and Real Wireless World. Right, now propose novel system engineering for cutting edge 5G portable systems. In the proposed engineering the versatile terminal has the likelihood to change the Radio Access Technology – RAT dependent on certain client criteria.

Keywords: Evolution from 1G- 5G, 5G Network Architecture, Need of 5G

1 Introduction

The adaptable remote industry has started its development creation, upset and progression since the mid-1970s. In the past very few decades, flexible remote advanced have experience 4 or 5 times of development upset and improvement. The media transmission organization in world incorporated a mind-blowing hop inside the latest couple of years. 6 billion people have mobile phones so we will analyse the various periods of cell structures as moved in the headway of convenient correspondences from the first time to the fifth time. We can separate this could be a direct result of the addition in the telecom customers bit by bit. In the present moment, there are four ages in the compact business. These are independently 1G- The first generation, 2G-the second generation, 3G- the third generation, and a short time later the 4G-the fourth generation, 5G-the fifth generation. By and by days assorted remote and convenient advances are accessible, for instance, third-period adaptable frameworks (UMTS-Universal Mobile telecommunication System, CDMA2000), LTE (Long Term Evolution), Wi-Fi (IEEE 802.11 remote frameworks), WiMAX (IEEE 802.16 remote and compact frameworks), similarly as sensor frameworks, or individual district frameworks (for instance Bluetooth, ZigBee). Compact terminals consolidate the collection of interfaces like GSM which rely upon circuit trading. All remote and convenient frameworks complete all-IP rule, that suggests all data and hailing will be moved by methods for IP (Internet Protocol) on sort out layer. Fifth-time advancement gives workplaces like camera, MP3 recording, video player, colossal phone memory, sound player, etc. the customers never imagine and for kids shaking satisfaction with Bluetooth advancement and Piconets. The fifth time remote correspondence without limitation, which makes the immaculate remote certifiable world- World Wide Wireless Web (WWWW). The fifth period relies upon 4G headways. The fifth remote compact web frameworks are certified remote world which will be reinforced by LAS-CDMA (Large Area Synchronized Code-Division Multiple Access), OFDM (Orthogonal repeat division multiplexing), MC-CDMA (Multi-Carrier Code Division Multiple Access), UWB (Ultra-wideband), Network-LMDS (Local Multipoint Distribution Service), and IPv6. Fifth-period advancements offer tremendous data capacities and boundless gather volumes and unending data impart inside the latest adaptable working system. The fifth period ought to have impact and add more organizations and points of interest to the world over 4G. The fifth period should be logically sharp advancement that interconnects the entire world unbounded. This age is dependent upon to be released around 2020. The universe of comprehensive, ceaseless access to information, preoccupation and correspondence will open new estimation to our lives and change our lifestyle in a general sense.

2 5G Networks

5G arrange is quick and dependable. The idea of handheld gadgets will be changed with the coming of 5g. Presently all the administrations and applications will be gotten to by single IP as communication, gaming and numerous other sight and sound applications. As it's anything but another thing in the market and there are a huge number of clients everywhere throughout the world who have encountered the remote administration's remote innovation. It is difficult for them to contract from utilizing this new 5G arrange innovation. There is just a need to make it open with the goal that a typical man can undoubtedly bear the cost of the beneficial packs offered by the organizations so the 5G system could hold the legitimate spot. There is have to win the client's trust to fabricate a reasonable long-haul connection to make a solid situation in the media transmission field. To finish with the previous remote advancements in the market 5G organize needs to delicate something dependable something additionally spearheading. All the highlights like communication, camera, mp3 player, are coming in new cell phone models. 4G is giving all these utilities on a cell phone. By observing the highlights of 4G one can get an unpleasant thought regarding what 5G Networks could offer. There is detachment, photograph display, and sight and sound applications that are additionally going to be the piece of 5G. There would be no contrast between a PC and a cell phone rather both would act the other way around.

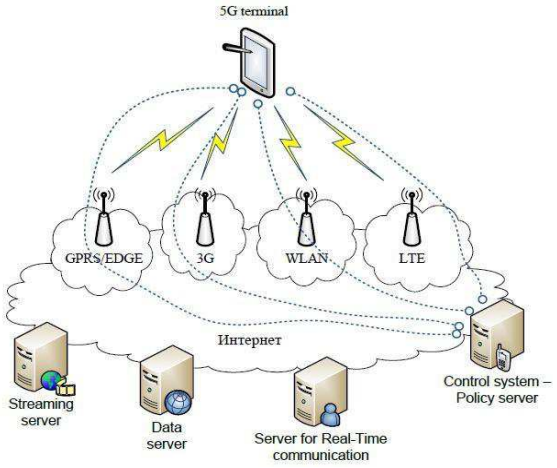

Figure 1 5G Mobile Network Architecture

3 Plan of 5G Mobile Network Architecture

The figure shows the framework model that proposes a plan of system engineering for 5G versatile frameworks, which is an all-IP based model for remote and portable systems interoperability. The framework comprises a client terminal (which has a vital job in the new design) and various free, self-sufficient radio access advances. Inside every one of the terminals, every one of the radio access advances is viewed as the IP connection to the outside Internet world. In any case, there ought to be a distinctive radio interface for each Radio Access Technology (RAT) in the versatile terminal. For a model, if we need to approach four distinct RATs, we have to have four diverse access - explicit interfaces in the portable terminal and to have every one of them dynamic simultaneously, with a plan to have this design to be useful.

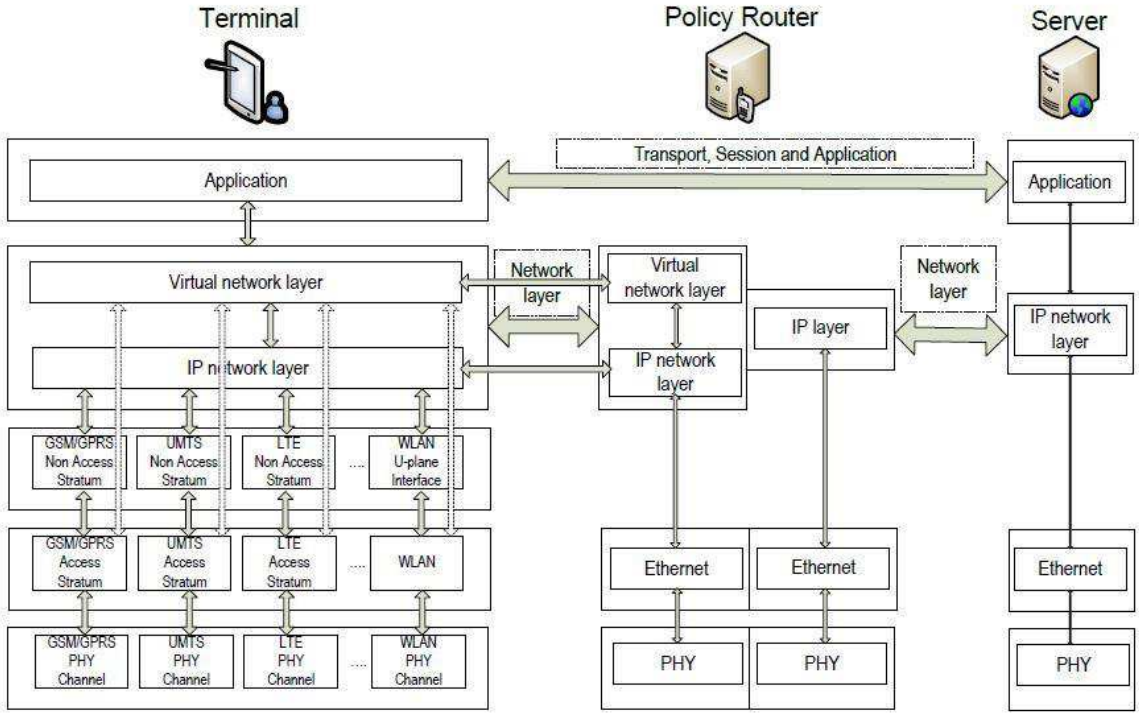

Figure 2 Protocol Layout for the Elements of the Proposed Architecture

4 Why Is 5G Required

The significant distinction, from a client perspective, between current ages and expected 5G strategies must be something different than expanded greatest throughput; different prerequisites include: Lower outage likelihood; better inclusion and high information rates accessible at the cell edge. Lower battery utilization. Various simultaneous information moves ways. Around 1Gbps information rate in portability. Progressively secure; better intellectual radio/SDR Security. Higher framework level unearthly effectiveness. Overall remote web (WWWW). More applications joined with a fake keen (AI) as human life will be encompassed by fake sensors which could be speaking with cell phones. Not unsafe for human wellbeing. Less expensive traffic charges because of low infrastructure arrangement costs.

5 Future Scope

The future improvement of Nano-centre will be mind boggling as it joins with counterfeit clever (AI). One can ready to control his astute Robot utilizing his cell phone. Your Mobile can naturally type the message what your mind thinks. We may get a condition where we don't require any range for correspondence. The Google hot patterns have appraised the term 6G as the seventeenth most looked through word in the web crawlers. The iPod 6G comes in seven distinct hues and has an aluminium body which makes the body solid to with stand consistent day by day use. It has a clasp on configuration like iPod mix and it joined to shirt solidly. 6G innovation haven't been completely uncovered at this point yet search queries like what is 6G versatile innovation, 6G innovation, 6G portable, 6G arrange, 6G wiki, 6G innovation ppt. are getting increasingly acquainted with new portable innovation getting advanced.

6 Conclusion

At this moment, induce that 5G arrange is fast and strong. Fifth time relies upon 4G propels. The fifth remote flexible web frameworks are certified remote world which will be reinforced by LAS-CDMA (Large Area Synchronized Code-Division Multiple Access), OFDM (Orthogonal repeat division multiplexing), MC-CDMA (Multi-Carrier Code Division Multiple Access), UWB (Ultra-wideband), Network-LMDS (Local Multipoint Distribution Service), and IPV6. Fifth-time headway offer monster data limits and unhindered amass volumes and vast data impart inside the latest adaptable working structure. The fifth period ought to have a critical impact and add more organizations and points of interest to the world over 4G. Fifth time should be continuously keen development that interconnects the entire world unbounded. This age is dependent upon to be released around 2020. The universe of general, persistent access to information, diversion and correspondence will open new estimation to our lives and change our lifestyle by and large.

References

[3] Tudzarov A, Janevski T 2011 Functional Architecture for 5G Mobile Networks International Journal of Advanced Science and Technology **32**
[4] Ms. Neha Dumbre, Ms. Monali Patwa, Ms. Kajal Patwa 2013 5G WIRELESS TECHNOLOGIES-Still 4G auction not over, but time to start talking 5G" International Journal of Science, Engineering and Technology Research (IJSETR) **2**(2)
[5] Akhilesh Kumar Pachauri, Ompal Singh 2012 5G Technology – Redefining wireless Communication in upcoming Years International Journal of Computer Science and Management Research **1**(1) ISSN 2278 – 733X
[6] Ms. Reshma S. Sapakal, Ms. Sonali S. Kadam 2013 5G Mobile Technology International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) **2**(2)
[7] Suvarna Patil, Vipin Patil, Pallavi Bhatt 2012 A Review on 5G Technology International Journal of Engineering and Innovative Technology (IJEIT) **1**(1)
[8] Professor T.Venkat Narayana Rao, Aasha S. A., Sravya Tirumalaraju 2011 5G TECHNOLOGIES – AN ANECDOTE OF NETWORK SERVICE FOR THE FUTURE Journal of Global Research in Computer Science **2**(7)
[9] Saddam Hossain 2013 5G Wireless Communication Systems American Journal of Engineering Research (AJER) e-ISSN: 2320-0847 p-ISSN: 2320-0936 **02**(10)-344-53 www.ajer.org

Design and development of the "Bulletin Board" website

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Abstract

After the Internet became a part of our life, it significantly facilitated the life activity of all mankind, as well as saving time for many segments of the population. Through the Internet, people exchange various information on a daily basis, study scientific activities, develop, or just relax. And for many people, the Internet has become a means of earning a living. Since time is a very valuable resource for everyone, it is necessary to learn how to save money and use it beneficially. Increasingly, people began to order various household items, food, clothing, equipment and much more on the Internet. This saves time and makes life much easier. One of the breakthroughs on the World Wide Web is the creation of «Bulletin Board». You no longer have to go to every site that does something specific. All of this has been replaced by a single website - the «Bulletin Board». The user simply finds the product he needs, calls up or writes off the seller and orders it, choosing the delivery and payment options. In addition, here you can buy not only new products, but also used ones. And also: find a job, rent a house, buy an apartment or rent a car.

1 Introduction

A «Bulletin board» is a special website or web application used by a PC user. The advantages of this site are enormous: you can find everything you want here. And also, to save your time. You no longer have to climb through the various sites and order from numerous online stores. Here you have everything you need, and even more. And it is very easy to find the goods. You only need to enter the right product in the search box that you want to order, and contact the seller. The product can be either used or brand new. In this case, «Bulletin Board» allows you to trade with the seller for the price. Which is strikingly different from ordinary shops. Among other things, here you can even put your product for sale. You just choose the right area, to which the product refers, and start selling. Usually, potential customers begin to be interested in the product within 1-2 days. Sometimes even more, depending on the product. In the «Bulletin Board» there are other areas of interest. For example, rental of premises (both residential and office types), or offers of work (vacancies), organization of concerts, other events, rent a car, leasing or renting any vehicle (and not a vehicle). In this case, «Bulletin Board» does not even need any special or unique design. Here minimalistic style will suit quite well, because the main thing in this business is functionality.

But, this website also has disadvantages. First of all, it concerns unscrupulous sellers who want to make money on trusting customers. They can simply sell "air", deceiving customers who pay for the goods by cashless payment. Also, not everything is so smooth with customers who place an order with cash on delivery and then just do not come and take the goods at the post office. And the buyer loses his money for delivery in both directions and, accordingly, time.

2 Overview

The feature of «Bulletin board» is that absolutely anyone on the planet who has access to the Internet, can go to the site and submit any ad he wants. And then, after viewing this ad site moderator, your service will be available to everyone. And it is absolutely free! Unless, of course, you want to buy an ad to outdo competitors. This is also possible, but the price "bites". Although if you want to sell quickly - this is the most advantageous offer. Buyer can be anywhere in the world and order the product anywhere, in any country and city. In this case, unlike conventional stores, in «Bulletin Board» you can write to the seller or call him, asking him to videotape the working state of the product, its functionality and appearance. This will allow the buyer not only to make sure that the product is working, but also that the seller will not cheat and will not sell "air".

«Bulletin board» helps the user in the following:

- saving your own time and money;
- removing geographical limits;
- availability of used and new products;
- the ability to find absolutely everything you need.

Your personal data is only visible to the administrator and moderator of the «Bulletin Board» website. Third parties will not be able to see this data.

3 Decision

During the investigation revealed several problems that need to be addressed:

- fast turnover of ads. When a user has added a new ad, and after it 20 more people have placed similar ads with goods or services in this area, your product will be the last and it will be difficult to find it. It is necessary to make the same conditions for all users to see the goods, if they were added even a week ago. One of the possible solutions to the problem is to allow users to update the date of placement of their products every day;
- unscrupulous sellers and buyers. As a matter of fact, in «Bulletin Board» everything is built on trust, therefore it is necessary to minimize possible losses of personal funds both from the seller and the buyer.

4 Conclusion

While writing the first stage of the diploma project (master's work), all possible problems and disadvantages of the future product were analyzed, as well as development goals, deadlines and main tasks were formed. Both advantages and disadvantages that need to be eliminated were identified. It is necessary to create a product in which there would be significant advantages and minimum disadvantages.

Analysis of the quality of video transmission in Wi-Fi networks depending on the algorithm used packet queue management

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Abstract

Wireless information transmission systems exist as much as human civilization itself. Technologies are changing, but the essence of transmission networks remains the same - to organize the interaction of several different elements so that information without wires at a given time comes from one point to another.

Keywords: Information technology, wi-fi, wireless technology, traffic analysis

1 Introduction

Wireless technologies - a subclass of information technology, are used to transfer information between two or more points at a distance, without requiring a wired connection. To transmit information, radio waves can be used, as well as infrared, optical or laser radiation.

There are many wireless technologies most commonly known by marketing names, such as Wi-Fi, WiMAX, Bluetooth. Each technology has certain characteristics that are determined by its scope.

2 General

In this topic, we will unmask the behavior of a Wi-Fi network with video traffic when implementing various queue management algorithms.

- Drop Tail
- Random Early Detection In / Out Coupled (RIO-C)
- Random Early Detection In / Out De-coupled (RIO-D)
- Adaptive Random Early Detection (Adaptive RED)

To achieve this goal we will perform the following tasks:

1. Consider the network requirements from multimedia traffic and the limitations of TCP / IP networks.
2. Simulate Wi-Fi transmission of video and web traffic using the Drop Tail, RIO-C, RIO-D, Adaptive RED packet queuing algorithms running on the router.
3. To analyze the impact of these technologies on the quality of video transmission. Estimate the size of the queue, the total network latency, PSNR (SNR) of the received video.
4. To assess the influence of the parameters of the Adaptive RED algorithm on network delays, as well as the quality of video transmission, based on the PSNR criteria.

Random early detection (RED), also known as random early discard or random early drop is a queuing discipline for a network scheduler suited for congestion avoidance.

In the conventional tail drop algorithm, a router or other network component buffers as many packets as it can, and simply drops the ones it cannot buffer. If buffers are constantly full, the network is congested. Tail drop distributes buffer space unfairly among traffic flows. Tail drop can also lead to TCP global synchronization as all TCP connections "hold back" simultaneously, and then step forward simultaneously. Networks become under-utilized and flooded-alternately, in waves.

RED monitors the average queue size and drops (or marks when used in conjunction with ECN) packets based on statistical probabilities. If the buffer is almost empty, then all incoming packets are accepted. As the queue grows, the probability for dropping an incoming packet grows too. When the buffer is full, the probability has reached 1 and all incoming packets are dropped.

RED is more fair than tail drop, in the sense that it does not possess a bias against bursty traffic that uses only a small portion of the bandwidth. The more a host transmits, the more likely it is that its packets are dropped as the probability of a host's packet being dropped is proportional to the amount of data it has in a queue. Early detection helps avoid TCP global synchronization.

The adaptive RED or active RED (ARED) algorithm infers whether to make RED more or less aggressive based on the observation of the average queue length. If the average queue length oscillates around min threshold then early detection is too aggressive. On the other hand, if the average queue length oscillates around max threshold then early detection is being too conservative. The algorithm changes the probability according to how aggressively it senses it has been discarding traffic.

Random early detection (RRED) algorithm was proposed to improve the TCP throughput against Denial-of-Service (DoS) attacks, particularly Low-rate Denial-of-Service (LDoS) attacks. Experiments have confirmed that the existing RED-like algorithms are notably vulnerable under Low-rate Denial-of-Service (LDoS) attacks due to the oscillating TCP queue size caused by the attacks. RRED algorithm can significantly improve the performance of TCP under Low-rate Denial-of-Service attacks.

3 Conclusions

During the work, issues related to the transmission of video information over a wireless Wi-Fi network were considered, with the introduction of various packet queue control algorithms on the router. Also, factors affecting the quality of video transmission are identified.

References

[1] Tanenbaum E 2012 Computer Networks 5th ed. - SPb.: Peter 960 p
[2] Olifer G V, Olifer N A 2008 Computer Networks, 3rd ed. - St. Petersburg: Peter 958 p

Text mining of news articles for prediction oil stock price

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Abstract

At the present time, oil prices forecasting is one of the most issues, research areas. Most of the work involved in predicting oil prices was based on structured data, while in this work news articles would be used as unstructured data to sentiment analysis. The sentiment analysis is used to extract key information from texts and will be viewed by three perspectives of: negative, neutral, and positive sentiment. Finally, this work will analyze various views to improve prediction and get more accurate model.

Keywords: text mining, prediction stock price, sentiment analysis, NLP

1 Introduction

Oil for the country isn't only a product, but also the foundation of stability with which economic prospects are connected. Thus, fluctuations in oil prices have a crucial role for domestic economic stability. However, it's impossible to search out fundamental influencing factors on the change in oil prices, since geopolitics, market speculation may affect the change price of oil. Research has shown that price fluctuations are non-linear, and chaotic [1], which complicates the task of predicting oil prices.

With the event of the web and large data technologies, unstructured data began to be used more and more often, which store potential information, providing a replacement source of information for forecasting. To prove the considerable contribution of text mining to plug price forecasts, one can cite the instance of the work of Liu et al., who extracted a system of indicators from the company's Twitter to research its relationship with stock returns, and therefore the results show that Twitter indicators and stock prices are better connected than traditional industrial indicators [2].

For a deeper analysis of forecasting, it is not enough to simply extract the "quantity" in news, but the mood of the texts also plays an important role. A study conducted by Tetlock showed that media pessimism has predictive power for exchange prices [3]. Also, Li et al. used the LDA theme model and CNN neural network model to extract the mood of the news text, which improved the prediction model [4]. Thus, researches show that news emotions can better predict oil prices.

Based on the foregoing, we propose a new model for forecasting using text mining. We use the textual opinion obtained using textual analysis in a predictive model to spot the most effective thanks to use text. First, we examine the connection of text with news headlines and oil prices. Then, we examine the difference between the categories of textual moods to determine the effect on the worth. Finally, we show how an extra source of information can improve the forecasting result.

2 Overview

In this paper, the model is split into two main branches.

- The primary branch is that the processing of text data
- The second is that the processing of oil price data.

The ultimate model of oil price forecasting is combined with textual information on oil price and, finally, its effectiveness is evaluated.

3 Methods

This paper uses Brent crude oil price data (USD/barrel) from 27 March 2015 to 27 March 2020 as data. We select the data from 27 March 2015 to 27 March 2019 as training and modeling data and data from 28 March 2019 to 27 March 2020 as test data.

Based on the above price data, we draw a time series diagram which describes how oil prices fluctuate over time, are shown in Figure 1.

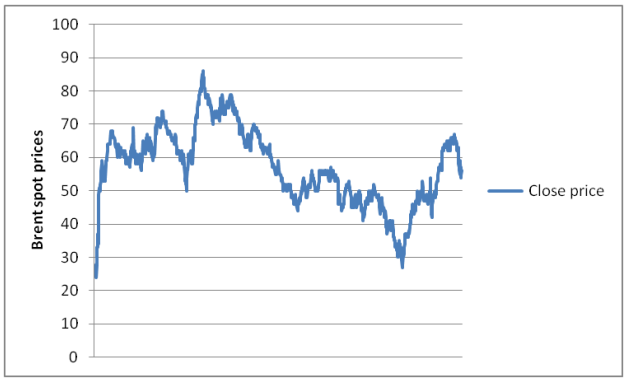

Figure 1 Daily Brent crude oil prices

In terms of web text, we use Python to scrape web text based on oil price related key words such as 'oil price', 'brent crude oil' from reliable online media such as Google News (https://www.news.google.com). We will pre-process the text data so as to urge more accurate results at the analysis stage. To do this, we filter the wrong text, and then

we delete the abnormal words.

The next step is text analysis. For text analysis we use VADER. VADER is rule-based unsupervised method [5]. Due to this method, we get sentiment analysis of text defined as Figure 2

news_title	neg	neu	pos	comp	sub
The Oil Glut Is About To Get Even Worse | OilP...	0.256	0.744	0.0	-0.4767	0.6000
Brent Oil Prices Continue Their Fall, Plunging...	0.000	1.000	0.0	0.0000	0.0000
Bloomberg - Are you a robot?	0.000	1.000	0.0	0.0000	0.0000
Closing prices for crude oil, gold and other c...	0.291	0.709	0.0	-0.5719	0.6875
U.S. Oil Prices Plunge to Lowest Level in 18 Y...	0.224	0.776	0.0	-0.3818	0.0000

Figure 2 Sentiment analysis of news title

Our last step is to create a model. When forecasting, we chose logistic regression, RF (random forest) and decided to use a neural network in addition.

4 Conclusion

An additional source of data, namely textual information, provides significant advantages in forecasting oil prices. When forecasting, you need to consider that the model is better if the sentiment analysis of text is strong enough. Therefore, it is important to identify the strength of sentiment of text.

References

[1] Panas E, Ninni V Are oil markets chaotic? A non-linear dynamic analysis
[2] Liu L, Wu J, Li P, Li Q A social-media-based approach to predicting stock comovement
[3] Tetlock P C Giving content to investor sentiment: The role of media in the stock market
[4] Li J, Xu Z, Xu H, Tang L, Yu L Forecasting Oil Price Trends with Sentiment of Online News Article
[5] Hutto C J, Gilbert E VADER: A Parsimonious Rule-Based Model for Sentiment Analysis of Social Media Tex

Application for controlling public transport in town

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Abstract

In today's world, the Internet has become an integral part of our daily lives. A huge number of people on the Earth now use the Internet for various purposes. The Internet helps people in communicating with each other, transferring various data, finding the necessary information, and in general – make our life easier. By virtue of its nature, a person has limited resources, one of which is very important for any person - time. Time is a resource that a person cannot, at the moment, increase to himself at any moment. Therefore, human time is a very expensive and very important resource that must be used as rationally as possible. To rationally use time, people often resort to using taxi services. If a person does not have a car and he urgently needs to quickly move from point A to point B - a taxi will help a person to pass this way. This work will resolve the main problems with taxi service in the city.

1 Introduction

Taxi (or taxicab, cab) – is a type of vehicle for hire with a driver, used by a single passenger or small group of passengers, often for a non-shared ride. [1].

The advantages of this vehicle include the speed of the vehicle, since it does not need to stop at stops and drop someone off, like in public transport. A taxi carries a person from A to B without any unnecessary stops, with the exception of unforeseen circumstances. Also, of the advantages of a taxi - a passenger might carry a lot of baggage, which will be inconvenient to carry in public transport, if you also take into account the fact that buses need to pay extra for oversized baggage.

The disadvantages of taxis are, first of all, the high cost of taxi services. Since the taxi driver receives money from one person for each trip, he needs to calculate the cost of the trip to the passenger, the cost of the trip with the passenger to the place of arrival, depreciation, profit and interest to the company that holds the state of this taxi driver or the percentage of the application in which he registered his car as a taxi. From the aggregate cost of these actions comes a considerable amount that you need to pay as a passenger for one trip. Another disadvantage of a taxi is its low passenger capacity. If there is a need for a huge company, for example, more than 6 people, to use a taxi - they will either need to look for a taxi bus, which are not so popular in a taxi, or order 2 cars. Both options will increase the cost of paying for taxi services. The last point I want to highlight the coverage of the city by taxi drivers in regions or districts. Sometimes it is impossible to find a taxi in a specific area, as they simply are not there, and a taxi driver from a neighboring area may not agree to go, as it is not beneficial for him.

The main task of this thesis project is to apply theoretical and practical knowledge in programming for the implementation of this product, familiarize yourself with the finished functionality, familiarize yourself with the development, testing of this software product and prepare a report.

2 Overview

The features of the subject area are to enable the user, in real time, to track the movement of road vehicles in the city, view the route and where the taxi is at this moment on the route, and get the exact time the vehicle arrives at a specific location on the map.

The application should solve the following problems:

- notification of the user about the timely arrival of a taxi;
- display taxi on the map;
- display of the full taxi route on the map;
- save money on taxi services for the driver and passenger at the same time.

In this subject area, there are also a number of restrictions that relate to the confidentiality of information, such as:

- the personal data of the user should not be visible to anyone except the user (not taking into account the data that needs to be shown about the user in order to identify him);
- the location should not be accessible to anyone except the passenger and driver.

3 Decision

During the analysis of analogues, the following requirements were identified:

- the application must have adaptation for different mobile versions of the Android platform (5+);
- the application should show in real time the movement of the vehicle;
- he application should be accessible with the minimum required set of information;

The system must be adapted to the loads and protected from unauthorized user access to real-time taxi or user position display devices.

4 Conclusion

When writing the first part of the graduation project, the problems of the developed software product were determined, the development goals, the subject and the object of development were formed. To understand the developed product, information about this area of its advantages and disadvantages was displayed. Development goals were set in order to form the functionality of an optimal project that would have fewer disadvantages and more advantages.

References

[1] Taxicab – Wikipedia https://en.wikipedia.org/wiki/Taxicab

Image processing for detection and geolocation of objects using UAV

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Abstract

Unmanned aerial vehicles (UAVs) have become popular in recent years in a huge number of applications, especially for object detection, localization and tracking of objects in some areas. However, these tasks can be difficult to solve for small objects or complex scenes. In this work, we aim to analyse and generate an algorithm for post-object detection and post-GPS localization of the detected object.

Keywords: unmanned aerial vehicles, object detection, object classification, computer vision, machine learning, convolutional neural networks.

1 General

The successful use of UAVs together with image processing algorithms lead to the expansion of UAV application areas. The use of UAVs to locate an object, determine its location and track movements has long attracted the interests of various scientists. But the most projects focus on motion detection and visual tracking [1]. In this paper, we will use machine learning algorithms for scenes from UAVs to detect objects. The development of computer vision systems leads to the appearance of better algorithms with open and big datasets by training and classifying the data with the help of machine learning approaches.

In our research, we will use CNN for target detection from aerial images using UAV. Then GPS coordinates of the detected object have to be determined. The post-processing module automatically will load that image including the necessary information for that image. The next step it will calculate and provide the GPS coordinates of the target on the image. We will focus on enabling UAVs to continuously collect geo-referenced data and detect objects.

Almost all CNN approaches remodel classifiers to perform detection, applying them in different locations and scales. Each individual component of those pipelines is trained separately, that makes them slow to compute and hard to implement.

One of the popular algorithms, for now, is YOLO. An architecture of YOLO is presented by a single neural network made of 24 convolutional layers and 2 fully connected layers. The core of the idea is that You Only Look Once to predict what objects are present and where they are [2]. That means object detection is considered as a single regression problem. Prediction of bounding boxes and class probabilities are made directly from full images in one evaluation.

Yolo has some limitations, such as: each grid cell predicts only 2 boxes and can only have 1 class; there are still problems with small objects detection and incorrect localizations. Despite this, Yolo outperforms other methods in learning very generalizable representation of objects, so it could be applied in a wide domain: from natural images to artwork.

References

[1] Kadnichanskiy S A 2016 Jingxuan Sun, Boyang Li, Yifan Jiang and Chih-yung Wen Sensors **16**(11) 1778

[2] Joseph Redmon, Santosh Divvala, Ross Girshick, Ali Farhadi 2016 You Only Look Once: Unified, Real-Time Object Detection

The economic impact of intelligent technologies in health care

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Abstract

The development of modern technologies leads to an increase in big data in the health sector. Healthcare systems face incredible challenges and need to improve health outcomes while containing costs. Medical data is being digitized, plus the volume of data from portable health monitoring devices is increasing significantly, which leads to such problems as the volume, speed, diversity, and reliability of data. With its ability to collect and analyze an enormous variety of data, Intelligent Technologies have the potential to have a tremendous and positive impact on doctors and patients in the healthcare industry. Research shows that even a relatively small investment in the mass adoption of BD technologies in this area can significantly improve the quality of life of individuals and support the active lives of the elderly and disabled in the short term. With Intelligent Technologies tools, out-patient and in-patient care costs can be significantly reduced, and productivity and efficiency in care can be improved. In this thesis, we consider what components will form the economic effect of AI application in the health care sector in Kazakhstan.

Keywords: intelligent technologies, health care, big data

1 General

The problem of population health management is strongly positioned as one of the highest-ranking among priorities of any state [1]. In developed countries, for information support to healthcare management tasks healthcare, Big Data (BD) analysis results are being used increasingly [2]. According to analysts of McKinsey Global Institute, the application of BD technologies in US healthcare will generate a $300 billion financial flow in cost equivalent, where two-thirds of which are made on account of cost reduction in the US healthcare system [3]. Studies show that even relatively small investments in the mass adoption of BD technologies in this area can significantly improve people's quality of life in a short time [4, 5]. Healthcare efficiency at all levels of management depends on the application of BD analysis results for decision-making [6, 7]. The resulting BD medical analysis models will be used in decision support systems for treatment and treatment management; information systems for evaluating drug use; mobile, body-worn devices; medical image recognition and analysis; medical navigation information systems; telemedicine; patient remote control systems, etc.

Application of BD analysis results in modern diagnostics and health screening will reduce substantially costs of out-patient and in-patient treatment, as well as costs of active living assistance for elderly and disabled people. The initiatives in the field are related to the application of information and communication technologies (ICT) [7, 8, 9, 10]. For instance, Active and Assisted Living Program - AAL is being implemented in Europe [11], uniting 123 projects with the joint purse of approximately €700 million; in different countries, there were established communities and scientific institutions being oriented to acquisition and processing of gerontological data [12, 13, 14, 15, 16, 17, 18, 19, 20].

The volume of data from portable health monitoring devices is growing significantly, contributing to the development of the market for medical BD analysis tools, which according to the agency Ovum, may grow to $ 11 billion in 2018 with an average growth rate of 30%. At the same time, it is expected that up to 70% of the market will be occupied by technologies that assess health conditions [21]. The economic effect will consist of several components.

Firstly, the use of healthcare data will contribute to the emergence of a new market for services, the volume of which can be estimated at 1-5 billion dollars by analogy in the European market of gerontological services (300 billion) and taking into account the lower living standards in value terms and a smaller (approximately 30 times) population of Kazakhstan.

Secondly, the economic effect can be achieved from the implementation of the developed models and methods for the analysis of medicinal BD, including such as from data and software export. By analogy with the McKinsey Global Institute's analysis above, the market for services based on large healthcare data processing technologies could be as large as $100 million.

Thirdly, the system will aid to reduce state healthcare expenditures for older people (which make up to 70% of all healthcare expenditures) and to optimize systems of health insurance. Reducing these costs by only 1 percent will have an economic effect of about $2 million per year.

References

[1] Malykh O L, Kochneva NI, Shmakov DA 2016 Sanological prognosis of population health New problems of modern medicine: materials IV Intern. sci. Conf. (St. Petersburg, December 2016) SPb.: The publishing house 2016 71-6 (in Russian)
[2] The State Program for Health Development of the Republic of Kazakhstan "Densaulyk" for 2016-2019 Ministry of Labor and Social Protection of Population of the Republic of Kazakhstan **E-source:** https://www.enbek.gov.kz/ru/node/332663: 15.08.2017 (in Russian)
[3] Manyika J, Chui M, Brown B, Bughin J, Dobbs R, Roxburgh C, Byers A H 2017 Big data: The next frontier for innovation, competition, and productivity. McKinsey Global Institute **E-source:** https://goo.gl/x8sMHi: 27.08.2017
[4] Savchuk I 2014 Big Data-technology Giving rise to a new type of business Business & Information Technologies **3** 36 (in Russian)
[5] Rivero E 2017 Twitter 'big data' can be used to monitor HIV and drug-related behavior, study shows University of California Los Angeles **E-source:** https://goo.gl/gM1JHJ: 20.08.2017
[6] Raghupathi W, Raghupathi V 2014 Big data analytics in healthcare: promise and potential Health information science and systems **2**(1) 3
[7] Ahmad P, Qamar S, Rizvi S Q A 2015 Techniques of data mining in healthcare: a review International Journal of Computer Applications **120**(15)
[8] Chen J H, Goldstein M K, Asch S M, Mackey L, Altman R B 2017 Predicting inpatient clinical order patterns with probabilistic topic models vs conventional order sets Journal of the American Medical Informatics Association **3** 472-80
[9] Ambient Assisted Living Roadmap Edited by Ger van den Broek et al AALIANCE project AALIANCE Office, Berlin: 2010 **6** 162
[10] Stefano Kluzer et al. 2010 Long-term Care Challenges in an Ageing Society: The Role of ICT. Results from a study on England, Germany, Italy and Spain EC JRC 33
[11] Official portal "Active and Assisted Living Programme" AAL ASSOCIATION **E-source:** http://www.aal-europe.eu/about/: 25.08.2017
[12] CareStore Project The project to create applications and devices for the life-support environment **E-source:** https://www.carestore.eu: 26.08.2017
[13] AGE Platform of Europe European network of non-profit organizations for people aged 50+ **E-source:** http://www.age-platform: 30.08.2017
[14] Gerontological Society of America (GSA) **E-source:** https://www.geron.org: 31.08.2017
[15] German Society of Gerontology and Geriatrics **E-source:** http://www.dggg-online.de/englisch.php: 19.08.2017
[16] National gerontological center of Russia **E-source:** http://ngc-russia.chat.ru: 20.08.2017 (in Russian)
[17] Saint-Petersburg Institute of Bioregulation and Gerontology **E-source:** http://eng.gerontology.ru: 28.08.2017 (in Russian)
[18] Israel Gerontological Data Center **E-source:** http://igdc.huji.ac.il: 31.08.2017
[19] European Innovation Partnership on Active and Healthy Ageing **E-source:** http://ec.europa.eu: 02.08.2017
[20] **Gerontological Society of China E-source:** http://en.cncaprc.gov.cn/nnsc/47192.jhtml: 10.08.2017
[21] Mobile medicine Forum "Open innovation" Where the Technological Market Is Moving: Prospects for Russia **E-source:** https://goo.gl/VJ2hsC: 23.08.2017 (in Russian)

Possibilities of improving the effectiveness of managing intellectual capital of ISMA HEI

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Abstract

The article discusses the possibilities of improving the effectiveness of managing intellectual capital on example of ISMA HEI, located in Riga, Latvia. Methods of evaluation of both intellectual and human capital were analysed and a survey of ISMA students to evaluate overall performance of ISMA staff was performed. Results of the study allowed improving existing managerial operations at the related HEI thus improving overall business performance of the enterprise.

Keywords: HEI, intellectual capital evaluation methods, survey, questionnaire

1 Introduction

The object of the research is the management process of the intellectual capital of ISMA University of the Applied Sciences, located in Riga, Latvia. The subject of the research is the combination of both human and intellectual capital evaluation methods that could be applied to increase overall performance of management process at the mentioned HEI. To achieve targeted aim, theoretical, empirical and survey methods were applied.

Human capital is the dominant component in the structure of intellectual capital, because only a high level of professionalism, awareness and experience of employees allows the enterprise to realize its existing potential.

The following functions are implemented within the human capital management subsystem:

- improving the level of education, qualifications of personnel of the enterprise;
- formation of the necessary professional knowledge;
- building an effective, results-oriented corporate culture;
- attraction of unique specialists.

To understand the effectiveness of the implementation of personnel management functions in higher education institutions (HEI), such as motivation, it is necessary to regularly evaluate both intellectual and human capital as one of its components.

2 Evaluation methods

In recent years, many alternative evaluation methods have been proposed, with particular emphasis on non-financial indicators.

According to D. Luthy (Luthy D. Intellectual Capital and its Measurement, Asian Pacific Interdisciplinary Research Conference in Accounting (APIRA), 1998.) and M. Williams [1, 3], these methods can be divided into the following groups:

1. Direct Intellectual Capital Methods (DICMs) measure the monetary value of intangible assets by identifying its various components. Once these components are identified, they can be evaluated directly individually or using an aggregation indicator.
2. Market Capitalization Methods (MCMs) make it possible to calculate the value of intellectual capital or intangible resources as the difference between the market capitalization of a company and the value of its share capital.
3. Return on Assets Methods (ROA) calculates the average income of the company before taxes and divide it by the average value of the tangible assets of the company. The result is a ROA, which is then compared with industry averages.
4. Scorecard Methods (SCM) distinguish various components of intangible assets or intellectual capital, then indicators and indices are determined and presented in the form of score cards or graphs.
5. Accurate measuring systems (Proper Measurement Systems, MS) use all directions that are of value to the company itself or its environment, and determine indicators within each direction. These indicators are combined into a measurement system, usually a hierarchy of general values measurements (Conjoint Value Hierarchy, CVH), and real data are used to obtain reliable value calculations.

The most suitable methods for assessing human capital are SCM and MS.

3 Conducted survey

Following the recommendations of the Study Accreditation Commission of April 27, 2016 "Mandatory questions for students, employers and graduates"[5], in 2016 ISMA developed unified student, employer and graduate questionnaires for all study programmes, allowing to evaluate not only a given study programme, but the work of

the HEI as a whole. The questionnaire takes place every year, so it is possible to find out as soon as possible where and what changes should be introduced in the study process, as well as to follow the dynamics of students' opinions.

The evaluation of student survey outcomes is one of the most important evaluation criteria of the study programme quality. The main parts of the questionnaire are the following: correspondence of the HEI and the study programme to the student's idea; assessment of the quality of the study process; assessment of the work of the academic staff; assessment of the international cooperation of the study programme and students' involvement in scientific research; assessment of the observance of the principles of democracy in the HEI.

4 Conclusions

The scorecard method (SCM) was applied elaborating the survey and evaluating results. The method helps to distinguish various components of intangible assets or intellectual capital, and then indicators and indices are determined and presented in the form of score cards or graphs. Results of the study allowed improving existing managerial operations at the related HEI thus improving overall business personal of the enterprise.

References

[1] Djakona V 2017 Vozmoznosti povysheniya effektivnosti upravleniya intellectual`nym kapitalom VUZa Scientific Monography: Vasil Levski National Militar University of Veliko Tarnovo (Bulgaria) (in Russian)
[2] Kaplan R, Norton D 2000 Having trouble with your strategy? Then map it. Harvard Business Review pp. 167—76
[3] Luthy D 1998 Intellectual Capital and its Measurement Asian Pacific Interdisciplinary Research Conference in Accounting (APIRA)
[4] Lev B 2000 Seeing is Believing – A Better Approach To Estimating Knowledge Capital CFO magazine
[5] Stewart T 1991 Brainpower? Fortune 42-60
[6] *Studējošo, darba devēju un absolventu aptaujā ietveramie obligātie jautājumi. Augstākās izglītības kvalitātes aģentūra. Ieteikumi* no *2016.g. 27. aprīļa.* **E-source:** https://www.aika.lv (skatīts 01.05.2016.)

Issues and methods of quantitative and qualitative data analytics for business operations optimization

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Abstract

Nowadays reliable data analyses of business activity of an enterprise is becoming a crucial part of making effective decisions that can help optimize business processes. The theses considers data analysis of both quantitative and qualitative research for business processes optimization. Explanation of the typical cases in which each of the method is used are given.

Keywords: data analysis, quantitative research, qualitative research, optimization

1 Introduction

The nowadays amount of data an organization can collect from a variety of sources enables them to get a deeper outlook on the business processes, understand which of them are working, and help teams predict future trends. However, without properly analysis and comprehension of the data collected, all the management has is figures and numbers with no context.

There isn't one universal data analysis method. Depending on a company's needs and the type of data collected, the right data analysis methods can vary. This also makes it necessary to understand each type of data, and which methodology can deliver the best results. Nevertheless, there are some common techniques that are included into most data analytics software as they were proven to be effective [3].

2 Main part

Data Analysis is the process of systematic application of statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. In this sense, various analytic procedures provide a way of making inductive inferences from data and distinguishing the signal (the phenomenon of interest) from statistical fluctuations present in the data. An essential component of ensuring data integrity is the reliable and appropriate analysis of research findings. Improper statistical analyses distort scientific findings, mislead casual readers and may negatively influence the public perception of research.

2.1 ISSUES OF RELIABLE DATA ANALYSIS

There is a number of issues that researchers should take into account respecting data analysis. Those include:

- Having the necessary analytical skills
- Accurate selection of data collection methods and appropriate analysis
- Unbiased inference drawing
- Analysis of inappropriate subgroup
- Statistical significance determination
- Lack of clearly defined and objective outcome measurements
- Methods of data collection
- Validity and Reliability
- Extent of analysis

2.2 QUANTITATIVE AND QUALITATIVE DATA

Quantitative data deals with quantities and exact numbers. This data includes sales data, marketing data, such as clickthrough rate, salary data, revenue and other data that can be calculated and measured objectively

- Regression analysis

Regression studies are usually used to make predictions and forecast future trends. Regressions measure the relationship between a dependent variable (what a researcher wants to measure) and an independent variable (the data a researcher uses to predict the dependent variable). While there can be only one dependent variable, having a nearly limitless number of independent ones is possible. Regressions also help uncover areas in business operations that can be optimized by highlighting trends and relationships between factors.

- Correlation analyses

Correlation analysis is a statistical method used to evaluate the strength of relationship between two quantitative variables. A high correlation means that two or more variables have a strong relationship with each other, while a weak correlation means that the variables are hardly related. This technique is strictly connected to the linear regression analysis that is a statistical approach for modeling the association between a dependent variable, called response, and one or

more explanatory or independent variables.

The standardized values can vary between -1 and +1, where 1 indicates perfect positive (linear) relationships, -1 a perfect negative (liner) relationship, and 0 stands for no correlation at all.

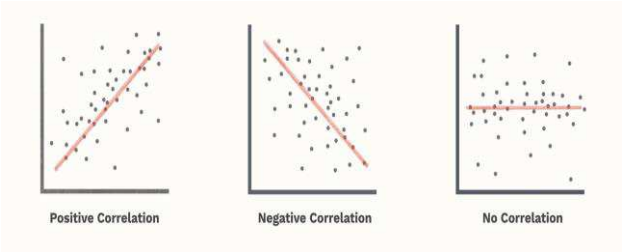

Figure 1 Visual interpretation of correlation of +1, -1 and 0

- Monte Carlo simulation

Monte Carlo simulations are usually perceived as to calculate the effect of unpredictable variables on a specific factor and use probability modeling to help predict risk and uncertainty. To test a hypothesis or scenario, a Monte Carlo simulation will use random numbers and data to stage a variety of possible outcomes to any situation based on any results. This tool is widely used among a number of fields including project management, finance, engineering, logistics etc. By testing a variety of possibilities, a rearcher can understand how random variables could affect your plans and projects [2].

Qualitative data is more interpretive and subjective as it pertains to aspects of an organization and is used to determine patterns. That includes information taken from customer surveys, interviews, and generally refers to qualities over quantities.

- Content analysis

The content analysis method helps to understand the general patterns that emerge in qualitative data. Usage of techniques like color coding specific themes and ideas helps parse textual data to find the most common threads. Content analyses is most effective when analysing data such as user feedback, interview data, open-ended surveys, and more. This can help identify the most important improvement areas.

- Narrative analysis

The narrative analysis focuses on the way stories and ideas are communicated throughout a company and can help a researcher better understand the organizational culture. This might include interpreting how employees feel about their jobs, how customers perceive an organization, and how effective operational processes are viewed. It is usually implemented when contemplating changes to corporate culture or planning new marketing strategies [1].

3 Conclusion

Concerning the mentioned above issues, there is no universal standard for statistical analysis or right way to conduct quality data analysis. On one hand, researchers face a number of issues concerning both accuracy of the primary data and skills set of an analytical team members coupled with the level of their work coordination. On the other hand, there is a variety of data analysis methods for either quantitative or qualitative research. The method chosen by a researcher should always correspond to the data they have collected, and the type of insights they want to extract. Matching the right data and analysis helps uncover deeper insights to optimize business processes.

References

[1] Guest G, MacQueen K M 2018 Handbook for team-based qualitative research Walnut Creek, CA: AltaMira Press
[2] Miles M B, Huberman A M 2013 Quantitative data analysis: An expanded sourcebook (2nd ed.) Thousand Oaks, CA: Sage
[3] Miller D C, Salkind N J 2002 Handbook of Research Design and Social Measurement 6th Edition. Thousand Oaks, CA: Sage Publications

Performance criteria for effective usage of the current volatility indicator in predictive modelling of price dynamics in financial markets

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Abstract

A set of criteria for the effectiveness of using the indicator of current volatility in forecasting modeling of price dynamics in financial markets is proposed. It is shown that at least one of the criteria of this complex can be methodologically used to evaluate the effectiveness of models of socio-economic systems of any nature (after some adaptation, taking into account the specifics of this system).

Keywords: effectiveness, criteria, model, profit

1 Introduction

The use of various models already built to predict the dynamics of prices in financial markets is possible if the proposed models are effective in a particular financial market. Otherwise, it is necessary to determine the performance criteria of each model. The article discusses the assessment of financial models in terms of an indicator of current volatility. Nowadays, there is no economic and mathematical model that would be completely break-even. For that reason, for one or more transactions with income, a trader can make one or more transactions with losses. In this case, the amount of loss from one transaction may exceed the amount of income from several previously completed transactions. Therefore, working with a selected (optimal) set of model parameter values can be considered effective if the amount of income during testing exceeds the amount of income from applying the same model for any other set of model parameter values.

2 Main part

To assess the adequacy of the model in the financial market, criterias for its effectiveness are necessary. Since the models will be tested for investment horizons of various depths, we need such a performance criteria that would allow us to adequately compare the results of the model. Therefore, we introduce the indicator "Average income per month":

ANI=(POI-R•PO)-UL-R•UO)/M,

where ANI - net average income per calendar month for the analyzed period (taking into account the broker's remuneration and other obligatory expenses inherent in a particular financial market);
UO - the number of unprofitable operations for the billing period;
PO - the number of profitable transactions for the billing period;
POI - the amount of income received from profitable transactions;
UL - the amount of losses received from loss-making operations;
M - the number of months during which the time series of quotes is analyzed;
R - the amount of remuneration to the broker for a transaction made by a market participant, including other mandatory contributions to the market [2].

From the point of view of the effectiveness of forecast models of price dynamics in the financial market, one can offer a number of criteria such as "total income for the analyzed period", "average income per transaction for the analyzed period", "average income for the calendar period (day, week, month, year, etc.), some of which have already been discussed above.

When analyzing the same market, these criteria are quite informative. But a comparative analysis of the effectiveness of the model for various markets raises a number of additional problems:

- adequate use of cross-rates, changing dynamically when analyzing markets in different currencies;
- accounting of differences in the length of the trading session comparing national and international markets;
- other differences between among financial markets.

Therefore, a criteria is suggested for the relative efficiency of the model (Ef), which is devoid of these shortcomings. The general view of it can be described by the formula:

$$Ef = \frac{P_{mod}}{P_{abs}}, \quad (1)$$

where P_{mod} - income from the use of the model in the studied calendar range in the analyzed market;
$P_{abs} = \sum_{i=1}^{n} |P_i - P_{i-1}|$ - absolutely possible income in the studied calendar range in the analyzed market;
P_i - price of the analyzed financial asset at point i of the studied calendar range ($i \in [1; n]$);
n - number of points in the studied calendar range [1].

If the price dynamics is represented by a 4-dimensional vector Pi = $(Open_i, High_i, Low_i, Close_i)$, the $Close_i$ price is selected, since it is considered the most optimal price for a candlestick transaction in the financial markets.

It should be noted (this is the opinion of the author) that adjustments must be made to the criteria of the relative effectiveness of the model (Ef), taking into account the slippage in the financial market, fixed market fees, including brokerage fees for transactions and other obligatory payments, which are usually set in a specific market for a particular financial instrument:

$$Ef_1 = \frac{P_{mod} - mk}{P_{abs} - (n-1)m}, \quad (2)$$

where Ef_1— the quantitative value of the modified criteria for the relative efficiency of the Ef model;
P_{mod} - income from the use of the model in the studied calendar range in the analyzed market;
$P_{abs} = \sum_{i=1}^{n} |P_i - P_{i-1}|$ - possible income in the studied calendar range in the analyzed market;
m - amount of slippage, fixed market deductions, including brokerage fees for the transaction and other obligatory payments;
k - number of transactions when applying the model;
P_i - price of the analyzed financial asset at point i of the studied calendar range ($i \in [1; n]$);
n - number of points in the studied calendar range.

3 Conclusion

The concept of “effectiveness” always introduces some element of subjectivity into this term. For example, what is effective for one subject is not always effective for another subject. The described set of criteria will allow us to correctly test the proposed set of models, taking into account the concept of "efficiency", which the most demanding economic agent puts into this term. The peculiarity of the criterion modified by the author is that he considers the net income of the economic agent from the application of the model, in contrast to the criterion in which the gross income is studied.

References

[1] Menshikov I S 2017 Market risks: models and methods Computer Center of the Russian Academy of Sciences
[2] Kussyy M Y 2011 Methodological foundations of the use of reflexivity in forecasting modeling of trends in financial markets NAS of Ukraine, Institute of Industrial Economics

Improving the structure of branch management of a commercial bank

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Abstract

The successful development of any large commercial bank depends on the efficiency of its branches.
This work is an attempt to find the clear and effective organizational structure of management of the bank branches, assessment and plans for its improvement.

Keywords: commercial bank, branch, management structure, value of the organizational structure, development and improvement of the management structure

1 Introduction

Currently commercial banks constitute the main component of the financial and credit system of almost any country in the world. In recent years, almost every commercial bank can offer its client about two hundred types of different banking products and services.

One of the determining roles in banking is the organizational structure of the level, which directly determines the financial success of the bank in the market. The selection and construction of the organizational structure, based on a combination of external and internal factors, is one of the main and important tasks of banking management.

2 Decision

The main tool for the territorial development of a commercial bank is the creation of branches. The structure of the organization represents the main ways of interconnection between departments of a bank or its branch. A rationally formed banking structure enables clear work for bank personnel, helps the successful implementation of bank management functions and also meets the needs of banking clients.

One of the main characteristics of the organizational structure possesses are:

- Dividing into divisions;
- Relations of accountability
- Subordination of the lower to the higher management.

It should be noted that the organizational banking structure should reflect the specific goals and objectives of its subject. It should express the functions of the division of labour and the amount of authority of bank personnel.

To improve the management structure of a branch of a commercial bank, it is necessary to make changes to this organizational structure. This process is rather complicated, responsible and often painful. Nevertheless, the choice of the optimal structure for a bank branch is an important condition for an effective labour organization, successful commercial activity of a bank branch.

The main factors of change in the organizational structure can be considered:

- Changes in the economic content and volume of operations performed by the bank;
- Changing the requirements for the competence of specialists;
- The need for downsizing due to the crisis, a decrease in the volume of services;
- Reorganization of the bank.

Improving the organizational structure involves taking into account such criteria as the peculiarities of the internal culture of the bank, the obligations of top management, the needs of the bank to reduce costs, the requirement for replenishment and retraining of personnel, career growth of bank specialists.

One of the ongoing challenges is the further development and optimization of its organizational structure. A well-thought-out organizational structure ensures:

- An effective bank management system;
- Optimized workflow;
- Effective personnel management.

The bank should determine as well as establish the statutory status of the credit departments of the bank, client departments and deposit departments.

3 Conclusion

The need to improve the management system at the present stage is determined by many factors. This is the optimization of the number of the management apparatus, its functions, introduction of automated control systems and development of decision-making system.

The development and introduction of new management structures has become a feature of the work of organizations. In the course of such changes, various combinations of known types and types of structures are often used, which the bank adapts to the specific conditions of its operation.

References

[1] Bedredinov R T 2009 Audit of management of the organizational structure of the bank Management today **1** 38-47
[7] Bublik A V, Kasheeva E V 2015 Management of the organizational structure of the bank 59-61
[8] Kuznetsov V I, Mikhailova M V 2008 Development strategy of a regional bank in a competitive environment Modern Competition **6** 92-6
[9] Merkushev A I 2000 Improving the management of the regional branch of a commercial bank Thesis. M. p 163
[10] Skachkova N A 2011 Rating assessment of the regional branches of the bank Economics, statistics and computer science **1** 120-3
[11] Tsukova G Y 2015 Branches of a commercial bank and their structure **25**

Global trends in the development of the restaurant equipment market and their impact on the trading companies marketing policy

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Abstract

The article discusses the features of the global restaurant equipment market development and its impact on the formation of the marketing policy of companies engaged in its production and sale.

Keywords: global market, restaurant equipment, trends, sales of goods.

1 Introduction

The modern restaurant business is an important component of the tourism industry, which forms the aggregate demand for a comprehensive socio-cultural product. In turn, the technological part of the restaurant business is one of the most important, because each restaurant begins with a kitchen. A properly designed and functionally equipped kitchen becomes the main tool in achieving success.

Therefore, companies involved in the restaurant equipment production and sale need to exam the global trends in the development of both the restaurant market and equipment for its entities. Market monitoring will timely allow companies to respond to changes in consumer demands, taking into consideration the development of new trends and technologies, and customers' preferences in the future.

2 Main part

The restaurant segment is one of the most developed and attractive investment areas in the modern business. It demonstrates rapidly dynamics growth, which remains quite risky at the same time. It possesses a large share of the consumer market in the world.

World turnover for the last year is more than $2.5 trillion per year. Among the leading countries of the world restaurant industry, we can distinguish the United States, the countries of Western Europe and Southeast Asia [1]. For example, in the United States for the period from 1970 to 2016, sales in the restaurant segment increased by more than 18 times, reaching a figure of 782$B. This indicator was expected to be increased by another 10.4%, i.e. up to 863$B according to the forecasts in 2019 [2].

Being quite capacious and dynamic, it has a significant impact on the development of the national economy, and needs timely implementation of technological and information innovations, which form the main vector in its development trends.

An important feature of the dynamics of the restaurant equipment market development is the fact that it is continuing to grow and develop even under the influence of such factors as: market segmentation, consumer demand for functional and operational features, pricing policy, intelligent technological developments, food innovations, as well as the world culinary trends.

According to a report published by Allied Market Research [3], restaurants are gaining more and more popularity among consumers because of the hospitality industry growth, lifestyle changes and the growing influence on external food. Due to the availability of various cuisines for consumers, the popularity of creative cooking and baking is growing. The main sources of income for the kitchen equipment market are sales, after-sales service, and equipment replacement. 2016 the restaurant equipment world market amounted to $ 9.105 million and it is expected that by 2023 it will reach $11.740 million. North America accounted for the highest share of 36% in 2016, and this growth trend is expected to be by 2023. Europe and the Asia-Pacific region are following it [3].

IMC / Teddy, the American manufacturer of stainless steel, has tracked the following trends in this industry [4]:

1. The visual appeal of the equipment.

The new equipment will have more aesthetic appearance, will become smooth with shiny touch screens instead of bulky buttons and knobs. All these will provide the opportunity to eliminate the problem with inconvenient cleaning, non-ergonomic and often unattractive appearance of kitchen equipment. New bright colors will be applied in the segment of ovens and deep fryers. Equipment manufacturers will offer such options as choosing the product color and finished materials to their customers.

This trend also extends to the color coding aspect in the implementation of color-interior solutions in open kitchen areas, which makes them better for visitor's perception. The

emphasis on color should create certain associations with the appropriate place.

2. Compact and multifunctional equipment.

As practice shows, kitchen space begins to shrink in favor of increasing a service room. As a result, many restaurateurs choose compact-sized kitchen equipment that can perform several functions and optimize any existing space. The latest innovations in the world of restaurant equipment are combined ovens, which provide several cooking methods in one device.

3. The economy of labor resources.

As Charlie Suhrad says (vice-president of regulatory and technical affairs at the North American Food Processing Equipment Association (NAFEM for short)), any catering equipment that reduces labor and improves efficiency is very important as the kitchens of modern restaurants are getting smaller.

4. Conscious consumption of resources.

The cooking technological process costs quite expensive for restaurants. Therefore, restaurateurs continue to look for ways to increase efficiency in order to reduce the cost of electricity, water, food, labor and chemicals.

After the introduction of plastic using restriction, the European practice gave a prompt to restaurants to replace traditional disposable plastic cocktail straws with reusable metal or cardboard ones, or abandon them at all.

The food eco-package using was predetermined by the growth of global demand (due to consumer demand).

Even reducing food waste is an urgent topic in the field of public catering: 4-10% of food purchased to restaurants is thrown away before they have been ready-made for visitors. This has led to the emergence of equipment demand that will reduce the amount of food waste - containers for composting and on-site processing. Such equipment introduction will provide an opportunity to control the amount of food waste in order to reduce it.

5. Increasing the cooking processing automation.

The catering industry is committed to more automated technologies. Nowadays many ovens and other equipment have programmed settings. Determining the exact temperature and cooking time for recipes is becoming easier. This helps to avoid mistakes in the cooking process and makes the restaurant kitchen more efficient.

Many equipment manufacturers are also developing smart devices available via Bluetooth / Wi-Fi, which remotely allow you to control the operation of equipment from a phone or any other device.

It should be also noted that modern technologies use artificial intelligence widely; it makes possible to create a "unified managed kitchen", where all kitchen appliances are connected with one another through an online program in the overall management process. Such management process gives an opportunity to prepare each other for subsequent work steps. Start-up latency and equipment downtime can be significantly reduced and efficiency can be increased. The artificial intelligence of instruments according to digitized recipes prepares dishes, selecting necessary technical parameters to achieve the best result. After the cooking process, automatic cleaning programs are activated. As a result, while a restaurateur is managing the kitchen online he receives significant time which reduces utility costs and staff wages.

3 Conclusions

Thus, the global market of the restaurant business and its segment, restaurant equipment, determine the main development vectors of companies operating in these market. Constant monitoring of current market development trends will provide the formation of effective production policy and marketing system for products demanded by the consumer market.

Now the digital technologies influence on the restaurant equipment market development, and it should be constantly examined by manufacturing companies. Companies should do a lot of in order to be successful in the market, to satisfy the consumers' growing needs, to produce competitive products, to ensure effective sales. That's why they need to seek new ideas and technologies, to have meetings with design consultants, customers and sales representatives in order to produce new innovative products that will meet the needs of constantly changing catering field.

References

[1] Bystrov S A 2018 Tehnologija i organizacija restorannogo biznesa i pitanija turistov: uchebnik INFRA-M: Moskva p. 536 (In Russian) **E-source:** https://studref.com/306332/turizm/sostoyanie_mirovogo_rossiyskogo_restorannogo_rynka

[2] Rekha, Khandelwal, CFA The Restaurant Industry: An Overview **E-source:** https://marketrealist.com/2019/09/the-restaurant-industry-an-overview/ 26 Sep, 2019

[3] Eshan, Hira Commercial Cooking Equipment Market. Global Opportunity Analysis and Industry Forecast, 2017 – 2023 p.180 **E-source:** https://www.alliedmarketresearch.com/commercial-cooking-equipment-market/ Jun, 2017

[4] Top 5 Trends in the Food Service Equipment Industry **E-source:** http://www.imcteddy.com/blog-post/top-5-trends-in-the-food-service-equipment-industry/10 May, 2019

Emotional labour in higher educational institutions

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Abstract

Emotional labor in higher education institutions is a relatively understudied research area. Academic staff are prone to dividing their time at work amongst teaching, research and administration. It is essential to understand the demands that emotional labor places on academic personnel and its impact on higher education institutions. Subsequently, the paper establishes that academic staff are emotional laborers, explores emotional labor among academic staff in higher education institutions, and presents the challenges faced. A theoretical framework of emotional labor is given as well. The consequences and challenges of emotional labor are further evaluated. Academic profession is a stressful occupation. There is a need for academic staff to effectively manage their work and emotions during designated areas of work, as increase in emotional labor enables lecturers to meet changing occupational and organizational expectations.

Keywords: emotional labour, academic staff, higher educational institution, occupational stress

1 Inrtoduction. Literature review

The concept of "emotional labor" was first theorized by sociologist Arlie Hochschild in 1983. One of the most influential sociologists of her generation, she is an American professor emerita of sociology at the University of California, Berkeley. Hochschild (1983) defined emotional labor as a face and bodily image creation management that can be observed by all. Hochschild also revealed that when the emotional feelings of employees do not match the rules of emotional display – such as when an employee feels sad but must appear enthusiastic to a customer – they often use one of two strategies to ensure that their actions are in line with the display rules. Deep acting alters felt emotion in order to change emotional display and produces a genuine emotional display, whereas surface acting only alters the outward expression of emotion and produces a faked emotional display. She called the process of managing emotions as part of the work role, 'emotional labour', and a central concern was how emotional labour, particularly the feelings of dissonance and inauthenticity that arise from surface acting, affect employee well-being.

Since the publication of 'The Managed Heart' there has been a lot of empirical and theoretical literature on emotional labour. Ashforth & Humphrey (1993) added a third dimension to Hochschild's approach as natural emotions (expression of naturally felt emotions). "Natural Emotions" mean that employees show or reflect emotions, regardless of any pressure or other cause, such as surface acting and deep acting dimensions. The theoretical understanding of emotional labour has been deepened by attempts to consider it in relation to theories of emotional regulation (Grandey, 2000), action regulation (Zapf, 2002; Diefendorff & Gosserand, 2003); social interaction (Cote, 2005), and demand-resource approaches to stress (Brotheridge & Lee, 2002). These theories have been used to test and explain the extent to which emotional labour has positive and negative effects on employee wellbeing.

In short, developments in the field of emotional labour indicate that its effects are dependent upon the extent to which the processes occurring during emotional labour either promote resource gain (e.g., social support, self-efficacy) or act as a demand and prompt resource loss. Resource gains improve well-being and resource losses decrease well-being.

Emotional labor theory has been strongly rooted in service-related industries and is most likely witnessed in hospitality services (Kerr & Brown, 2015), call centres (Holman, Chissick & Totterdall, 2002), nursing (De Jonge, Le Blanc, Peeters & Noordam, 2008), and hospitality and tourism (Chu & Murrmann, 2006; Van Dijk & Kirk, 2008). Recently, emotional labor has been researched in various disciplines, and have gained attention from public administration scholars (Hsieh, Yang & Fu, 2012) and in the education field among teachers in schools and academics in universities (Berry & Cassidy, 2013; Tunguz, 2014).

2 Emotional labor in HEI

Higher education institutions perceive their students to be customers and hence, the role of teaching staff can be advocated as that of a service provider (Gibbs, 2001). As academic institutions are categorized as a service provider, with customers, means of production and service deliverers, such an approach demands that academic staff perform emotional labor. This presents the need to ensure that negative emotions are controlled and expect their performance at the time whilst executing of duties, thereby ensuring effectiveness towards teaching and learning activities being experienced by the customers (students).

Gibbs (2001) noted that academic staff, in higher education, are expected to perform emotional labor in order to achieve the dual outcomes and hence, the generated outcomes are perceived as customer satisfaction, and profits

for the institution. Notably, the effect of emotional labor on academic staff can also be extended to teaching effectiveness.

Barkhuizen and Rothman (2006) proved that the academic profession is a stressful occupation. Academic work is divided into teaching, research, and leadership with a high administrative workload (Barkhuizen & Rothmann, 2006). As a result, academics feel powerless in the face of the changing nature of their job. Ogbonna and Harris (2004) noted that academic staff are burdened with various demands, which are sometimes conflicting.

In order to achieve teaching effectiveness, academics need to ensure they are able to regulate, manage and monitor their emotions. Moreover, academic staff sould be able to create, foster and enhance a positive teaching and learning environment (Boyer, 1987; Gates, 2000).

Most teachers manage their feelings, and express their emotions according to normative beliefs or emotional display rules held about the teaching profession. However, lecturing warrants unpredictable displays of emotion over lengthy periods, and may exaggerate some emotions (Ogbonna & Harris, 2004). Academics carry out a wide range of disparate tasks. Emotional labor may occur in the classroom during lecturing, outside the classroom communicating with the students remotedly via e-mail, Moodle, etc. Moreover, academics involved in committee work are faced with the demands of emotional labor when generating ideas and maintaining collegial relationships. Among other activities, academics are involved in research activities. Collaboration among researchers and the aforementioned research role may place further emotional demands on academics (Dhanpat, 2016).

Studies have noted that academics face high levels of occupational stress. A strong association exists between occupational stress and emotional labor (Mann, 1999), and is likely to have negative effects on the health and well-being of individuals. Notably, the consequences of emotional labor are dependent on the characteristics of the job and organization and, hence, lead to emotional exhaustion (Kruml & Geddes, 2000), emotional dissonance, job satisfaction (Ibanez-Rafuse, 2010), workplace stress, and burnout (Mann, 1999).

Thus, increased levels of emotional labor that are found in academic sphere require continued investigation into occupational stress and emotional labor among university lecturers, researchers and other staff.

3 Conclusion

The effects of emotional labour on wellbeing have been established as being over and above other individual variables (e.g., positive and negative affectivity) and contextual variables (e.g., job control). It is also possible to distinguish between constraining and enabling emotional labour environments. In constraining emotional labour environments, job demands are high, job resources low and employees do not identify with display rules or the motives behind them. Consequentially employees are more likely to experience the negative aspects of emotional labour. In enabling emotional labour environments, the opposite is the case (Holman et al., 2008). After all, employees are able to regulate their emotions by using various strategies (Cossette & Hess, 2015).

Recently, higher education institutions in Latvia have faced radical changes, namely, downsizing and restructuring, an increase competition, lack of local students because of demographic changes in the society, shift to education in the state language, Latvian, subsequent influx of foreign English-speaking students, constant changing of educational programs; and the most recent, because of Covid-19, necessity to provide distance learning education to all, even day department, students.

Thus, an increase in emotional labor enables lecturers to meet changing occupational and organizational expectations. It is imperative that universities pay attention to the emotional demands faced by newly hired and less experienced university lecturers in terms of staff recruitment, staff retention and staff wellbeing (Dhanpat, 2016). Ideally, the management of universities and departments should understand the challenges faced by academics through the pressures of emotional labor. High emotional labor intensity are likely to pose a threat to academic staff job performance, well-being, teaching effectiveness and job satisfaction. It is essential that academics address the emotional demands of their work (Grandey, Kern & Frone, 2007; Rupp & Spencer, 2006). However, there is need for further research on how academics perceive their challenges of emotional labor from a personal perspective, and its impact on students.

References

[1] Hochschild A R 1983 The managed heart. CA: University of California Press: Berkeley
[2] Ashforth B E, Humphrey R H 1993 Emotional labor in service roles: The influence of identity Academy of Management Review **18**(l) 88-115
[3] Grandey A A 2000 Emotion regulation in the workplace: a new way to conceptualize emotional labor Journal of Occupational Health Psychology **5** 95–110
[4] Zapf D 2002 Emotion work and psychological well-being: a review of the literature and some conceptual considerations Human Resource Management Review **12** 237–68
[5] Diefendorff J M, Gosserand R H 2003 Understanding the emotional labour process: a control theory perspective Journal of Organizational Behavior **24** 945–59
[6] Cote S 2005 A social interaction model of the effects of emotion regulation on work strain Academy of Management Review **30** 509–30
[7] Brotheridge C M, Lee R T 2002 Testing a conservation of resources model of the dynamics of emotional labor Journal of Occupational Health Psychology **7** 57–67
[8] Kerr M M, Brown E L 2015 Preventing school failure for teachers, revisited: Special educators explore their emotional labor, preventing school failure Alternative Education for Children and Youth **60**(2) 143-51
[9] Holman D, Chissick C, Totterdell P 2002 The effects of performance monitoring on emotional labor and well-being in call centers Journal of Motivation and Emotion **26**(1) 57-81
[10] De Jonge J, Le Blanc P M, Peeters M C W, Noordam H 2008 Emotional job demands and the role of matching job resources: A cross-sectional survey study among health care workers International Journal of Nursing Studies **45**(10) 1460-9
[11] Chu K, Murrmann S 2006 Development and validation of the Hospitality Emotional Labor Scale Tourism Management **27** 1181-91
[12] Van Dijk P A, Kirk A 2008 Emotional labor and tourism-based visitor interactions: Job characteristics as determinants of emotion regulation Tourism Analysis **13** 233-43
[13] Hsieh C W, Yang K, Fu K J 2012 Motivational bases and emotional labor: Assessing the impact of public service motivation Public Administration Review **72** 241-51

[14] Berry K, Cassidy S 2013 Emotional Labor in University Lecturers: Considerations for Higher Education Institutions Journal of Curriculum and Teaching **2**(2) 22-36
[15] Tunguz S 2014 In the eye of the beholder: emotional labor in academia varies with tenure and gender Studies in Higher Education 1-18
[16] Gibbs P 2001 Higher Education as a market: a problem or solution? Studies in Higher Education **26**(1) 85-94
[17] Barkhuizen N, Rothman S 2006 Work engagement of academic staff in South African higher education institutions Management Dynamics **15**(1) 38-47
[18] Ogbonna E, Harris L C 2004 Work Intensification and Emotional Labor among UK university lecturers: An exploratory study Organisation Studies **25**(7) 1185-203
[19] Boyer E L 1987 College: The undergraduate experience in America New York: Harper & Row
[20] Gates G S 2000 The socialization of feelings in undergraduate education: A study of emotional management College Student Journal **34** 485-504
[21] Mann S 1999 Emotion at work: to what extent are we expressing, suppressing, or faking it? European Journal of Work and Organisational Psychology **8**(3) 347-69
[22] Kruml S M, Geddes D 2000 Exploring the dimensions of emotional labor: The heart of Hochschild's work Management Communication Quarterly **14** 8-49
[23] Ibanez-Rafuse C 2010 Hiring smiling faces: the moderating role of emotional intelligence when performing emotional labor among a sample of flight attendants PhD thesis, Capella University, MN
[24] Holman D, Martinez-Inigo D, Totterdell P 2008 Emotional labour and employee well-being: an integrative review Research companion.
[25] Cossette M, Hess U 2015 Service with style and smile. How and why employees are performing emotional labor? European Review of Applied Psychology **65**(2) 71-82
[26] Dhanpat N 2016 Emotional labor in Academe. Challenges faced Problems and Perspectives in Management **14**(3)
[27] Grandey A A, Kern J H, Frone M R 2007 Verbal abuse from outsiders versus insiders: comparing frequency, impact on emotional exhaustion, and the role of emotional labor Journal of Occupational Health Psychology **12** 63-79
[28] Rupp D E, Spencer S 2006 When customers lash out: The effects of perceived customer interactional injustice on emotional labor and the mediating role of discrete emotions Journal of Applied Psychology **91**(4) 971-8

Communication tools for brand promotion in the online environment

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Abstract

The article considers tools and channels of digital communication for companies to promote brands, as well as the features of the formation of their communication strategy in the digital space.

Keywords: digital communications, brands, tools, promotion

1 Introduction

Digitalization of social environment and business processes, changes in consumer's media space motivate the companies selling brands to develop a new understanding of the effectiveness of marketing communication strategy in the digital space, as well as choose effective tools and channels for promoting brands that meet the challenges of the times. Therefore, analyzing the effectiveness of marketing communications, they should not be considered as separate elements, but as a system for promoting a branded product or company, the main purpose of which is to inform, convince, remind consumers of the brand, support its marketing, create company's positive image and build customer loyalty.

2 Main part

The era of digital technology is changing the existing world, society and people. The Internet provides with unique and limitless opportunities for communication, exchange and acquisition of new information. At the same time, it also changes forms of interaction, behavior, and the established traditions of organizing life, work, and education. The Internet has created a technological basis for communications, transforming them into digital communications, which have a huge impact on the business space: the ways business is organized and conducted, marketing strategies of companies, economic aspect of business, relationships and forms of communication with customers, the speed of changing their preferences.

It is important to understand that in the digital age customer problems and their solutions become a source of company profit. The value of customer experience is growing, which becomes an acquired value for companies in the segment of intercompany relations (B2B). Work with a customer is individualized, involvement in his tasks and empathy are practiced [1, p. 39].

All this requires companies, especially those selling brands, to be better aware of their communication policy, new approaches to strategic communications planning, the choice of effective channels and digital communication tools with customers.

It is especially important for companies selling brands to communicate with customers, create favorable and simple conditions for quick search for brand information in online environment, and use convenient methods to find a product of interest to customers. It is essential to take into account the peculiarity of the wishes and requirements of modern customers, i.e. spend less time searching for the information they need about the product. This means that in the process of developing a marketing policy for digital marketing communications, it is necessary to consider all possible methods of information search: search engines, brand sites, mobile applications, video brand advertising, and brand building in social networks [2].

Therefore, in the framework of strategic communications planning for companies selling brands, the algorithm for selecting channels and digital communications tools should be as follows [3]:

1. Setting goals and objectives achieved by digital communications and corresponding to client's goals and objectives at the level of marketing and business (Is it an image-building company or is it aimed at stimulating sales tactically? Is a new brand introduced on the market or is brand loyalty maintained to the existing ones?);
2. Integration of digital communications with the general brand strategy, with other communication channels (both online and offline);
3. Analysis of the brand's target digital audience in the digital space (its interests, online behavior) in order to determine the tools and the communication channels that are relevant for achieving client's goals and objectives;
4. Social listening – monitoring and analysis of the presence of the brand and its competitors in all digital channels, which will make it possible to determine the specifics of the brand's presence in the digital space in relation to competitors, understanding the features and scope of their digital communications;
5. Qualitative data collection and analysis of previous brand communications (media indicators, brand resource statistics (sites, communities, applications), experience in their application, which will help to determine effective (or ineffective) channels and tools for every particular situation;
6. Analysis of the uniqueness and potential of brand messages to customers in digital communications,

which will provide an opportunity to determine the effectiveness of individual tools and communication channels when working with clients.

In practice, companies selling brands are recommended to use a matrix developed by specialists of Articul Media when forming a communication strategy, as well as choosing tools and digital communication channels [3] (Table 1).

TABLE 1 Matrix of choosing tools and digital communications channels for brand promotion

Tools	Brand knowledge	Engagement	Sales growth	Loyalty formation
Brand website	*	***	**	***
Direct advertising	***	**	***	*
Sponsorship / Special Project	**	***	*	***
Video advertisement	***	**	**	**
SEO / SEM	**	*	***	*
SMM	**	***	*	***
Games, applications	**	***	*	**
PR	**	*	*	***
Newsletters (e-mail, sms)	*	**	**	**
Viral advertising	**	**	*	***
Mobile applications	*	***	*	***

*** - most relevant; ** - quite relevant; * - least relevant.
Source: [3].

Companies need to understand the importance of Internet promotion tools that can create omni-channel experience for the buyer, as a single system linking various communication channels with the client, which will ensure the speed of the buying decision and success of the company's market activity in the long term.

3 Conclusions

The digital economy has a huge impact on both human life and the development of modern business. Information and computer technologies, involving people in the Internet space on a large scale, are in fact an important source of information for companies about their preferences and expectations. Therefore, it is important for business to be constantly present in a digital environment, where the use of artificial intelligence to search and process information helps companies conduct in-depth work with customers, individualizing their marketing communications. The use of digital technologies in business contributes to the formation of network platforms as new business models in the Internet space that are successfully combined with the marketing strategies of companies with a high degree of customer focus.

References

[1] Safronchuk M V 2018 Vlijanie cifrovoj transformacii na biznes i delovuju sredu Cifrovajaj ekonomika **2**(3) 38-44 (In Russian)
[2] Zezjulin V I, Arstanova D S 2019 Digital-transformacija: prodvizhenie kompanij v internet-srede i razvitie omnikanal'nogo marketinga Molodoj uchenyj 108-10 **E-source:** https://moluch.ru/archive/244/56440/.
[3] Vybor kanalov i instrumentov pri sozdanii digital strategii **E-source:** https://adindex.ru/publication/tools/2013/02/6/96637.phtml

Accelerate statistical process improvement methods using process mining

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Abstract

Process Mining is a next generation technique to collect, analyze and visualize process statistical data for further continuous process improvement. Process Mining simplifies, fastens and overcomes some of the barriers of the Six Sigma DMAIC cycle in improvement projects execution.

Keywords: Process Mining, Six Sigma, DMAIC, Business Process Improvement, Continuous Improvement.

1 Introduction

What can be measured, can be improved. Call for action aimed on for Business Process Improvement (BPI) [1] cannot be done before the reality of measurement is met. How can organizations effectively measure the "as-is" process and how can they define, execute changes within the process and assess the impact of these changes on the business? This is where process mining solves the issue and makes Business Process Improvement effective.

The most common methodologies for Business Process Improvement are TQM (Total Quality Management, popular in 70's, and Six Sigma, established as an approach #1 by TOP Fortune companies to achieve their business goals by removing the causes and defects in a process, with the goal of error-free performance. The core difference of Six Sigma is strong infrastructure of champions and sponsors that requires management involvement, while simultaneously creating a true team-level culture of continuous improvement. Six Sigma takes the DMAIC 5 step approach [2].

High speed of business development and IT-development requires for new algorithms for data collection, analyze and decision making. Nowadays most information systems implemented in business are able to log enormous amounts of events that could be a subject for exploration for both Six Sigma and process mining.

2 Decision

The mining process is an automated algorithm that allows you to determine the BPI phase "as is" to identify waste, bottlenecks, anomalies, and opportunities in an existing workflow or process. The data mining process relies on verifiable data in IT systems and replaces the manual display of processes, which depends on human errors and time loss.

It is extremely important to understand the data that is analyzed during the analysis, namely the event logs [3]. Unlike conventional data mining, process mining is always based on a specific form of data, which is basically a tracking log that records transactions in real time. The data mining process creates a statistical way of connecting real information recorded in the event logs of the information system to data analysis for performance management. As shown in Figure 1 [4], once transactions in the real world are recorded in the event log of the software system, three types of process analysis can be practiced.

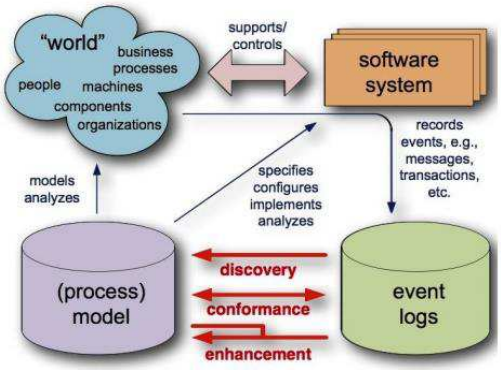

FIGURE 1 Production process structure

A critical step at an early stage is a deep understanding of how this process actually works in real life. Guides and documentation may take into account "should be", but the mining process is connected with "as is". It is here, at this stage of understanding, that the mining process is first applied.

The production process actually provides the basis for streaming processes and tracking inefficiencies and losses. In other words, the mining process provides raw materials for analysis in the Six Sigma project. It may seem that the mining process does not play a significant role at the analysis stage. However, compared to conventional Six Sigma methods, the raw materials are much more refined and prepared for continuous analysis.

A key success factor is the development of a detailed control plan that documents all the changes that are introduced into the process and locates these changes in the process stream.

3 Conclusion

The application of process mining according to DMAIC framework in a structured and step-by-step way to improve business processes. DMAIC is a data-driven improvement cycle used for improving, optimizing and stabilizing business processes and designs. Whether or not Process Mining is applied, defining a clear and precise objective and scope is an important first step [5]. Taking advantage of

existing data extracted from the information systems is one of the advantages when applying Process Mining. This speeds up the process of measurement significant, resulting in less discussion about the quality of the collected data. However certain preconditions must be satisfied in order to take advantage of the data from the information systems.

References

[1] Maha Syed Ibrahim, Aamer Hanif, Faheem Qaisar Jamal, Ali Ahsan 2019 Towards successful business process improvement – An extension of change acceleration process model Published: November 27, 2019 **E-source:** https://doi.org/10.1371/journal.pone.0225669

[2] ISO, ISO 13053-1:2011 Quantitative methods in process improvement - Six Sigma - Part 1: DMAIC methodology, Standard, 2011

[3] The Integration of Process Mining and Lean Six Sigma, With a case study on the improvement of an accounting reporting process, Wei Zhong, Tilburg, p. 23

[4] Accelerate DMAIC using Process Mining, Frank van Geffen, Rudi Niks, Rabobank, The Netherlands and O&I Management Consultants, The Netherlands, CEUR Workshops Proceedings **1052** ISSN 1613-0073

The impact of information technology development on the business environment of creative industries

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Abstract

Advances in information technologies are changing the whole social and economic scene and requirements for the labour market not only in technology-related industries, but also in creative industries, humanities and social sciences. The aim of this paper is to examine how these changes have affected the creative industries, analyse the changes that have occurred in its external business environment and reflect on how much the sector has changed digitally.

Keywords: entrepreneurship, data, analytics, education

1 Introduction

This paper focuses on the development of creative industries its external business environment in the context of data economics and advanced technologies. In recent years there has been a growing interest in adoption of new technologies. Much work on the challenges and opportunities of technologies has been carried out, however there are still some open questions. Many studies and reports have been published on the importance of technological change on a global scale. Researches show that technologies changes how people, organisations and governments live, interact and work [1]. Digital technology continues to be one of the major forces shaping our society today [2]. It transforms economies and societies, all industries are affected by the digital transformation [3]. Opportunities offered by data resources are progressively engaging also human disciplines, for example, history, archaeology, law, and politics [4]. Creative industries are not an exception.

2 Information technology development impact on demanded skillset

It is particularly interesting to analyse the development of creative industries in the context of technology because of the long-standing opposition between the technology and creativity. Although technological development is highly regarded in the economic context, technology and creativity have been long perceived as incompatible concepts. It is often misunderstood that the development of technologies and automatization will make the human workforce redundant. Unlike these expectations, the technology will increase the need for human expertise. As reported in European Union (EU) study, virtual and augmented reality represent important technological advancements and innovations and are a growing sector of interest for the creative sector. Both the digital shift and globalisation have had a strong impact on cultural and creative operators - they continually need to develop and adapt competences and contents to the rapid pace of the digital innovation.

The results of the studies carried out so far have led to an interesting conclusion. Leadership now needs to be combined with creativity, innovation and digital literacy. Among the future transferable skills of employment, creativity is considered as the most significant predictor for an occupation's chance of growing [5]. Consequently, in order to ensure the competitiveness, development and contribution to the global economy, creative industries are forced to change.

Transformations have affected the external business environment at different levels, making it necessary to make changes to the internal environment of companies and organisations. The aim of the following sections is to clarify how above-mentioned processes have transformed the external business environment.

3 External business environment: policies and technologies

The external business environment is in continuous development and determines business activities and opportunities. Ability of companies to accept and adapt changes affects the competitiveness of countries and regions in the global market in the so-called digital era - era of the data economy. The following paragraphs will highlight some significant changes that have occurred in the external environment at the level of policy and technological development.

Policy makers are commissioning research on technology applications in industries and developing better policies. A Digital Single market strategy is one of the strategies developed at EU level. The EU is committed to set global standards for emerging technologies and has set a goal to remain the most open region for trade and investment in the world. At the same time, EU aims to create an environment where companies of all sizes and in any sector can compete on equal terms, and can develop, market and use digital technologies, products and services at a scale that boosts their productivity and global competitiveness, and consumers can be confident that their rights are respected [6]. It is expected that the digitalization, new technologies and strengthening of the Digital Single Market will increase distribution and access to culture and creative production. *Europe's* General Data Protection Regulation (GDPR), the privacy legislation that went into effect in May 2018 represents the first large-scale effort in the world to offer

consumers more legal protection. In the field of creative industries, an initiative Creative Skills Europe was launched in November 2014 by a partnership of European trade unions and employers' organisations.

Surveys and qualitative analyses have shown that the general technology shift and the acquisition of digital skills represent key challenges for the development of the sector. The digital shift has also deeply impacted the sector's business models, demanding even stronger capabilities to innovate and experiment with new development schemes [7]. The above-mentioned initiatives are some examples, however there is still a need to develop new policies and harmonize them.

As a result of the development of information technologies, it is possible to use different platforms, programmes, technologies and improve the functioning of organisations in different sizes and financial capabilities. As concluded by the Organisation for Economic Co-operation and Development (OECD), digital technologies allow firms to access multiple geographical and product markets almost instantaneously, sharing ideas and exploiting increasing returns to scale. They are generally associated with lower costs of operations and of entry into a market, even across borders, thus potentially increasing competition among firms for the market itself. Thanks to sustained technological progress, information technology products have become much cheaper and more powerful over time.

Some of the benefits brought by advanced technologies are:

- Mobile connectivity has undergone major improvements starting with the launch of 3G at the beginning of the millennium and 5G is now in the early stages of roll out.
- The number and growth of top-level domains (TLDs) associated to websites provides an indication of the increased content hosted by the Internet. TLDs reached close to 350 million in the third quarter of 2018. By that time, the .com generic domain had reached 135 million out.
- Capacity for data transmission is increasing everywhere, including developing economies. Cross-border data flows enable businesses to effectively co-ordinate their, supply, production, sales, after-sales, and research and development processes in global markets.
- Data centres - the analysis of big data coming from ubiquitously networked end-user devices and the internet of things – has added to the value and growth of data centres.

By reducing or avoiding the large fixed costs associated with investment in new information technology equipment, purchases of information technology services allow companies to reduce the costs of experimenting with new technologies, scaling up, and adapting technology use to the business cycle [8].

4 Impact of the external environment on creative industries

Digitisation and advanced technologies are having an important impact on the creative industries. Analysis of creative sectors shows that a large part of companies integrate technology into their activities, but their application levels and quality differ. Studies show that an increasing number of consumers have access to more creative content at lower costs, as content creators benefit from reduced production and distribution costs which have lowered barriers to entry and deliver content on a wider range of devices. The direct link with consumers has facilitated an increasingly competitive environment that has led to the developing of new business models in most of creative industries. It is transforming working processes and operations, such as audience development, ticketing and communication. The digital environment has enabled new development opportunities, for example in data-driven marketing or live streaming, and has offered new perspectives of creation with works specifically curated for the online environment, as well as new revenue streams. [9].

5 Conclusions

The development of technologies has a significant impact on the economy, society and various industries, including creative industry. Various initiatives have been taken on external business environment level in order to ensure the competitiveness of the European Union and other regions and provide the necessary infrastructure, however there are various aspects that prevent the full use of the opportunities they provide and the development of businesses.

References

[1] OECD 2020 Going Digital integrated policy framework, OECD Digital Economy Papers **292** OECD Publishing: Paris p 50
[2] Bandopadhyay S, Wong M 2019 Digital Culture MTM and Nesta: London p 19
[3] OECD 2019 Measuring the Digital Transformation: A Roadmap for the Future OECD Publishing: Paris 45
[4] Schiuma G, Carlucci D 2018 Big Data in the Arts and Humanities: Theory and Practice (Data Analytics Applications) Auerbach Publications 17
[5] KEA and PPMI 2019 Research for CULT Committee – Culture and creative sectors in the European Union - key future developments, challenges and opportunities European Parliament, Policy Department for Structural and Cohesion Policies: Brussel 7-34
[6] Europen Commision The European Digital Strategy **E-source:** https://ec.europa.eu/digital-single-market/en/content/european-digital-strategy Apr 19 2020
[7] 2016 Trends and skills in the European audiovisual and live performance sectors European Skills Council for employment and training in the Audiovisual and Live Performance sectors: Brussels p 9
[8] OECD 2019 Measuring the Digital Transformation: A Roadmap for the Future OECD Publishing: Paris 38-48
[9] 2016 Trends and skills in the European audiovisual and live performance sectors European Skills Council for employment and training in the Audiovisual and Live Performance sectors: Brussels 34-9

Improving the training system for the digital economy

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Abstract

A modern education system should provide the digital economy with competent employees. Changes in the labour market should be based on the requirements of the digital economy, which leads to the creation of an effective motivation system for the development of the necessary competencies and the participation of personnel in the development of the digital economy. Thus, the main goal of this article is to reveal the most important problems of ensuring the continuous process of formation of a modern digital economy using the capabilities of all links in the educational system.

Keywords: digital economy, training systems, education system

1 Introduction

The problem of research. Modern changes will require significant changes in the structural reorganization of the economy in the functioning of the socially-economical in the first place in the education system [1]. The key aspect is to determine the conditions and factors affecting the accelerated development of the digital economy using the capabilities of all parts of the educational system [2].

The objectives of the study. It is necessary to define the essence of the digital economy as a new type of economy, changing the format in education, communication between people and setting a new paradigm for the development of the economy and society as a whole [3-5].

Therefore, the relevance of training qualified personnel to carry out various types of work in the digital segment of the economy, and in connection with this a fundamental change in the concept of education, comes to the fore. The primary is the justification of the need for processes of continuous learning and the development of vocational training and retraining, the acquisition of new competencies and advanced training for both managers and employees of modern organizations. The focus should be on staff.

2 Overview

According to the author, the competencies of personnel should be considered as a key element of the subsystem of any company. Updated staff competencies should be a source of development, and ensure its competitiveness in the new paradigm of intensive development of business processes. In a scientific study, a mechanism is being developed to study the problems that arise in the activities of modern organizations and their staff in the formation and development of digital culture.

The main problems of human resources at the present stage are identified, which should be eliminated through the use of digital technologies in the future and changes in educational programs. The prospects for the formation of competencies of future specialists are predicted and possible ways of solving the raised problem are proposed.

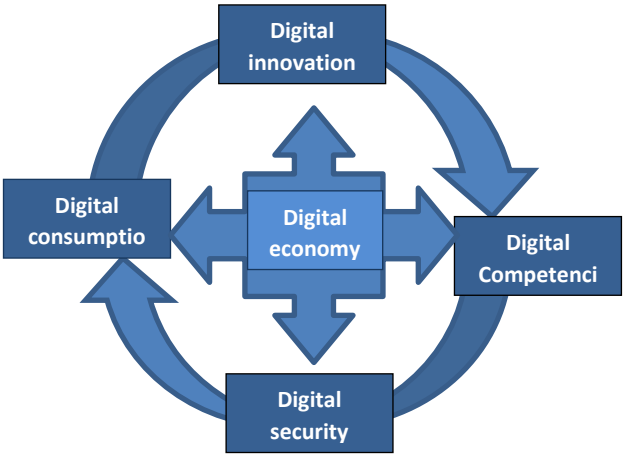

Figure 1 Automation testing

In the condition of digital economy the usage of information technology provide businesess with new opportunities to access global markets and also develop business activities on-line. The full realization of these potentials is essential for new enterprises and companies which can compete and create competitive advantage globaly [6].

3 Decision

One model that emerges from a mix of discourse and reality is the notion of the digital economy, argued by some to be the leading driver of economic growth and to lead to life-changing economic upheavals" and profound regional implications on businesses, jobs and people [7].

The authors of the article examine what skills a higher

education graduate needs to have during the digital transformation, as well as what aspects of the activities of universities will undergo changes during the digitalization of higher education [8]- [9].

4 Conclusion

Research hypothesis. The study is based on an interdisciplinary approach using the methods of logical-structural, situational and comparative analysis. The conclusions and recommendations obtained during the writing of the article can serve as a basis for the further development of economic science (for example, the theory of the interaction of economic entities) and the improvement of the higher education system in modern conditions of digitalization of the economy.

The article reveals the essence of the process of adaptation of graduates of universities to new economic conditions, which involves the transformation of the nature of their knowledge, skills, motivations, and values. It is concluded that the main mechanism of professional adaptation of graduates of universities should be the educational system in Latvia, which itself needs a comprehensive transformation.

References

[1] Cifrovaja ekonomika – novaja realjnostj **E-source:** https://www.youtube.com/watch?v=0FIlVvEIcY4
[2] Klimenko G Chto takoe cifrovaja ekonomika **E-source:** https://www.youtube.com/watch?v=2UAe3HkmUM4
[3] Schultz T W 1971 Investment in Human Capital: The Role of Education and Research Free Press, New York, NY
[4] Gaivoronsky D V, Kutuzov V M, Minina A A 2017 Engineering education in the context of the digital transformation of the economy. Planning and supply in the process of training professionals for the industrial and economic complex of the region. St. Petersburg **1** 3–6
[5] Trufanova T A2014 Professional adaptation of university graduates as a special category of labour Soc. Econ. Phenom. Process **2**(60) 136–42
[6] Brynjolfsson E, Kahin B (eds) 2000a Understanding the Digital Economy: Data, Tools, and Research MIT Press, Cambridge, MA
[7] Rasmussen J 1983 Skills, rules, and knowledge: signals, signs and symbols and other distinctions in human performance models In: IEEE Transactions: Systems, Man & Cybernetics SMC-13 257–67
[8] Tchoshanov M A 2018 Digital age didactics: from teaching to engineering of learning (Part 1) Inform. Educ. **9** 53–62 CrossRef

Competitiveness level increase of SIA "Avk Grupa"

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Keywords: competitiveness, competitive advantage, competitiveness level increase

In today's environment, competitiveness is one of the most important factors in the company's operation, as it ensures the organizations survival on the market and further effective development. A high competitive level of a company guarantees that it will make profit in the current market conditions. Thereby each company has the goal of achieving such level of competitiveness that could ensure the organizations functionality in the long term. The interest of organizations in the results of their work increases the need to raise the completive level of products or services, which require improving the work of all departments of the company. Therefore, in the modern economy, the main strategy of each business is to increase its competitiveness in order to strengthen its position on the market and to maximize profit. Nowadays, there is fierce competition between companies; managers are constantly looking for new tools and methods to increase the competitiveness level.

The object of the research is SIA "Avk Grupa" entrepreneurship activity.

The subject of the research is the competitiveness of the company SIA "Avk Grupa".

The main **goal** of the diploma is to develop recommendations to help the company to increase its competitiveness level. In order to archive the set goal, several **tasks** are appointed:

- Perform a theoretical analysis of literature sources on the basic principles of competition;
- Analyze theoretical and practical experience in increasing competitiveness;
- Perform analysis of SIA "Avk Grupa";
- Develop recommendations to increase the company's competitiveness level;

In order to achieve the goal of the qualification work, the author used the following research methods: statistical data collection and analysis, monographic or descriptive method (conducting research of literature), document analysis method (analyzing the company's internal documentation), comparative method, as well as SWOT analysis and Porter's five forces analysis.

The results and developed recommendations of this qualification work can be suggested to the company's top-brass, to help improve competitiveness. The diploma has practical usage and value.

Competitiveness assessment is based on the creation of the company's competitive advantages and their further development in the company's operations, which is the main goal of strategic management. In order, to do a competitiveness assessment, a SWOT analysis must be conducted to identify the strengths and weaknesses of the internal environment, as well as the threats and opportunities of the external environment. Then several methods can be used, such as Porter's analysis of the five forces to assess the competitive level of the company.

Competitiveness is a relative concept that can be defined as the ability to provide the best offer on the market compared to competitors [6].

Adam Smith was first to formulate the concept of competition as "competition that raises prices (through supply shortage) and lowers prices (through oversupply). Competition determines and progresses the company's ability to adapt to the requirements of competition and in the process continue to develop" [7]. A. Smith defined the five main conditions of competition:

1. Competitors must act independently, not in collusion;
2. The number of competitors (potential or existing) should be sufficient to exclude extraordinary approaches;
3. Economic subjects should have acceptable knowledge of market opportunities;
4. There must be freedom of action in accordance with this knowledge;
5. Time is needed for the direction and volume flow of resources to meet the owner's wishes/expectations [4].

The concept of ideal competition was developed by David Ricardo, who developed a model that explains how market prices are combined in a long-term equilibrium with the principles of decentralized management and helps economic development. The economist founded the theory of comparative advantage, which explains not only the competition between companies, but also the competition between countries. Countries, like companies, win the competition fight if they specialize in a particular economic activity" [2]. Later, James Milne, referring to such management, noted that "given the fact that competition is the only regulator of prices, wages, rents, the law itself determines the rules for this regulation" [6].

Michael Porters, for his part, considers that the organizations position in the industry is determined by competitive advantages. In the end, organizations overpower their competitors if they have a strong competitive advantage [1]. In his opinion, all sustainable competitive advantage creating strategies can be fit into three standard options - reducing production costs, differentiate product, or to focus on a certain market segment. He thought that each strategy model promises only relative success, because it has not only advantages but also risks. In order to choose the right strategy, M. Porters suggested examining the company's value chain, which should be the key to creating a competitive advantage.

Latvian researchers, such as Z. Caurkubule defined competition as "competition between companies, people and territories with an interest in achieving the same goal" [5].

The main theses of the qualification work:

1. The nature and meaning of competition and competitiveness
2. Competitiveness ensures the organization's survival in the market and further effective development
3. Research of theoretical and methodological aspects for improving the competitiveness of the organization
4. A high level of competitiveness of a company is determined by competitive advantages
5. The most common factors influencing competitiveness are divided into external and internal factors
6. Competitiveness analysis of SIA ”AVK Grupa”
7. Development of recommendations for increasing the company's competitiveness

References

[1] Porter M 2003 Competition M. Портер. – M.: Viliams 496 (in Russian)
[2] Ricardo D 2006 Principles of Political Economy and Taxation New York: Cosimo Classics
[3] Seligman B 1968 The main trends of modern economic thought M.: Progress 600 (in Russian)
[4] Smits A 2007 An Inquiry into the Nature and Causes of the Wealth of Nations) M.: Eksmo 960
[5] Caurkubule Z, Vishnevska A Basics of marketing 51
[6] Zavjalov P V 2013 Competitiveness and Marketing Russian economic journal **12** 55 (in Russian)
[7] **E-source:** https://lv.wikipedia.org/wiki/Konkurence (Accessed 7 April 2020)

Improve enterprise efficiency by implementing the Physical Access Control System (PACS)

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Abstract

A modern production enterprise is a complex mechanism the efficiency of which is ensured by the management process.
Company management sets the main tasks and strategic goals based on both current and new requirements for the enterprise. The effectiveness of the measures taken to optimize and adapt the processes of activity of all levels and employees of the enterprise takes place through strict control of the developed procedures and processes. Quality control is a joint process of human and IT technologies.

Keywords: efficiency, analysis, management, personnel, PACS

1 Introduction

Information technologies according to the most scientists are designed, based and rationally using modern developments in the field of computer technology and high technologies, software and practical experience in order to solve the problems of effective organization of the information process aiming to reduce the costs of time, labour, energy and material resources [1].

2 Overview of the study area

Modern production can be seen as a hybrid process of interaction between people and machines [2]. IT PACS technology can help us to control the quality of this interaction.

PACS is a term, an abbreviation, formed by the capital letters of the word "Physical Access Control System" and is an electronic system that physically restricts access anywhere. By examining PACS on the example of an enterprise having production, we can define PACS as a set of software and technical elements and organizational and methodological measures, the purpose of which is to control limited access space, visit and movement.

Considering types of PACS, the basic elements of PACS will be electronic or biometric data; readers of these data; an electronic controller processing and checking the data and then providing an action signal; an opening or closing electrical mechanism; a computer that manages the controller and stores the databases.

Experience of other enterprises, without their in-depth analysis, can be considered partly subjective, as it is based on a survey of their representatives. At the same time, the accuracy of judgements and experience analysis data is considered objective in connection with the introduction of data only from highly qualified specialists in the field related to PACS. Based on the experience of other enterprises that have implemented PACS, the main factors affecting personnel management are derived: convenient interface, integration of PACS, speed of data transmission.[3] Regression analysis of data of experience of other enterprises that implemented PACS revealed that factors "Integrability," Agility "definitely influence the indicator of the value" Personnel management, "other factors did not show a certain influence. Also, when collecting these experiences, positive economic effect of the implementation of PACS was revealed.

Analysis of a specific production facility of medium level, application of theoretical research of IT technology of PACS to it and analysis of experience of other industries allowed us to develop the model of PACS implementation. This allowed to conduct the analysis of subsequent effective optimization of business processes and the conclusion of economic impact.

Having proved the hypothesis "Development of the plan and implementation of the system of access control and control in the enterprise X will create a qualitative system of operation with effective interaction of processes, which will improve economic condition of the enterprise", the company has been asked to implement the PACS system, which:

1. Improves interaction and human resources
2. Facilitates monitoring of quality and efficiency of the workflow
3. Accelerates analysis and adjustment of people's involvement in industrial and administrative needs, making important decisions
4. Reduces human influence as a problem of inaccuracy and inadequacy in business process analysis
5. Improves control and security across the enterprise in many ways
6. Economically adapts the enterprise to new requirements

And implements time accounting, staff motivation, and healthy lifestyle promotion.

3 Conclusions

Modern business competition dictates the rules of market

strategy and enterprise management should use all management methods to create effective processes of interaction in order to increase profitability. Thus, PACS, being a strong lever for creating a highly efficient profitable enterprise, affects enterprise efficiency factors and revenue maximization. The introduction of PACS is one of the first steps to attract investors to a highly profitable enterprise to obtain financial resources that contribute to its economic growth.

References

[1] Free on-line dictionary of computing (FOLDOC) Archived from the original on 15 April 2013. Retrieved 9 February 2013.
[2] KrulT 2013 Personnel Management Northcliff: Troupant Publishers
[3] Hybrid Intelligence. Machine as Creative Partners **E-source:** https://towardsdatascience.com/hybrid-intelligence-1495c0e1fde8

Social entrepreneurship in education area through the charity education of teenagers with special needs

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Abstract

Within the frameworks of the conference, the author raises a topical issue of aid (through the social entrepreneurship in education area) to the children – teenagers who are in difficult life situations, or who are left without foster parents. At the platform of ISMA University, the author developed and implemented a project-platform for charitable assistance to 14 -17-year-olds from boarding schools. The project aimed at social adaptation, and allows children to make a conscious choice of the future profession with the support of mentors. A number of lessons and master classes were held in the framework of the programme "Entrepreneurship within the Restaurant Business" at ISMA University. The successful experience of working with school students has shown the relevance of the events, with the prospect of involving a full list of professions taught at ISMA University and not only there.

Keywords: social entrepreneurship, teenagers with special needs, development, education, career guidance, adaptation, higher school

1 Introduction

In most cases, people make certain decisions, make choices, know the future profession, set certain goals and achieve them. But there are also those who have certain difficulties with choice, and their life is not like common people.

The fact is that orphaned teenagers live here and now, mostly by the present. Such teenagers most often have a psychological trauma in their personal history, do not remember their roots, and therefore it is difficult for them to change their inner world as they grow up. There are a lot of talented teenagers among them, what they need is just an opportunity: an opportunity to prove themselves, an opportunity to feel important and an opportunity to develop [1, 3]. The author suggests a social project-platform that will allow teenagers not only to enter more confidently into adult life, but also to get a decent profession that will as much correspond to their aptitude, personal characteristics and the needs of the modern market.

2 Part I

According to the recent research, only one of 10 graduates of boarding school adapt to life in society successfully. The remaining 9 cannot find a job, gradually fall down the social ladder and become a tax burden for the state. Less than 1 % of graduates enter the higher education institution. One of the reasons for this problem appearance is the lack of contact of school children with people who have recently passed the path of becoming in life and who can share advice and their life experience. According to "WorldSkills" statistics, the problem of conscious choice of profession is also acute for teenagers from families; in general, 70% of teenagers do not know how and what profession to choose [2, 3].

3 Goals of the social project

1. Professional orientation of orphaned children who are brought up in boarding schools.
2. Successful admission to the educational institution, which is the best for the student, as well as increase the chances of motivated students from boarding schools to get higher education.
3. Organization of workshops to facilitate the identification of professionally important qualities and interests of teenagers.

4 Tasks of the social project:

1. Individual testing and assistance in choosing a profession in accordance with psycho-emotional and personal qualities, expanding the horizons of students, getting acquainted with modern professions and trends, the job market.
2. Participation of students in master classes and lectures
3. Assistance in finding a future place of study, collecting and submitting the necessary documents before entering an educational institution, choice of the optimal educational institution for each teenager.
4. Formation of students' skills in searching vacancy with a decent salary for getting their first professional experience.
5. Giving the soft skills to teenagers in successful self-presentation for admission to an educational institution and employment, with the help of participants of this project.

The geography of the project includes primarily Latvia (ISMA University) and the Baltic States, as well as, in the future, expanding the project in the EU and joining similar and existing projects.

5 Part II

Also, one of the directions of the proposed project is forming the basic platform where high school students from boarding schools (including teenagers with special needs) can communicate and learn from teachers and students of ISMA University, corporate mentors (professional practitioners), who will pass on their professional skills [4, 5].

Mentors will help with the passing on knowledge in disciplines within their specialty and to prepare teenagers for admission to vocational and higher schools [6].

The first meetings and master classes within the project have been hold by the author and his team. The author has established the contacts and cooperates actively with the management of a special boarding school for children with disabilities in Riga "Rigas Daugavas pamatskola" [8].

6 Conclusions

The author is convinced that the mentoring project can change for the better the situation in the teenagers' education market. The author is also convinced, and his opinion is confirmed by the practice of that earlier acquaintance with the future profession, that the practical classes starting from the age of 14, a close acquaintance with companies and enthusiastic employees could increase motivation of teenagers for their work and development, and also help to improve school performance, since teenagers realise the necessity of knowledge they receive at school [6, 7].

As a result, each teenager will get a more complete understanding of the outside world, faith in their own strength, the ability to set worthy goals and to implement them, as well as knowledge, skills and soft skills necessary for further independent life, such as communication skills, self-presentation skills, etc.

According to the author, information about higher schools, motivation for further entering the higher education institution, additional assistance in preparing for admission and support of experienced, successful and motivated professionals will also be important.

References

[1] Miscenko S 2020 Social Entrepreneurship in the Restaurant Business through the Charity Education of Teenagers with Peculiarities The 18th International conference Open learning and distance education 2020 January 30 – 31. Riga. Latvia
[2] Learning new skills can change your life 2020 **E-source:** https://worldskills.org/site/search/?search_paths%5B%5D=&query=statistical&submit=Search
[3] David Bornstein, Susan Davis 2010 Social Entrepreneurship: What Everyone Needs To Know Oxford University Press, USA; 1 edition 172 p
[4] Teresa Chahine 2016 Introduction to Social Entrepreneurship CRC Press; 1 edition 314 p
[5] Arthur C. Brooks 2008 Social Entrepreneurship: A Modern Approach to Social Value Creation Pearson; 1 edition 208 p
[6] Jason Haber 2016 The Business of Good: Social Entrepreneurship and the New Bottom Line Entrepreneur Press 213 p
[7] Kathleen Kelly Janus 2018 Social Startup Success: How the Best Nonprofits Launch, Scale Up, and Make a Difference Da Capo Lifelong Books 272 p
[8] ISMA Gastro Studio Master Class (March, 2020) **E-source:** https://www.isma.lv/isma-jaunumi/item/1535-isma-gastro-studijas-meistarklase

The equal rights of disabled people to employment: issues in Latvia

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Abstract

The equal rights of disabled people to employment in-depth and expanded stated into the legal and normative documents. It is in UN Convention "Convention on the Rights of Persons with Disabilities, in the Constitution of Latvia, in the labour laws and in other normative documents as a forecast of the employment strategy towards to the EU Lisbon goals - to promote employment and social inclusion for all people. Unfortunately employment rate of disabled people do not have an inadequate compere with non-disabled. The aim of this research are focus on the realization of equal rights on employment of disabled people on a practice in Latvia. The research carried out by analysing the situation in Latvia, as well as by compiling the statistical data, the experts' opinions and performed review of literature. The conclusion that existing of the regulatory and policy framework has not had a significant impact on employment growth of people with disabilities und will be developed the real motivation mechanisms.

Keywords: disabled employees, employers, regulations, government policy, human rights, Latvia

1 Introduction

During in the last ten years significant changes are observed in employment of Disabled persons: it is a changing paradigm for disability policy making from compensation towards to human rights. Important contribution to these changes has been to ensure the development and improvement of the legal and regulatory frameworks of Latvia [1-5].

For to assess of the realization of equal rights on employment of disabled people on a practice in Latvia authors were carried out an analysing the situation in Latvia, as well as by compiling the statistical data, the experts' opinions and performed review of literature. A survey scale develops within this framework in order to determine the perspectives of managers and employers with regard to the employment of disabled people.

2 Study on realization of equal rights on employment of disabled people

Inclusiveness on employment of disabled people in the area of labour market Latvia's performance is clearly visible on compiling the statistical data. Analysing the situation in Latvia by compiling the statistical data according to the latest available data in early December of 2019 was registered 57 808 unemployed (their proportion around 6.2% from working age in the total number of economically active population [6] and 17929 registered job vacancies [7].

In comparison employment of disabled people in December 2019 was registered 7868 unemployed with disability (accordingly their proportion 13.6% of the total number of registered unemployed). These data ten years in retrospection in December 2008 were registered 4 458 unemployed with disability (accordingly their proportion 5.8% of the total number of registered unemployed). Therefore, in recent ten years the number of disabled persons has increased on 7.8% or has more than doubled.

The statistical data shows, that the unemployment rate of disabled people within the labour market is still very high. There is a negative tendency in the realization of equal rights on employment of disabled people in Latvia. The results of the statics data' analysis lead to the conclusion that in Latvia is gap between policy and practice for the employment of disabled people, which constantly has decreasing. This means that there are shifts into the legal and normative documents. It is a problem for the researches to do a better understanding the relationship on effective solutions of them.

Some of the practical issues have been discussed be: National Government of Latvia have adopted mainstreaming issues of disability within their policies however, at the same time they have set up parallel structures to implement separate disability programs instead of institutionalizing the same across all sectors. This has often led to confusion regarding mainstreaming, with various ministries not taking the ones of including people with disability.

Much has been written about the equal rights of disabled people to employment. Significant research has been carried out on the employment and integration strategy of people with disabilities in various aspects and levels in the EU and Latvia [8 – 15]. According to draw of the researchers' conclusions on the equal rights of disabled people to employment, there were stated that the simplistic approaches are not likely to solve the complex problem of employment and disability. Nevertheless, the main instrument for realization on practice of equal rights of Disabled People to employment has been to ensure the

development and improvement of the legal and regulatory frameworks of Latvia.

The predominant approach on anti-discrimination legislation in Latvia is the "mainstreaming model". There is no one single comprehensive law and random anti-discrimination clauses are scattered throughout different laws. The assessment of the results of these regulations' system do not to appraise unequivocally. The employment enhancing measures in all policy areas several empirical studies have suggested that the "mainstreaming model" reduces rather than increases employment opportunities for people with disabilities. For example, the Labour law was intended to protect people with disabilities [16, article 109 and 17]. It has become an obstacle for the employer to employ disabled people, on the one hand, while it is a barrier for people with disabilities to enter the free labour market, on the other hand.

The problems occurring within legislation are: 1) Latvian still does not provide the hard ground in terms of employment of disabled people, especially in terms of its legal framework (legislation) and financial aid. 2) Lack of one single comprehensive anti-discrimination law within the LR does not provide strong and enough financial aid for the employment means of disabled people. 3) Legislation does not foresee legal regulations about obligatory employment matters of disabled people.

3 Conclusion

The survey shows:

- Considerable number of problems in economic, legal and social sectors, which influence the realization of equal rights on employment of disabled people on a practice in Latvia;
- Appropriate changes in labour legislation are needed in order to serve both the employer's and the employee's interests;
- Motivating cooperation mechanism between the various stakeholders - state institutions, employers, local governments, and non-governmental organizations - should be created

References

[1] ANO 2010 *Konvencija par personu ar invaliditāti tiesībām* (Latvijas Republikā/ ratificēta 03.02.2010, stājās spēkā 31.03. 2010) **E-source:** http: www.un.org/disabilities

[2] WHO & WB 2010 Present a new global estimate concerning the numbers of People with Disabilities in the world In Disabled World News **E-source:** http: //www. disabled-world.com/disability/statistics/who-disability.php#ixzz2NVUn0zL9

[3] International Labour Organization (ILO) 2015 Decent work for persons with disabilities: promoting rights in the global development agenda International Labour Office, Geneva, Switzerland **E-source:** http://www.ilo.org/wcmsp5/groups/public/---ed_emp/--ifp_skills/documents/publication/wcms_430935.pdf Access: 01.02.2020

[4] Cabinet of Ministers 2015 Ministru kabineta rīkojums Nr. 561 (Order No. 561) Par Iekļaujošas nodarbinātības pamatnostādnēm 2015.– 2020.gadam (The Guidelines on Inclusive Employment 2015-2020) *Latvijas Vēstnesis* 14.05.2015. **93**(5411)

[5] Cabinet of Ministers 2013 Ministru kabineta rīkojums Nr. 564 (Order No. 564). Apvienoto Nāciju Organizācijas Konvencijas par personu ar invaliditāti tiesībām īstenošanas pamatnostādnes 2014.– 2020.gadam (The Guidelines for the Implementation of the United Nations Convention on the Rights of Persons with Disabilities 2014-2020) *Latvijas Vēstn*esis 26.11.2013. **231**(5037)

[6] Central Statistical Bureau of Latvia, (CSP) **E-source:** http://www.csb.gov.lv/en

[7] Nodarbinātības valsts aģentūra (**NVA)** (State **Employment** Agency) **E-source:** http://www.nva.gov.lv/docs/31_5e319809a21300.60027341.pdf

[8] Barnes C, Sheldon A 2010 Disability, Politics and Poverty in a Majority World Context Disability & Society **25**(7) 771-82

[9] Hersh M 2010 Disabled People and Employment: Barriers to Potential Solutions In book: Profiting from Diversity. The Business Advantages and the Obstacles to Achieve Diversity. Edited by Gloria Moss. Palgrave Macmillan 215-37 p

[10] Monteleone R, Mozzana C 2009 Integrated employment policies for disabled people: Organisational innovation between obstacles and opportunities International Journal of Sociology and Social Policy **29**(11) 649 – 61 **E-source:** http://dx.doi.org/10.1108/01443330910999087 (15-05-2012)

[11] Henry A D 2014 Employer-recommended strategies to increase opportunities for people with disabilities Journal of Vocational Rehabilitation **41**(3) 237-48

[12] Kantar TNS 2017 *Iekļaujošas darba vides un dažādības vadības principu ieviešana darbavietās Latvija: Darba devēju aptaujas galarezultātu apkopojums (*Implementation of inclusive work environment and diversity management principles in workplaces: Survey of employers) **E-source:** http://www.sif.gov.lv/images/files/ESF/ESFintegracija/petijumi/Aptaujas_gala_rezultatu_apkopojums-Analize.pdf (02.03.2020)

[13] Oborenko Z, Rivža B 2018 Legal and policy framework of employment **for** people with disabilities in Latvia Proceedings of the 2018 International Conference "ECONOMIC SCIENCE FOR RURAL DEVELOPMENT" No 49 Jelgava, LLU ESAF, 9 11 May 2018, p. 372-384 DOI 10.22616/ESRD.2018.156 **E-source:** https://www.researchgate.net/publication/330768301

[14] Oborenko Z, Zivitere M, Konstantinova 2016 Disability Management in the Workplace: Problems and Trends in Latvia RSU conference proceeding

[15] Zivitere M, Claidze V 2011 Legal environment, national strategies and policies for employment of people with disabilities SEER: Journal for Labour and Social Affairs in Eastern Europe **14**(1) 119-30

[16] Saeima (Parliament of Latvia). Darba likums (Labour law. Article 109) *Latvijas Vēstnesis* 06.07.2001 **105**(2942)

[17] *Invaliditātes likums* **E-source:** http://www.likumi.lv/doc.php?id=26019

Customer management mechanism on e-business environment

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Abstract

At the present time the creation of customer management mechanism on e-business environment and its testing is actively developing field of marketing managemet. The creation of customer management mechanism on e-business environment is relatively young field, there are no best practices and standards formulated main directions for customer management mechanism development on e-business environment. Currently there are many approaches and tools on the e-business environment used by different enterprises and organisations for creation of customer management mechanism. This work is an attempt to find the best way of doing customer management mechanism on e-business environment.

Keywords: customer managemnt, mechanism, enterprise, e-business environment

1 Introduction

Many standard customer management functions have been undergoing radical transformations on e-business environment. Modern customer management cannot be considered as a narrow national phenomenon. Customer management internationalisation and globalisation process is characterised by the features like intenationalisation and globalisation company customer management, differences between the place of location and residence of the company owners, abilities of accomodating themselves to the e-business environment, as well as international culture of business organisation.

Customer management via Internet is a perspective area. It offers access practically to people all over the world. Of course, language barriers and legislation differences in various countries shall be taken into account. Internet creates the possibility to new directions of customer management.

Thus understanding and investigation of e-business environment in due time give the possibility to avoid several problems related to further development of customer management in Latvia.

2 Overview

The object of the present research paper is customer management. The subject of the research paper is customer management on e-business environment.

The objective of the paper is to study the integration process of e-business environment and customer management problems, to elucidate the factors influencing the customer management effectiveness, to develop proposals for solving problems and for customer management mechanism by maiking use of relationship between these factors in investigation of customer management in Latvia.

The tasks advanced in order to reach the objective:

- identify the concept of e-business environment management,
- to carry out analysis of the factors influencing customer management in the process of e-business environment integration,
- to carry out analysis of indicators characterising customer management effectiveness on e-business environment.

Theoretical study methods are reported analysis of customer management, e-business environment management, study of correlation between customer management factors and e-business environment. Empirical pilot methods are observation for the purpose of studying mutual influence between customer management factors and e-business environment, study of documents regulating customer management in Latvia, analysis of the e-business environment management in Latvia, economic and statistical analysis of the customer management results on e-business environment, economic experiment, and study of public and non-government institutions data in Latvia.

Research basis are customer management, business and its e-business environment in Latvia. The research period is from the year 2010 until the year 2020, separate themes have been studied for a shorter period of time or by way of comparison.

3 Conclusion

The main results and conclusions of the research:

(1) Changes in the customer management theory are associated with changes in the e-business environment.

(2) Basing on the analysis of e-business environment management and pilot studies, the developed system of indicators of e-business environment enables:

- to carry out analysis of e-business environment management in Latvia,
- evaluate the effectiveness of customer management on e-business environment in Latvia,
- identify problems of customer management on e-business environment in Latvia.

(3)Solution of customer management problems is based on the study of e-business environment managemet and customer management mechanism.

Alfa Bank competitiveness assessment and ways to improve it

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Abstract

The relevance of the study of enterprise competitiveness depends on a clear sequence of managerial decisions, as their effectiveness and clarity of functioning affect the banking sector and the country as a whole.

Keywords: competitiveness, bank, banking services, rating, enterprise strategy, integrated assessment.

1 Introduction

Modern conditions for the development of the banking system determine a tendency to increase the level of universalization of commercial banks. Diversification of banks in various areas of financial and banking services, including through the development of banking services to the population, the introduction of new services, is one of the ways to solve the problem of adapting commercial banks to constantly changing conditions of the financial market, developing promising market niches and segments.

Under these conditions, banks are developing and offering an increasing number of banking products on the market. This raises the problem of tracking the competitiveness of new products and researching the potential demand for them.

2 Mainpart

Alfa-Bank was founded on November 18, 1992 as a limited liability company in accordance with Ukrainian legislation, was registered by the NBU on March 24, 1993, and began operating under the name Vito Commercial Consumer Assistance Bank with its head office in Kiev. In 1995, the Bank was reorganized into Kyivinvestbank LLC, which, in turn, was reorganized into Kyiv Investment Bank Joint-Stock Commercial Bank in 1997. Alfa-Bank Ukraine has been operating under its current name since January 2001 [1].

The main competitors of Alfa-Bank are banks such as PJSC CB Privatbank, JSC Raiffeisen Bank Aval and JSC Oschadbank.

The position of Alfa-Bank JSC in the banking services market, depending on certain parameters and performance indicators, is clearly demonstrated by its rating among other Ukrainian banks on the basis of "reliability". So, in 2019, Alfa-Bank JSC occupies the 13th position in the TOP-15 banks in terms of overall reliability, as well as the 6th position in the TOP-10 banks to which they have entrusted their deposits to insurance companies and the 2nd position in the TOP-10 of foreign banks (737542 thousand UAH). In addition, as of October 1, 2019, Alfa-Bank JSC took the 2nd position in the TOP-10 of the most profitable banks in Ukraine, its profit is 1487190000 UAH (200870000 UAH growth for the month).

Banking sector assets in 2019 increased by 5%. In particular, in terms of assets, Alfa-Bank JSC occupies the 9th position in the TOP-10, its assets amounted to 37601759 thousand UAH, including 21654402 thousand UAH in foreign currency.

In the TOP-10 rating of the largest banks, Alfa-Bank JSC on deposits of individuals has 5th position (17642822 thousand UAH, including on demand 3156410 thousand UAH), the best indicators are PJSC CB Privatbank (159561569 thousand UAH), JSC Oschadbank (UAH 74603999 thousand), Ukreximbank JSC (UAH 23833267 thousand), Raiffeisen Bank Aval OJSC (UAH 18342288 thousand). Regarding credit activities, Alfa-Bank JSC takes the third place in loans to individuals (5642902 thousand UAH, including in the currency of 746 602 thousand UAH) after PJSC CB Privatbank (25099122 thousand UAH) and PJSC Ukrsotsbank (10061711). However, on loans to legal entities-6th place (20790981 thousand UAH, including in the currency of 16705786 thousand UAH) [2].

The number of bank branches in Ukraine decreased by 3.8. Oschadbank remains the leader in the number of divisions with 2980 branches, and PrivatBank takes the second place with 2108 branches. In the first half of this year, Oschadbank closed 225 branches, while Privat Bank - 135. Large networks of branches also have Raffeisen Bank Aval - 504 branches and Ukrsibbank - 315 branches.

The largest increase in the number of branches among large banks was shown by Alfa Bank - by 72 branches, to 259 (but with a decrease in the number of branches that became "sister" of Ukrsotsbank by 22 - to 209), A-Bank - by 9, to 220, Ukrbudinvest Bank - by 8, up to 42, FUIB - at 7, up to 172.

According to the results of the banks stability rating in the 3rd quarter of 2019, which is carried out by the Ministry of Finance of Ukraine among banks with a retail deposit portfolio of UAH 1 billion or more, Alfa-Bank JSC takes the 11th position in the overall rating score and is 3.66. He improved the indicator relative to the 4th quarter of 2018 (3.53 points - 13th position). Note that, for example,

Oschadbank JSC in 2019 worsened its ranking position and received 3.53 points versus 3.65 points in 2018, i.e. it dropped from position 10 to 14. For sub-rating indexes of Alfa Bank JSC has the following indicators: stress resistance - 2.7, depositor loyalty - 4.5, analysts' rating - 4.44, place in the rating on deposits of individuals – 3 [2].

According to the calculations in the work, the integral indicator of competitiveness of Alfa Bank JSC is - 61.05%. This indicates that the level of competitiveness of the bank has a positive assessment, that is, it is considered one of the best banks in the country [3].

3 Conclusions

The presented methodology for determining the integral competitiveness of the enterprise, which allows to exclude expert estimates as a result of calculations based on available information about the activities of the Alfa Bank study. In addition, a computable interpretation of the integral indicator of enterprise competitiveness is proposed:

1. The definition of the integral competitiveness of the enterprise as two numbers is proposed: a) the market share occupied by the enterprise, and b) the market share growth rate.
2. A formalized methodology for determining the integral competitiveness of an enterprise is proposed, which allows replacing the expert assessment of individual factors by quantitative calculation based on marketing information on the results of enterprises of one industry group operating in similar marketing environment conditions.
3. It has been established that from the point of view of determining integral competitiveness, in its calculation it is necessary to use a multiplicative formula of the form (fixed assets, measured by residual value, financial management, expressed as return on equity and measured as the ratio of net profit to sources of equity and personnel and production management, measured by one indicator - labor productivity.
4. An community assessment of weight coefficients allows us to confidently talk about the relative weight of individual competitive factors in the overall market success of the enterprise and enables management to make efforts in certain areas of the company's business commensurate with their weight [5].

References

[1] Official site alpha bank **E-source:** https://alfabank.ua/ru
[2] Analytical review of banks in Ukraine **E-source:** https://www.slideshare.net/kornellio/2017-1-qubqr-39336630
[3] The financial statements of the bank Alfa Bank JSC **E-source:** https://alfabank.ua/en/investor-relations
[4] Official site alpha bank v **E-source:** https://finance.ua/ru/org/-/ua/banks/alfa-bank-b
[5] **E-source:** https://www.cfin.ru/press/marketing/2001-4/04.shtml

Finding the recipe to success in the chocolate industry

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Abstract

This article provides an overview and analysis of the chocolate industry in Latvia, specifics of the chocolate business and main manufacturers of chocolate in our country are presented.
In the process of creating own handmade chocolate bar manufacturing business, analytical studies of the planned enterprise were carried out: TOWS Analysis, Stakeholder Analysis, Microenvironment Analysis, strategic importance and possible risks, competitors were analyzed as well. Authors consider different Business Alternatives in chocolate industry. The economic value of each project is determined, their cost estimates, internal rate of return and net present value are calculated.
According to the results of various analyzes and calculations, the best project is own business of manual production of chocolate bars called "Mini Choco Factory".

Keywords: chocolate business, analysis, production, alternative, evaluation.

1 Introduction

There is a sufficient number of chocolate producers in Latvia. However, new manufacturers are not afraid to enter the market [4].

Moreover, despite the apparent abundance of chocolate products, the emergence of new manufacturers, especially those producing high-quality chocolate, so-called "premium" brands are strongly encouraged [3].

Its relatively uncomplicated production technology makes this business idea very attractive for entrepreneurs.

Earlier chocolate market was represented by a couple of industrial giants, now on the shelves of shops there are a lot of products released by small new brands.

Handmade chocolate business is slowly gaining momentum, largely due to the fact that it is very "fashionable" today to buy unique high-quality chocolate. Such products, mainly, can be provided to customers by small companies that do not pursue quantity because quality is more important to them [4].

Chocolate business attracts entrepreneurs for many reasons: relatively small starting investments, a growing demand for exclusive sweets, a high level of profitability and the average payback period of costs [5]. The chocolate industry is worth almost 10 billion dollars annually [1].

To "experience the charm" of the chocolate business, authors of this article analyze several possibilities of chocolate business.

The purpose of the authors is to create and implement a successful model of organizing own business in the chocolate industry.

2 General part

The authors of the article developed a concept of own business: "Mini Choco Factory" chocolate shop with handmade chocolate production on site, it will be located in Radisson Blu Hotel Latvija, the relevance of which was confirmed by a survey of hotel guests and visitors.

As a result of increased competition, there is a need for an adequate assessment of the competitive environment. In order to do this, authors used the world's leading practices to estimate the opportunities and weaknesses of the enterprise, analyzed the strengths in the development of which the company can increase its competitiveness and withstand threats. At this stage of the development of an innovative product model, assessments of key success factors for the business and its competitors are compared. Strategy development should be based on the strengths of the business in order to minimize the impact of weaknesses [2]. To do this, authors used TOWS Analysis, Stakeholder Analysis and Microenvironment Analysis.

To determine the success of "Mini Choco Factory" project, careful planning and analysis of possible alternatives to this business was carried out.

Of the three proposed Business Alternatives: "Mini Choco Factory" in Radisson Blu Hotel Latvija; Chocolate store with Nelleulla and Al Mari Anni chocolate bars in Radisson Blu Hotel Latvija; "Mini Choco Factory" in Grand Hotel Kempinski Riga, the latter is excluded. At the time of the research and in nearest 2 years, the Kempinski Hotel is unable to provide a rental space. In turn, Radisson Blu Hotel Latvija is ready to provide a place for rent, because hotel administration foresees great potential of both ideas and considers cooperation as mutually beneficial. Therefore, Work Breakdown Structure (WBS) is made up of two alternatives that show what actions must be completed in order to start a business. These results are presented in Gantt charts.

During an economic assessment of the two above-mentioned Business Alternatives, an analysis of total costs at the development stage and at the implementation stage was made.

According to the results of cost estimation and calculation of the internal rate of return for both projects, it turned out that the project of opening own shop-production "Mini Choco Factory" is more profitable. However, it takes more time and money to implement it than for Alternative 2.

3 Conclusions

The present work showed that the realization of the entrepreneurial potential for the production of handmade

chocolate bars will be profitable for the entrepreneur and is more successful business model than the sale of ready chocolate bars of other brands.

Main developments of the study have significant importance for professionals in the chocolate industry. The results of this work will be useful not only for young entrepreneurs but also for professionals in the chocolate industry who are interested in improving their business.

The practical significance of the study lies in the fact that a new business idea that was proposed with the goal of making a profit can be put into practice.

References

[1] Blockchain Revolutionizing the Chocolate Industry **E-source:** https://businessblockchainhq.com/business-blockchain-news/blockchain-revolutionizing-the-chocolate-industry/ (Accessed on 21.03.2020)

[2] Financial SWOT Analysis: What it is and How to use it **E-source:** https://pestleanalysis.com/financial-swot-analysis/ (Accessed on 21.01.2020)

[3] Global Chocolate Market 2020 - 2024 **E-source:** https://www.reportlinker.com/p02840424/Global-Chocolate-Market.html (Accessed on 21.03.2020)

[4] Maxima Mazumtirdzniecbas Kompass 2018. Decembris 2018. **E-source:** https://www.maxima.lv/fileman/Uploads/2018/Kompass/Maxima_Kompass_parskats_12.12.2018.pdf (Accessed on 19.01.2020.)

[5] Risks of starting a new business **E-source:** http://smallbusiness.chron.com/risks-starting-new-business-4195.html (Accessed on 12.01.2020.)

Marketing communication strategy of insurance companies and ways to improve it

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Abstract

The article considers the features of ways to improve the marketing communication strategy of insurance companies in Ukraine

Keywords: insurance companies, insurance product, marketing communication strategy, marketing communications complex, Internet marketing

1 Introduction

With the development of the insurance market, a rapid increase in the number of insurance companies has begun, but not everyone is able to precisely meet the needs of consumers, as current customers have become more demanding. Currently, the marketing communication strategy of the insurance company is one of the most effective tools for promoting insurance services. This strategy cannot be effective without innovation. The insurance companies that use an innovative approach in the development of insurance products and sales channels, achieve the greatest success.

2 Main part

The marketing communication system is now one of the important tools for the interaction between insurers and policyholders. The effective activity of the insurance company in order to bring the insurance product to the market and sell it to a certain extend depends on a well-constructed communication strategy and selected effective marketing communication tools. Marketing communication strategy of the enterprise implies the direction of the complex of actions to ensure its information presence on the market and the formation of long-term partnerships with other market entities in the process of creating and distributing certain values [1].

There are two forms of marketing communications: basic and synthetic. Fixed assets of a complex of marketing communications consist of: advertising; direct marketing; public relations; sales promotion. Synthetic agents include: branding; sponsorship; participation in exhibitions and fairs; Internet advertising, integrated marketing communications at points of sale [2]. In order to carry out an effective communication strategy, using only one element of the complex of marketing communications is not enough for an enterprise, therefore the measures and tools of the main elements of the complex should be implemented in combination, this will help to bring the proper effect.

On practice in the modern business community, it is impossible for insurance companies to provide quality service and be competitive without using the latest technologies and developments. Among innovations, it is necessary to highlight those that relate to the technological progress of mankind. Today, almost 89% of all humanity uses the Internet. In Ukraine, Internet users have 71% of the population, of whom 66% use a smartphone to access the Internet, 40% use a home laptop, 36% use a desktop computer from home, 5% use a desktop computer from work [3]. Therefore, the Internet as a channel for the promotion and implementation of services is undoubtedly one of the most effective, it makes it possible to remotely communicate with the insurer and the policyholder, while reducing costs and saving time.

It should also be noted that the Internet is an important center for the company's image. The modern consumer is becoming very demanding. The buyer seeks information about the financial condition of the insurance company, reads reviews of other insurers on forums and blogs, compares the cost of the policy with other market prices for this insurance product. Therefore, when developing a communication strategy, companies need to pay special attention to working with blogs, forums and organizing their own chatrooms on their sites to discuss current issues and company's performance on-line. The majority of domestic insurers, including TAS, don't provide forums on their websites, however, there are such tools as job reviews, questionnaires for assessing the quality of work of the insurer and forms for complaints.

In the insurance market in Ukraine, almost all companies have their official websites where the consumer can get acquainted with the product and information about their activities. But in order to have competitive advantages, some insurance companies have developed the Personal Account service on their website, which is the consumer's personal page on the company's website, where the client can track the information he needs at any time: the status of the contract, information about the timing of the insurance payment, and things like that. Such a service is available in the following insurance companies: TAS, INGO Ukraine, Alfa Insurance, PZU Ukraine and Ukrainian Insurance Group. This service

differs from company to company, for instance in some companies it is at the stage of development or improvement.

At the present stage of the information technologies development, when developing a marketing communication strategy, it is also worth considering the growing popularity of social networks. According to a study by leading sociologists in Ukraine, the most popular social networks are: Facebook (53.11%), more than 11 million active users, and Instagram (16.79%) [3]. This trend requires insurers to actively use this tool when developing a communication strategy, this will provide an opportunity to directly and unobtrusively interact with consumers in order to improve the image of the company.

Considering the possibilities of increasing the effectiveness of the marketing communication strategy, one can see that one of the main factors for increasing is the use of Internet marketing in building communications between the insurer and the policyholder. The main advantages of the Internet marketing are:

1. Saving time for the consumer and simplifying the interaction between the insurer and the policyholder. This will reduce the level of influence on the consumer, emotional and rational factors of conviction of company employees.
2. On the Internet, the policyholder has the opportunity to independently choose insurance, calculate the cost of the policy, compare it with other companies' offers, and also get the policy without leaving home.
3. No borders. Any user can access the site from anywhere in the world, and therefore this does not tie him to a separate place.
4. The speed and convenience of upgrading information.
5. A variety of promotion channels. Due to the development of digital advertising, information about insurance services can be placed on any sites in the form of banners using a huge number of formats.
6. The organization of a virtual office requires significantly lower costs than the cost of customer service directly in the office of the insurance company.

However, along with the advantages of using the Internet marketing communication strategy tool, there are some disadvantages:

1. Creation of the company's website, as well as, if it already exists, its constant modification for the convenience of users, which requires significant funds.
2. The constant growth of competition of insurers on the Internet. Due to the openness of information, it is very difficult to maintain a competitive advantage. A competitor can at any time withdraw the information he needs and use it to increase his competitiveness.
3. The majority of insurers of the Ukrainian market still don't dare to sell insurance products on a completely contactless basis.

3 Conclusions

The development of the insurance market depends on the direction of the chosen tools of marketing communications. Fixed assets of the complex of marketing communications, which were considered earlier, confirm that the insurance market of Ukraine is gradually adapting to changes in the external conditions of its functioning. Online insurance is a priority for effective and profitable future activities of insurance companies. Domestic insurers understand the need to use communication strategy tools and try to use its individual tools, but in most cases these processes occur spontaneously. To increase their competitive advantage, insurers must develop and implement an effective communication strategy. A balanced strategy of insurance companies will contribute to increasing competitiveness, as well as the level of insurance culture of the population, which will positively affect the development of one of the young, but at the same time one of the most promising areas of human activity.

References

[1] Primak T O 2009 Marketing Communication Strategies: A Comprehensive Approach to their Classification /T.O. Primak/ Formation of market economy: Coll. of sciences. Wash - Special. vol. Marketing: Theory and Practice. - Kyiv: KNEU

[2] Romat E V 2014 Advertising: study for universities 7th ed. / E.V Romato. - St. Petersburg.: Peter

[3] Website of the Kiev International Institute of Sociology **E-source:** http://www.kiis.com.ua/

Features of financial stability management of a commercial bank: theoretical and practical aspects

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Abstract

This article defines financial stability as the ability of the Bank at any time to keep the normative parameters of its activities; to provide a full range of financial services to customers; to maintain and increase capital for shareholders and to play its role of financial intermediary in the economy so as not to violate the confidence of clients, owners, managers and the regulator in the continuity and quality of its activities.

Keywords: financial stability, commercial Bank, system approach, profit, capital.

1 Introduction

In modern conditions, financial stability is one of the main elements of the Bank's financial condition. Determining the level of stability and reliability of a Bank requires an objective assessment of its financial condition, which is of a systemic nature. A systematic approach to diagnosing the Bank's financial position includes a balanced set of indicators that reflect the level of reliability and efficiency of the Bank's operations, as well as the threat of bankruptcy [1].

2 Main part

One of the most important conditions for the development of the domestic economy is the formation of a stable banking system. The successful functioning of the banking system as a whole depends on the financial stability of each individual Bank, its ability to counteract negative factors and develop dynamically [2].

In the process of analyzing the financial stability of a commercial Bank, it is very important to take into account such cash flows that affect the Bank's performance as:

- receiving interest income on all types of Bank assets;
- changes in the value of the securities portfolio on the market;
- payment of interest on attracted resources;
- net inflow or outflow of new resources (equity and borrowed funds);
- changes in the value of assets that are caused by the need for their unscheduled sale in order to meet current obligations or transfer funds to other types of investments.

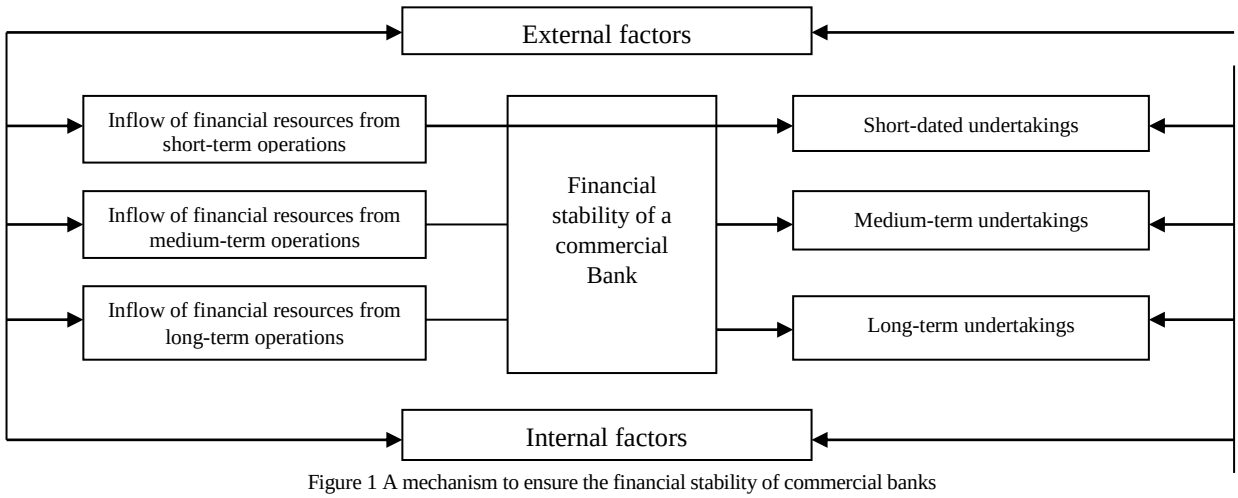

Figure 1 A mechanism to ensure the financial stability of commercial banks

The first stage, which makes it possible to determine the level of financial stability of banks, is the analysis of the structure of Bank assets and liabilities. When performing asset analysis, it is important to take into account the fact that the share of working assets in the Bank's balance sheet should be at least 50 %.

If the Bank has a significant share of “bad" assets, this leads to a decrease in asset returns and loss of liquidity. In addition, you should consider the ratio of the main types of working assets: loans and securities. At the same time, the share of loans in the Bank's asset portfolio should not exceed 60-65% of the balance sheet currency, and the share of securities should be 20-25 %. However, even if the total volume of the loan portfolio meets this restriction, but it mainly consists of loans of the same type, the assets cannot be considered sufficiently diversified.

The problems of financial stability of the banking sector in Ukraine remain insufficient capitalization of the banking system to meet the goals of economic growth and limited liquidity [3].

In addition, the reduction in the capital of commercial banks generates negative consequences, both for the banking system itself and for the economy as a whole. Taking into account the fact that equity capital should reduce the difference between assets and liabilities by terms, in the conditions of predominance of short - term liabilities and without a sufficient level of equity, banks cannot invest in medium-and long-term projects.

In this regard, it is necessary to recapitalize domestic banks, which should be carried out in accordance with the comprehensive program of recapitalization of the domestic banking system. This program should contain clear criteria of selection of banks with a view to their subsequent support and basic principles for the adoption of this kind of solutions.

In addition, it is important to understand that tactical financial tasks are individual for each commercial Bank, since they are formed on the basis of strategic objectives, tax policy, opportunities to use the organization's profits for the development of financial activities, etc.

Also, given the relative stability of the financial condition, the tactics of managing the financial stability of the organization should be characterized by flexibility and provide a prompt response to changes in state of mark.

3 Conclusions

Summing up, it is necessary to highlight the following aspects of improving the financial stability of commercial banks in Ukraine:

- strengthening cooperation with various types of enterprises, which will minimize the impact of external risks, will increase the prestige and confidence in banks. To this end, it is necessary to improve payment technologies and diversify the client base by industry;
- creating mechanisms that would protect Bank deposits from instability in the world market and from inflation, together with improving the system of money transfers and payments;
- diversification of the loan portfolio by industry sector of clients and deadlines will help to overcome liquidity risks and external risks to insure active operations;
- development of new information products, introduction of advanced technological techniques of banking management, which helps to prevent technical risks;
- increasing the transparency of the activities of domestic banking institutions for state supervision [4].

In addition, banks should develop strategies for post-crisis development, providing adequate risk management systems, profitability, liquidity, and capital. Commercial banks must constantly implement measures to increase capitalization at the expense of existing and new participants.

It should also be noted that a comprehensive approach to all these aspects of banking institutions ' activities will effectively prevent the symptoms of banking crises and increase financial stability together with competitiveness in the banking services market.

References

[1] Goryukova O V 2014 Models of financial stability of credit organizations M. p 12
[2] Miroshnichenko O S 2013 Profit in the formation and regulation of bank capital Financial analytics: Problems and solutions **24** 25–35
[3] Kuznetsova L 2011 Implementation of a systematic approach to the analytical support of financial stability management of a commercial bank Finance, money circulation, credit 1 567–71
[4] Murysev A A 2016 Problems of ensuring financial stability of commercial banks Young scientist **11** 864-7

Factors of influence on competitiveness of the enterprise

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Abstract

The essence and importance of enterprise competitiveness are considered. The factors influencing the competitiveness of the enterprise are investigated and systematized.

Keywords: economy, enterprise, organization, competitiveness, factors influencing competitiveness, efficiency.

1 Introduction

In a highly competitive environment, for Ukrainian enterprises face the problem of the uncertainty of the results of the implementation of their own competitive strategies, due to the influence of a combination of external factors. The most important are: strategic and tactical actions of existing and potential competitors, suppliers, consumers, partners; government economic policy; changes in the scientific, technical and political-legal environment and the like. Adverse effects of any of these factors may worsen the competitive position of the enterprise [1]. The competitiveness of the company can be defined as the ability to achieve their own goals in the face of competition. It follows that the assessment of the competitiveness of an enterprise may be a "balance of power" between a particular company and its main rivals in the market.

The purpose of writing abstracts is to consider the concept of enterprise competitiveness, to study the factors affecting enterprise competitiveness and their systematization.

2 Main part

Competitiveness is a complex characteristic, and therefore it is the result of the activities of all departments of the enterprise in all areas of production and its maintenance [2]. In order to conduct effective economic activity, one should carefully monitor changes in the external and internal environment, be able to anticipate them and their consequences, which may affect the competitiveness of the enterprise.

There are a number of factors to which attention should be paid, the main of them: - economic - can be detailed as: - financial; - marketing; - political; - management; - personnel; - technological; - innovative. All factors are important, it is difficult to single out the main ones, and political, managerial and innovative have the greatest influence. The state of its economy also depends on the political situation in the country, therefore it follows from this that economic factors are somewhat dependent on political ones. But also the components of economic factors, financial factors that influence politics: only having a stable financial position, the state can develop itself and domestic producers. ntertwined with each other and political with innovative factors. Technological and innovative factors are closely related. Both of them are components of scientific and technological progress. These factors complement each other and are equally important for the development of the enterprise, achieving and maintaining the proper competitive position.

3 Conclusions

Based on the above, it can be concluded that a number of factors affect the competitiveness of an enterprise. It is important to understand that, with proper management, each factor can contribute to the formation of additional competitive advantages; therefore, it is necessary to identify factors in time, analyze their influence and possible consequences.

In order to ensure efficient business activities for an enterprise, it is necessary to take into account its specifics and industry specifics. Taking into account that these factors can create competitive advantages for the enterprise or vice versa destroy them, it is necessary to develop approaches to managing each competitive factor.

References

[1] Farafonova N V 2012 The main factors of influence on the competitiveness of enterprises in the context of globalization / V. Farafonova 5 Problems of Economics **8** 219-26

[2] Sumets A 2009 Assessment of the competitiveness of a modern industrial enterprise: a training manual - second ed., Revised. and add. / A.N. Sumets, A.E. Somova, E.F. Pelikhova. - M.: Publishing House "Professional" 280 p

Innovative approach to the formation of assortment policy of small and medium-sized businesses in the service sector

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Abstract

The article considers the formation of the assortment policy of small and medium-sized businesses in the service sector, including an innovative approach on the example of an enterprise that conducts licensed activities and product certification of LLC "ALCERT" (Kiev). Several innovative approaches were identified for small and medium-sized businesses. The main ways to expand the range of services are outlined.

Keywords: efficiency, service sector, assortment policy, business, formation, enterprise, innovation campaign, market

1 Introduction

In a competitive environment, the market independently determines the assortment leaders, which in turn forms one of the strategic objectives of the functioning of different types of enterprises.

The assortment policy is formed depending on the needs of the market, the financial condition of the enterprise and restrictions on various types of services used.

Achieving high performance indicators of the enterprise is possible on the basis of management decisions aimed at optimizing the existing assortment of the enterprise.

The development of an enterprise's policy begins with an assessment of the enterprise's competitiveness.

The formation this process will improve the quality of management decisions and ensure the growth of the effectiveness of innovation in General and each individual innovation in particular.

2 Main part

Forming the optimal range of services in the sphere of small and medium-sized businesses is a laborious and very time-consuming process, it requires constant monitoring of the provision of services, customer needs and new products.

Now in the age of modern technology, customer preferences are constantly changing, increasing requirements for quality, variety of services and level of service. In order for a small and medium-sized enterprise to function effectively in the market and "stay afloat", it is necessary to constantly take into account all external and internal factors, as well as to invest various resources in improving its activities [1].

Especially successful at present are those enterprises that introduce innovations by inventing something new or improving the old. To ensure long-term success, an enterprise must innovate continuously [4].

Currently, the service sector occupies an increasingly stable position in the world market and is one of the most important sectors. Many countries focus their economy on the development of small and medium-sized businesses, because today the demand in this area is unusually high. Income from services in many countries leads to an increase in GDP, which has a positive impact on the economy of any country [2].

When choosing an innovative approach for LLC "ALCERT", first of all, it is necessary to take into account how the situation will change in the future and how this change will affect the company's position that provides the main groups of services: for a domestic manufacturer, for an importer, and for retail organizations. Development and registration of technical conditions, development of product labeling, registration of bar codes, certification of goods, sanitary and epidemiological assessment, declaration of conformity with Technical Regulations (analogues of European Directives), customs clearance of goods, independent voluntary examination of goods and many other types of services are today the subject company activities.

Considering the application of an innovative approach on the example of LLC "ALCERT" it is necessary to take into account the following factors:

1. Social;
2. Political;
3. Strengths and weaknesses of the organization and its competitive opportunities;
4. Personal ambition;
5. Values and cultures of the company. [2]

In the context of rapid changes in the world economy, almost every company feels the need to implement innovative as a factor of increasing competitiveness.

We can offer several innovative approaches for LLC "ALCERT":

- formation of a new type of service for the organization's entry into new markets and regions as the population's need for internationalization of the market increases;
- development of monitoring systems;

- the creation of an internal motivational system of personnel focused on the search, analysis and implementation of innovative ideas;
- creation of a company website that will perform not only advertising functions, but will also expand the customer base and increase the volume of services sold.

It can be noted that in the modern world, the service sector occupies a significant position and plays a significant role in the development of the economy [3].

3 Conclusions

Thus, summing up, we can conclude that at present new innovative approaches tend to develop.

Companies that decline adapting to innovation fail. However, those who actively introduce new technologies are growing and developing. The old type of organization cannot exist in the new environment. It needs changes in all areas, including in the formation of the company's assortment policy.

The paper proposes innovative approaches to the formation of the assortment policy of small and medium-sized enterprises, namely, for the enterprise of LLC "ALCERT" considered above.

For optimizing the portfolio of services, but in order for the innovative activity of the enterprise to be effective, it must be synchronized with strategic management, both budgeting and business process management systems. This conclusion is relevant not only for this enterprise, but also for other enterprises in the industry that have similar conditions for basic and innovative activities.

References

[1] Avramenko S 2018 New forms of investment in a transition economy Economist
[2] Agafonova I P 2012 Risk characterization and classification of the innovation project Management in Russia and abroad
[3] Shred I L 2019 Formation of innovative production structures in the information-creative space / I.L. Klochko, O.N. Danilova, T.A. Zaitseva Sewing industry
[4] Zagvyazinsky V I 2014 Ways to protect resistance to innovation / V.I. Zagvyazinsky, T.A. Strokova Innovative projects and programs in education

The peculiarities of the institutional environment for entrepreneurship in Ukraine

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Keywords: institutional theory, formal and informal institutions, corruption, kleptocratic economy

Almost thirty years after proclaiming independence, a comprehensive analysis of the institutional environment for entrepreneurship in Ukraine gives all grounds to characterize it as kleptocratic.

The institutional foundation for kleptocratic economy is the corruption base of the power structure and the motivated social and political elite that aligns with it. Moreover, the actual power in the state belongs to a group of people who either hold senior positions or do not publicly demonstrate their real dominant role in public administration.

In this situation, the entrepreneurial institutional environment is degrading, the specification of property rights is unreliable and eroded, and business is criminalized through distorted incentives, alongside with the complete neglect of the requirements of formal institutions in the court system, prosecutorial supervision, law practice, the activities of law enforcement and government bodies. Corruption of government officials forces businesses to distort financial statements; it slows the flow of foreign investment significantly, impedes the country's socioeconomic growth and undermines credibility of government and legal institutions.

Under these conditions, the bureaucratic-administrative apparatus acts as an institution which subordinates complex administrative procedures and leads to "intimidation' and repression of entrepreneurship. In the future, after institutional adaptation, corruption acts are treated as standard and ordinary behavior. That is, corruption is formalized into an institution when a bribe in the plane of "power – business" is perceived as a type of agreement or standard contract between the representatives of government and business with the elimination of unnecessary negotiations and approvals.

Formal and informal institutions do not oppose each other, but are in a state of a special symbiosis. The latter is characterized by the fact that institutions that supposedly guarantee the rule of law, while maintaining the formal shell, are either destroyed from within, or even transformed into the opposite. In most cases, the influence of such "subversive institutions" determines negative effects in entrepreneurship practice.

At the same time, it is especially valuable for the kleptocratic regime that the vast majority of national and foreign businesses are forced to find direct or circumventing corruptive communications with senior officials to protect their business, property rights, as well as obtain the necessary business information. It also provides an opportunity for the businesses that are faced with the problems of biased actions of bureaucratic institutions to use privileged connections and convey their appeals to those in power directly or indirectly. In such conditions, none of the so-called anti-corruption measures can eliminate corruption as a systemic phenomenon.

Therefore, compliance with one of the fundamental institutions of competitive economy, i.e. equality before the law, is a prerequisite for the formation and adjustment of the institutional business environment in Ukraine. At the same time, it can be asserted that the quality of the institutional environment for entrepreneurship, which is measured by an integrated indicator of institutional factors, is a key precondition for sustainable economic development.

Change in motivation of economic activity in the light of economic and non-economic motives

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Abstract

The article considers the changes of motivation of economic entities. The forms and methods of economic stimulation and sanctioning are changing, the current norms and rules are transforming, and property relations are being modified. An important feature of the article is the need to shift the focus of research from economic interest to the process of motivation of economic activity.

Keywords: behaviour, labour market, social-value needs, the motivation of economic entities

1 Intorduction

The modern labour market is a system of socio-economic relations of supply and demand for labour. The labour market is differentiated by certain criteria: national features, gender, age, quality of work force, education etc. In fact, it turns out that the labour market is divided into many segments, which differ in their specificity. There are different theoretical approaches to the study of labour markets, taking into account the behaviour of social subjects. It is impossible to separate a single vector that explains human behaviour. From our point of view, economic behavior in the labour market is related to the choice of such a workplace that will satisfy both economic (material benefits) and social-value needs of the subjects.

In economic theory for a long time dominated a paradigm, according to which the motivation of economic entities was fully formed by the utility function of an individual, possessing only budgetary and time constraints. The behaviour of economic entities was explained solely by economic motives. The focus of economic research was most often on all kinds of benefits or loss of utility functions of economic entities, which are determined by such a construct as economic interest. However, ignoring non-economic motives does not allow to reflect the completeness of the situation, reduces the accuracy and adequacy of modeling the behaviour of economic entities. A man is not a machine, but a living being, who makes systematic mistakes in their judgments and is not able to mathematically accurately predict the future [1, 2].

The active use of non-economic motives in economic science with the purpose of modeling the behaviour of economic subjects dictates the need to shift the focus of research from economic interest to the process of motivation.

The variety of approaches to the definition of the concept of "motive" has led to an even wider range of approaches that substantiate the essence of the category "motivation". Some scholars see the essence of motivation in purposeful activity of creating motives for ensuring appropriate behaviour of people. They interpret the motive as the subjective value of an individual's labour activity, which drives them to act as a result of the transformation of an external stimulus factor (stimulus) into the consciousness of the individual [4, 5]. Other scholars define the motivation to work as stimulating people to act on the part of the administration or the production management body, which is related to the satisfaction of human needs for material goods [3]. Third group of scholars interpret motivation as encouraging people to engage in activity, a process of conscious choice by a person of a certain behaviour based on internal and external factors, i.e. on motives and incentives [6].

In the process of development of economic systems, the forms and methods of economic stimulation and sanctioning are changing, the current norms and rules are transforming, and property relations are being modified. It can be assumed that the development of human capital is associated with a change in motivation, an increase in the role of intrinsic motivation and a decrease in extrinsic. Motivation of economic activity should be considered as a basis for self-determination of an individual in the modern economic space with domination of personal choice of an individual, increase of the effectiveness of their actions on the basis of the increase of abilities and skills.

2 Conclusions

Motivation reflects the whole process of transforming the needs of economic agents into concrete economic results. Thus, economic interest is a component of motivation of economic activity. The development of perfect and adequate models for explaining and predicting the behaviour of business entities dictates the need to shift the focus of research from economic interest to the process of motivation of economic activity.

The main economic factors include the system of economic incentives and sanctions, current rules and regulations. They shape the motivation of economic activity and establish different styles of economic behaviour of subjects. The psychological factors of formation of motivation include the attitude of the individual to these economic factors, as well as the attitude of the individual to himself as an economic entity. The interaction of psychological determinants shapes the economic identity of the economic entity.

In the most general sense, the motivation of economic activity should be considered as a hidden component of economic development. Motivation of economic activity of an individual forms the degree of rationality and activity, determines the orientation and sequence of actions of an individual, and establishes the level of efficiency of economic activity of an individual.

References

[1] Deci E L 1975 Intrinsic motivation New York: Plenum Press
[2] Ryan R M, Deci E L 2000 Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being American Physiologist **55**(1) 68—78
[3] Lisogor L 2006 The role of material motivation of labour in ensuring the effective use of labour potential of workers / Larisa Lisogor // Ukraine: aspects of labour **5** 23-31
[4] Bugutsky O A 1997 Factors of development of labour motivation / O.A. Bugutsky Economics of agribusiness **7** 79-82
[5] Malik M Y 1996 Motivation of production activity in agrarian sphere of economy (methodology and organization) / Malik M.Y. - K.: IAE 177 p
[6] Sabluk P T 1993 Labour Motivation and Labour Market Formation / P.T. Sabluk, O.A. Bugutsky. - K.: Urozhai 416 p

Risks in the operation of micro and small enterprises in Latvia

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Abstract

Improper attitude of the company's management to risks can lead to serious consequences, such as financial losses and even bankruptcy. The object of the research is the risks that are most significant in terms of possible losses. The aim of the research is to identify and quantify the most important high risks. The following main risks have been identified and analysed: financial risks, production risks, risks of innovative projects, risks of legislative changes. The results of the analysis are presented as a risk matrix. The majority of risks for micro and small enterprises in Latvia belong to low, medium and high groups. In terms of the extent of possible damage, risks more often have low or high extent of damage. The level of risk tolerance and decisions on their optimisation are made by the management of each company depending on specific conditions.

Keywords: micro and small enterprises, risks

1 Introduction

Risks arise in business due to uncertainties [1]. At the beginning of the 21st century, the uncertainties in the world increased significantly. In addition to economic crises, political crises and epidemics among people and animals arise, the economy has become global and competition has increased significantly. Any organisation, including micro and small enterprises, constantly faces risks. The number of personnel at these enterprises is as follows: in case of micro firms, there are 1–9 staff members; at small enterprises, there are 10–49 people employed. Improper attitude of the company's management to risks can lead to serious consequences, such as financial losses, deterioration of reputation and even bankruptcy. When deciding whether to invest in a project, the company's management always has the task of choosing the optimal option, the best one under the given conditions. Each option has its two main characteristics: average expected income and average expected risk. Senior management always strives to ensure that incomes are greater, while risks are less. Consideration of significant potential risks is especially important when implementing innovative projects [2].

2 Main part

Each small business in Latvia has its own risks. The company's management should identify and consider primarily the risks that are the largest in magnitude and can lead to significant damage to the company. The object of the research is the risks that are most significant in terms of possible losses for most micro and small enterprises, which have the greatest likelihood of undesirable results. In highly developed countries of the world (the USA, Germany, etc.), small businesses often cooperate with large world companies, fulfilling their orders to test any technical and organisational innovations, innovative projects, which are then introduced into production at large enterprises [3]. In modern conditions, given the increasing competition in the markets, innovation processes should be constant in any enterprise [4]. The aim of the research is to identify and quantify the most important high risks arising from the functioning of micro and small enterprises in Latvia, which can lead to undesirable consequences.

The paper has identified and analysed the most significant risks in small enterprises in Latvia for the first time. The methods of examination and scenario analysis of the development of situations with risks and their negative impact have been used, taking into account changes both in the Latvian markets and in international markets. The following main risks have been identified and analysed.

- Financial risks (0.5 – 0.6): partial or complete refusal of customers to pay for the completed stages of work on time for various reasons; currency risks due to changes in exchange rates.
- Production risks (0.2 – 0.3): the inability to fulfill orders on time for various reasons (failure to obtain raw materials, materials, equipment breakdowns, lack of necessary specialists, etc.).
- Risks of innovative projects (0.3 – 0.4): refusal to carry out the initiated projects for various reasons (lack of financial resources, failure on the part of suppliers, identification of errors in projects, etc.). It should be taken into account that innovations are almost always associated with increased risks [5].
- Risks of legislative changes (0.4 – 0.6): in Latvia the taxation system changes quite often, which negatively affects small enterprises and their competitiveness.

To analyse the main risks, they have been ranked depending on the extent of possible damage. Responsible executives and specialists of several micro and small

enterprises of Latvia have been involved in the examination. The results of the analysis are presented as a risk matrix in Table 1.

TABLE 1 Assessment of the most significant risks in micro and small enterprises in Latvia

No	Risk grading	Magnitude of risk	Possible damage		
			Low (a)	Medium (b)	High (c)
1	Low	> 0.1 – 0.3			2
2	Medium	> 0.3 – 0.4	3		
3	High	> 0.4 – 0.6			1; 4

The zone of risk tolerance is the diagonal of the risk matrix going from cell "a3" to cell "c1". Production risks (2) are in the tolerance zone. It means that risks (2) are the most acceptable for the enterprises under consideration, whose management is able to accept these risks and successfully optimise them. Profit will be maximum possible for these conditions. If the management of enterprises, in order to obtain greater profit, allows an increase in risks (2) – a transition to medium or high risks, then such actions can lead to greater damage with a higher probability. It has been established that the extent of possible damage to micro and small enterprises in Latvia is mainly low or high. Medium sizes of possible damage are rare.

Risks of innovative projects (3) can lead to small losses and belong to the medium-sized group. They are located above the tolerance zone in the risk matrix. This is due to the fact that, as surveys have shown, the company's management is wary of introducing innovations, having no guarantees of the return of financial resources invested in projects, even small ones. Having such guarantees, for example, from the state or any funds, the enterprises of this cluster would be able to more actively engage in innovations in their fields, even when moving into a group of high risks, but being in the zone of tolerance. This would allow enterprises to increase their competitiveness and survival in difficult conditions.

In the most dangerous zone with the greatest risks and greatest possible losses, there are financial risks (1) and risks of legislative changes (4): matrix cell c3. The best way to improve this situation would be to shift this risk group along the second diagonal of the matrix (a1 – c3) to the tolerance zone (a3 – c1). Financial risks (1) can be reduced by improving the quality of marketing in enterprises: it is a more accurate assessment of the reliability of enterprise's clients, their solvency. However, in general, it is not possible to change the situation for the better, for example, in the field of risks of legislative changes (4).

3 Conclusion

It has been established that the majority of risks for micro and small enterprises in Latvia belong to low, medium and high groups. There are practically no risks greater than 0.6. In terms of the extent of possible damage, risks more often have low or high extent of damage, medium-sized damage is rare. The level of risk tolerance and decisions on their optimisation are made by the management of each company depending on specific conditions. Particular attention should be paid to marketing activities, since they affect financial risks and lead to possible high extent of damage in many respects. It is necessary to constantly monitor changes in the legislation of Latvia, since here both the risks and the magnitude of possible damage are significant.

References

[1] Borge D 2001 The Book of Risk New York: John Wiley & Sons
[2] Aliev B, Kochetkov Yu 2017 Characteristics of the risks of innovation process in the industry of shipbuilding in Latvia *BSA scientific collection International scientific conference "The transformation process of law, the regional economy and economic policy: the relevant economic and political and legal issues" 2016 9 December Riga: BSA 27-36 ISBN 978-9984-47-143-3*
[3] [Siropolis N 1990 Small Business Management. A Guide to Entrepreneurship Houghton Mifflin Company Princeton New Jersey
[4] Kochetkov Yu, Aliev B 2016 Evaluating the strategic directions of innovative development of the shipbuilding industry in Latvia Computer Modelling and New Technologies **20**(1) 27-32
[5] Fathutdinov R 2000 Innovatory Management Moscow

Sustainable development cities imperatives in the 21st-century global challenges system (security aspect)

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Abstract

The article deals with contemporary aspects of sustainable urban development in the global challenges system. The author draws attention to the fact that cities are turning into drivers of modern economic development of the national economy, they are centers of gravity of economic activity and its high concentration, and also have the best infrastructure systems. The author unveiled that global challenges are changing the traditional concepts of city development, which makes it beneficial to consider their safety component.

Keywords: city, global challenges, safety, national economy

1 Introduction

One of the essential components of the economic security of the national economy in Ukraine in modern situations is a city. It is, at the same time, an element of the socio-economic system structure of a country and a region.

One of the essential components of the economic security of the national economy in Ukraine in modern situations is a city. It is, at the same time, an element of the socio-economic system structure of a country and a region. Identification of the city as an object of economic security in the process of decentralization reform, which is carried out in Ukraine: will further refine an understanding of the objects hierarchy in economic security; legal state substantiation of a city as an object of economic security of the national economy and economic security of a region, taking into account world and national challenges; as well as developing a new concept of urban development management for implementing the sustainable development model in the context of decentralization reform, as a city is the first link in this system.This topic is also relevant from the viewpoint of the formation, functioning, and current trends of urban geosystems on a sustainable development basis.

Sustainable development problems and their solutions are actively researching by world-known scientists (Hulse, J.H [1], Kates, R.W., Parris, T.M., Leiserowitz, A.A. [2], Michael von Hauff, Claudia Kuhnke [3] and others) and Ukrainian scientists (Doroguntsov, S., Danylyshyn, B., Shostak, L., Komelina, O. and others.) [4]. The problems of society's sustainable development in the system of global challenges of the 21st century (security aspect) are under the scrutiny of UN and specialized international institutions. Moreover, the security aspects of countries' transition to a sustainable development model, in particular, in the context of further urban development.

Therefore, it is currently essential to investigate the features of the sustainable development methodology construction; and its practical implementation in the enlightenment of new trends in urban growth; and building an adequate system of public administration and local self-government. In doing so, it is crucial to consider the security aspects of urban development that are affected by global challenges.

2 Main material

According to official statistics, in 2007, for the first time in human history, the number of the urban population exceeded that of rural people, making the world predominantly urban. According to international organizations, by 2050, nearly 70% of the world's population will live in cities, and urbanization will turn into one of the most radical trends of the 21st century. Modern metropolitan areas cover more than 40% of the world population and makeup about 60% of world GDP. Population, economic activity, social and cultural interaction, environmental and humanitarian impact on the global and national environment are increasingly concentrating in cities. That poses enormous problems for the sustainable development economics of countries and regions, especially in the areas of affordable housing, modern and secure infrastructure, essential services, food safety, health, education, decent work, security, and natural resources, etc. [5].

Cities are tightly integrating into the world globalization processes, and some scientists consider their deployment as a paradox of the 21st century. On the one hand, globalization is the result of finding the most effective mechanisms for improving the economic efficiency of economic activity in the situation of increased competition in the international markets for goods and services. At the same time, centres of gravity of economic activity and its high concentration are cities as territories with the best infrastructure systems. On the other hand, the deepening of globalization and its inclusive indication is a great challenge for humanity, which is further accompanied by a radical change in economic, social, technological, environmental, social, political, ideological and other processes and, consequently, significant structural changes in the national economies of

the world as a whole. These problems also significantly affect the sustainable development and resilience of cities as complex socio-economic systems.

In the system of these transformations, a city takes on a unique role as a complex socio-economic system, an essential element of the national and regional economy. Cities are becoming a significant factor in the formation of economic, social, human, scientific, cultural, infrastructural, and other components of their own potential. The peculiarities of formation, use, and development of the city's aggregate potential in the context of global changes determine the content of the course of socio-economic development processes and the possibility of implementing the prerequisites of sustainable development of the country as a whole.

The formation accompanies the development of urbanization based on cities of megaregions, city corridors, and cities-regions; economic, social, and political characteristics of which change traditional concepts of city development. In particular, new international migration flows, their trends, and their scale is usually accompanied by many economic, social, other risks and threats to urban development. That applies to both cities that accept migrants as labour force and those who lose that labour). In general, these trends affect the level of vulnerability of cities to the impact of global factors, which at the same time actualizes the issue of ensuring the economic security of their functioning.

Modern global processes are affecting the dynamics of the urban systems of national economies and the world at large. That is confirming by the results of research many scientists of the world over the last few decades. Also, that is characterizing by increasing attention from the world society to this issue. Thus, new trends in urbanization are turning cities (especially large cities and metropolises) into principal drivers of national economies.

Awareness of global changes and their impact on urban development has contributed to the emergence and evolution of new international institutions at the global level. Activities analysis of these institutions and the content of their essential documents make it possible to examine changes in role identification of cities in a globalized environment, to identify changes in their functioning over time and space, including those related to economic security.

Identification of the city as an object of economic security in the process of decentralization reform, which is carried out in Ukraine: will further refine an understanding of the objects hierarchy in economic security; legal state substantiation of a city as an object of economic security of the national economy and economic security of a region, taking into account world and national challenges; as well as developing a new concept of urban development management for implementing the sustainable development model in the context of decentralization reform, as a city is the first link in this system. This topic is also relevant from the viewpoint of the formation, functioning, and current trends of urban geosystems on a sustainable development basis.

3 Conclusion

The provision of economic security of cities in the system of global challenges turns into a complex of political, social, economic, legal, organizational, technical, specialized, moral-psychological, information-analytical, and other measures. The primary purpose of these activities to identify and prevent threats to individuals, cities, and society as a whole. Also, to create an adequate system of protection. Furthermore, we need to ensure the conditions of the normal functioning of all city life support systems, as well as the life and activities of its inhabitants.

References

[1] Hulse J H 2007 Sustainable Development at Risk: Ignoring the Past / J.H. Hulse. – New Delhi: Cambridge University Press India Pvt. Ltd.; Ottawa: International Development Research Centre 390 p
[2] Kates R W 2001 What is Sustainable Development? Goals, Indicators, Values, and Practice / R.W. Kates, T.M. Parris, A.A. Leiserowitz. – Environment: Science and Policy for Sustainable Development **3** 8-21
[3] von Hauff M, Kuhnke C 2017 Sustainable Development Policy: A European Perspective
[4] Komelina O V 2015 Economic insecurity of households as a key indicator in estimating economic security of the country, region, city / O.V. Komelina, A.W. Pluzhnyk *Економіка і регіон* **94**(53) 86-90 **E-source:** https://drive.google.com/file/d/0Bwbz8yU2lkF9M0c1cXhNc0F1YTQ/view
[5] Housing and urban development in the economic commission for europe region **E-source:** http://habitat3.org/wp-content/uploads/NUA-Ukrainian.pdf

Theoretical aspects of the innovation ecosystem

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Keywords: Innovation, Innovative Ecosystem, Innovative Activities, Fundamental Studies, Commercialization, Global Economy, Innovators, Investors, National Innovation System.

Creating favorable conditions for sustainable innovation in the economy is linked to the formation of an ecosystem. In the work, the author discusses the essence of an innovative ecosystem, elements of the innovation ecosystem and their interconnection at different stages of the innovation life cycle are separated. The article explains the place of the linear model of the innovation process in the concept of national innovation system, the ecosystem development levels and their characterization are also given.

Under the modern conditions, preferable lines of economic development of the country is preferable development of innovative high-technology lines. Market conditions of forming innovation economy is characterized with the global changes, global transformation of innovation activities, large scales of changes, which make the task of forming innovation ecosystem actual. It is capable to provide competitiveness of industrial production in the field of high technologies, national safety and sustainable social and economic development throughout the economy of the country.

Knowledge management in Ukraine: intangible assets

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Abstract

The article explores theoretical and practical aspects of knowledge management in Ukraine. In the context of the information economy, knowledge is transformed into intangible assets that play a strategic role in generating competitive advantages and ensuring sustainable development.

Keywords: knowledge, intangible assets, patent, invention

1 Introduction

An important feature of the current stage is the changing role and importance of knowledge as an economic resource for the Ukrainian economy. Because, in the economy they are important; types of knowledge: "know-what" - refers to knowledge of "facts"; here knowledge is closer to what is called information; "Know-why" - scientific knowledge of the principles and laws of nature; Know-how - the skills or ability to do something; Know-who contains information about who owns and knows what skills he has. The first two types of knowledge refer to explicit or codified knowledge, which can be expressed in the form of words and numbers, and be transmitted in formalized form on appropriate carriers. This type of knowledge can be easily reproduced and disseminated to a large number of consumers [1]. Thus, in a knowledge economy and a high level of competition, it is necessary to manage explicit knowledge that allows not only competitive advantages but also sustainable development.

2 Overview

In a digital economy, intellectual property is a strategic role that allows not only competitive advantages but also additional funding. Thus, knowledge is transformed at the level of socio-economic systems into objects of intellectual property, namely patents, inventions, utility models. On the basis of intangible assets, the franchise business is developed and franchises are used.

3 Decision

In order to study the dynamics of intangible assets in Ukraine, which allow for the commercialization of knowledge, we analyze the dynamics of receipt of applications for industrial property (Table 1).

During the period under review, the number of applications for industrial property is increasing. Among foreign countries, Cyprus remains the leader in submitting applications for utility models in 2018-2019. The number of applications from which has doubled in 2018, and the share exceeded 40% of the total number of foreign applications for utility models. In 2019, applicants from Slovakia, the United Kingdom, the Russian Federation, Belarus and Latvia were active. The number of applications from the Russian Federation decreased by more than 46% and their share by 13.8% in 2018 compared to previous years. Despite a decrease in the number of applications received in 2018 from applicants in Belarus (−38.5%), the United States (−58.3%), Germany (−28.5%) and Poland (−50%), they are in the top ten leaders. In 2019, there is a decrease in the number of applications for industrial designs compared to previous years, especially from foreign applicants.

TABLE 1 Dynamics of receipt of applications for industrial property

Industrial property	2015	2016	2017	2018
Total received	47819	51559	53462	54784
1. Inventions, including:	4497	4093	4049	3965
from foreign applicants	235	192	213	250
2. Useful models, including:	8618	9559	9112	9123
from foreign applicants	112	81	128	133
3. Industrial samples, total:	2080	2302	2480	3042
from national applicants:	1811	2016	2249	2787
from foreign applicants	269	286	231	255
4. Signs for goods and services	32621	35605	37817	38651

In the reporting year, as in the past several years, the first positions among foreign applicants were: Bayer AG (Germany), which is engaged in the production of plastics, medicines, paints, varnishes, plant protection products (84 applications, +35.5%); one of the largest tobacco companies in the world - Philip Morris Products S.A. (Switzerland) (73 applications, + 7.4%); the largest chemical company in the world for the production of plastic, paint, cosmetics, food additives, technical and construction chemicals, agrochemical plant protection products - BASF SE (Germany) (65 applications, 2.2 times); the largest metallurgical company in the world ArcelorMittal (Luxembourg) (44 bids, +69.2%); pharmaceutical company conducting research and development related to a wide range of human health disorders - Janssen Pharmaceutica (Belgium) (34 applications, +41.6%); tobacco manufacturer - British American Tobacco Plc. (United Kingdom) (30

applications, 2.5 times); Leading manufacturer of biotechnology drugs for oncology, virology, rheumatology and transplantation - F. Hofmann-La Roche Ltd. (Switzerland) (30 applications, +42.9%); private research and production company Xyleco Inc. (USA) (26 applications, -3.7%); multinational agrochemical and agricultural biotechnology corporation Monsanto Company (USA) (21 applications, +31.3%). It should be noted that among the industrial enterprises in 2018, the largest number of applications came from PJSC "Mayak Plant", which is the leading enterprise in Ukraine specializing in the development and production of magnetic recording and sound reproduction equipment, and JSC "Motor Sich" - one of the world's leading enterprises for the development, production, repair and maintenance of aircraft gas turbine engines for aircraft and helicopters, as well as industrial gas turbine plants (8 applications).

4 Conclusion

Thus, we can conclude that the positive period of growth of intangible assets is observed during the period under review, but this is not enough in a competitive environment. Therefore, a promising area of operation of modern enterprises is the intensification of intangible assets that allow you to compete not only in the domestic but also in foreign markets.

References

[1] Indicators of activity in the field of industrial property for 2018. Statistical Yearbook. 2018 Kyiv: Ministerstvo ekonomichnoho rozvytku i torhivli Ukrainy ta derzhavne pidpryiemstvo «Ukrainskyi instytut promyslovoi vlasnosti» **E-source:** https://ukrpatent.org/uk/articles/promvlas-tsyfra/

[2] Indicators of activity in the field of industrial property for 2019. Statistical Yearbook. 2019 Kyiv: Ministerstvo ekonomichnoho rozvytku i torhivli Ukrainy ta derzhavne pidpryiemstvo «Ukrainskyi instytut promyslovoi vlasnosti» **E-source:** https://ukrpatent.org/uk/articles/promvlas-tsyfra/

[3] Bondar-Pidhurska O 2017 Nanotechnologies as a Basis for Realization of the Paradigm for National Economic Development/ O. Bondar-Pidhurska, A.Hliebova, I. Khomenko// Economy and region **3 E-source:** http://nbuv.gov.ua/UJRN/econrig_2017_3_6

Telecommunication services in the world information system

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Abstract

The role of telecommunication services in the world information system is investigated. The basic tendencies and strategic orientations for the further development of the information system of the world economy are considered.

Keywords: telecommunications, information, information system, information and communication technologies

1 Introduction

The development of the world economy and the constant integration processes cannot be explored without the telecommunications sector, which is the main tool for managing the information flows of modern society and the basis of the economy in its modern sense. Each country's information resources are strategic and have the same meaning as raw materials, energy and other resources. Information in today's society is a major driver of economic growth.

2 Overview

Telecommunications is a process, a fundamental means of achieving different goals. In the economic world, telecommunications serve to disseminate information to suppliers, consumers, researchers, analysts, legislators, regulators, and the like. They are present in all processes of economic production and are an integral part of almost any modern business activity, the purpose of which is the production of goods and services for consumers. In the social environment, telecommunications is a means of informing, entertaining and sharing experiences. Telecommunications networks and services allow you to do all these actions over long distances and across a wide range of users.

The introduction of modern computer and telecommunication technologies in almost all fields of activity has led to the formation of a single information space. The acceleration of the rate of creation and dissemination of information, on the one hand, makes it possible to realize intellectual potential in the form of innovation, on the other hand, increases the requirements for the state of telecommunications infrastructure. There has been a rapid development of the information industry in general and of the global information market, in particular, in recent years. Never before has information and telecommunications technology evolved so rapidly.

The impact of telecommunications is manifested in the development of various industries of the shadow economy, increasing the share of intellectual work in the product, the emergence of new business formats, etc.

Experts prove that the US is a follower of the strategy of innovative leadership in the field of telecommunication services, which is based on the focus on scientific and technological leadership, growth of investments in informatization of society and active development of the corporate sector, optimal interaction of the state share of sectors, state support of state corporations and state support. EU countries are adherents of a social orientation strategy that envisages education and retraining, accessibility to telecommunications for all citizens, funding for science and telecommunications research; creation of trans-European networks of municipal bodies, health care.

The global market for telecommunications services is an integral part of the information and communication market and the global market for services. In an information economy, countries with the most advanced information and communications technology (ICT) sectors have the highest level of competitiveness, as information technologies increase the efficiency of the economy in the long run. As a result of all these factors, a 10% increase in broadband investment increases average annual GDP growth by 0.6-0.7 percentage points [1].This effect is achieved through direct and indirect influence on the economy of both the state and private business.

Analysts from the International Telecommunication Union conducted a correlation analysis that showed a strong correlation between GNI per capita and IDI. The higher the IDI, the higher the GNI per capita. Therefore, ICT has a direct impact on the well-being of countries IDI 2017 covers 176 countries in the world. The IDI ranking in 2017 is Iceland, with an IDI of 8.98. Changes in positions can be tracked in Table 1 [2].

TABLE 1 ICT Development Index in the World

Place	2014	20115	2016	2017
1	Denmark	Korea	Korea	Iceland
2	Korea	Denmark	Iceland	Korea
3	Sweden	Iceland	Denmark	Switzerland

Progress in the use and development of ICT is continuing in 2020. The steady increase in telecommunication

accessibility is maintained, given the growth in mobile cellular telephony and, more recently, in mobile broadband. The growth of fixed and mobile broadband infrastructure encourages access to and use of the Interne.

3 Decision

Studies of scientists show that telecommunications to the world economy is manifested in the form of development of various sectors of the economy, increasing the share of intellectual labor in the product, the emergence of new formats of business. At the same time, there is a growing scale and widespread diversification of telecommunications companies, accompanied by the shift of telecommunication operators to providing a wider range of users with a wider range of services.

At the same time, the modern developed countries of the world are prioritizing both the current development of the telecommunications industry and the development of appropriate strategic development plans for the future. The introduction of telecommunications into the economic, legal, social and other spheres of society determines the strategic directions of their state support.

Mobile telephony, landline telephony and Internet access services remain the main segments of the telecommunications market. In recent years, it has accounted for 87.1% of total telecommunications services revenue.

4 Conclusion

Thus, telecommunications play a significant role in the social and economic activities of society by providing online or interactive (dialog) transmission of information. The development of telecommunications should be ahead of the overall pace of economic development and will be decisive in the near and distant future. The slow pace of development of telecommunications is causing a decrease in the competitiveness of the economies of the countries. Telecommunications play a significant role in accelerating the economic and social development on a planetary scale. The current stage of development of the world economic cannot be seen without the telecommunications sector, which is the main tool for managing the information flows of modern society and the basis of the economy in its modern sense.

References

[1] Statistic portal Statista **E-source:** https://www.statista.com/
[2] Communication industry: figures and facts **E-source:** http://nkrzi.gov.ua/index.php?r=site/index&pg=138&language=en

Pandemic COVID-2019: Distance learning in Universities in Kazakhstan

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Abstract

The paper deals with the transition of Kazakhstan to distance education in the context of the pandemic, an overview of the organization of distance learning in Universities in Kazakhstan, problems and solutions in the framework of working with distance learning technologies in the country.

Keyword: Coronavirus pandemic, COVID-19, Distance education, Online learning, distance technologies, quarantine, Universities, information platforms

1 Introduction

In Kazakhstan, in order to ensure the safety of life and health of students and pupils, teachers, and other employees of educational organizations, as well as to prevent the spread of COVID-19 coronavirus infection during the pandemic declared by the world health organization, it was decided to suspend internal and external mobility of students; provide students with distance learning; organize online training courses for teachers on distance learning; conduct intermediate and final certification of students online, apply online proctoring technologies that allow you to verify the student, monitor the screen and behavior of the student, as well as record the entire exam on video; conduct defense of diploma projects and master's works online.

Online learning is a global trend in education, consistently implemented by major universities such as Stanford, Berkley, MIT, and others. For Kazakh universities, the situation with total quarantine has become a serious test of strength, as well as a good opportunity to show their achievements in this direction. Many universities in the country, following international experience and global trends, began implementing distance learning and mass open online courses using various platforms long before the quarantine was announced.

In modern society, full-fledged education using distance technologies is possible only if the proper level of quality of the material (content) is combined with a service that provides convenient navigation between lectures, a clear structure of the educational process and uninterrupted broadcasting of educational audio and video materials. Since classes are mainly divided into lectures, practical and individual work, the distance format implies training in real time with teachers, as well as self-study of the provided material.

Most universities in the country have a corporate subscription to Microsoft services, including Outlook and SharePoint, as well as Cisco WebEx video conferences, and distance learning modules on the Platonus and Moodle platforms are installed. These modules become a virtual audience, giving students access to education from anywhere in Kazakhstan. At the same time, it is important that students from the regions who have gone home during the quarantine period can not interrupt the educational process, and if there is no permanent Internet connection or high speeds, get access to lectures at a convenient time for them. Teachers conduct webinars on a schedule through the Zoom app, and additional electronic platforms are used for practical classes and feedback: Meet.jit.si, Skype, Kahoot, WhatsApp, Telegram, Teams, etc.

Taking into account the specifics of medical specialties, where it is necessary to conduct practical classes in situation centers with layouts, only teachers attend, from there they conduct webinars. They show how to put on dressing gowns, examine the patient, what reactions the patient may have. Students watch what is happening online. To work with virtual patients, the Open Labyrinth platform is used. On YouTube, teachers posted their video lectures and demonstrations of clinical manipulations.

In order to make an emergency transition to distance learning in connection with the COVID-19 pandemic, many universities in the country have increased the capacity of existing platforms, solved some technical problems, moved servers, organized broadband Internet access, prepared storage and built up system backup mechanisms, developed and launched load monitoring tools. At the same time, at the initial stages, problems were identified that could not be ignored:

- not all people in Kazakhstan have access to computers/mobile phones/the Internet;
- Kazakh providers often cannot provide the necessary bandwidth, which is why communication is often interrupted or the connection is not established at all;
- there are frequent power outages in some regions.

All the above-mentioned problems prevented distance learning from being fully implemented during the quarantine period.

2 Decision

In order to minimize the risks of disruption of distance education, it is necessary to train a number of teachers in the

framework of reorientation to the developer of courses and working in distance education systems. Universities should step up their efforts to develop e-courses, textbooks and their own software; develop a quality control system for training; formulate proposals for the development of legal support for distance education; implement further development of technical support for distance education, Internet service providers to increase the bandwidth and transmission capacity of the Internet.

3 Conclusion

Distance education is distance learning. In essence, this is a full-time form of online/offline training. Distance education should not be confused with distance learning, which was canceled in Kazakhstan from January 1, 2019. According to the data of the Ministry of education and science of Kazakhstan, part-time students mastered only 65% of the volume that full-time students master. At the same time, both received the same diplomas. In distance learning, students learn all 100% of the volume of information. Distance education technologies in Kazakhstan have been used in higher and postgraduate education since the mid-2000s. According to the Ministry of education and science of Kazakhstan for the period of 2019, distance technologies are used by 71 universities out of the total number of all universities in the country more than 130.

In addition to the obvious advantage of distance learning-the ability to study on the job-it has other advantages, including: individual training schedule; availability from anywhere in the world where there is an Internet connection; the possibility of self-isolation during quarantine measures. In order to study remotely during a pandemic, the student must have strict self-discipline and self-control, otherwise the proper effect will not be.

In the conditions of quarantine measures introduced in Kazakhstan, prompt response and timely decision-making is necessary to ensure the continuity of the educational process.

Reference

[1] Law of the Republic of Kazakhstan "on education" Almaty
[2] Dzhusubalieva D M Theoretical bases of formation of information culture of students in the conditions of distance learning Diss. ... d. PED. sci. Almaty
[3] Nurgalieva G K 2004 Experience and prospects of Informatization of education Modern education, Almaty
[4] https://informburo.kz/cards/chto-takoe-distancionnoe-obuchenie-i-pochemu-ego-nelzya-putat-s-zaochnym.html
[5] https://informburo.kz/stati/kak-uchatsya-na-karantine-studenty-medvuzov.html

International trade and specialization in Latvia

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Keywords**:** Macroeconomics, imports, exports, main specialised industries, balance of payments

1 Introduction

International trade is vital for the 21st century, because it establishes closer economic relations between different economic countries. All international economic relations can be divided into a number of spheres with different objectives: International Trade – Exchange of goods and services between different countries; International division and specialisation; Exchange of scientific and technical progress, information. International Capital Movement: Investment, Currency and Securities Movement; International Activities of Economic Organisations with a view to addressing global challenges.

The countries trade with each other, so they help each other. International trade is governed by imports and exports. But it is very important that they are at the same level. Unfortunately, for many years, Latvia has a negative trade balance, which means that import in Latvia is higher than export.

2 Spotlight

For many years, Latvia has a negative external trade balance (balance of payments), which means that imports into Latvia are higher than exports. This poses a variety of economic challenges: unemployment, non-development of different sectors. This is happening because states don't get more benefits: tax revenues, reduced reliance on already learned markets, new demand for products, offset seasonal profit swings.

3 Conclusions

Revised and analyzed: International trade and Latvia's International Trade Problem, Latvia's field of specialisation, Latvia's comparison of exports and imports, Latvia's volume of export and import.

Reference

[1] Latvian National Statistics
[2] Latvijas *Vēstnesis*
[3] Results of the People's Counting 2011 (2011 Central Statistics Bureau),
[4] Foreign Trade Statistics

Innovative perspectives of public-private partnerships in Uzbekistan

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Abstract

Public-Private partnerships are an increasing aspect of the delivery of public policies and services across the world. Public-private partnership can be seen as an effective structural way of dealing with specific causes of market failure by establishing a sense of equity and shared responsibility in transactions between public and private entities through cooperative actions. The current study begins by analyzing partnership between government and business along with present innovative activity in Uzbekistan. The paper also examines the ways to develop existing schemes and new initiatives in public-private partnership. A stable regulatory structure will maximize the state's benefits by guaranteeing that key collaborations function effectively and leverage the tools available to them in line with wider policy goals, ranging from social policy to environmental protection. It will be important to apply the principles of good governance to the prospective implementation of PPPs - but it will also be crucial to ensure that certain values are fully adequate to the context in which such PPPs work.

Keywords: Public-private partnership, innovative system, government, economy, investment, policy, information and communications technology

1 Introduction

In order to consistently continue and bring to a new, modern level, the work Uzbekistan has begun to create national strategies. It includes developing the field of science and education, educating the young generation with moral values and with in-depth knowledge, high culture, and spirituality, creating a competitive economy. In January 2020, President Shavkat Mirziyoyev proposed declaring 2020 in the country the Year of the Development of Science, Education, and Digital Economy.

Public-private partnerships play an important role in the integration of science, education, production and finance. Ensuring the competitiveness of the economy is impossible without the consolidation of efforts of state authorities and the business community. Nowadays, many countries with a transformational economy forming a new institutional structure of the economy, shifts are observed in the system of economic relations between the state and the private sector. Ensuring the competitiveness of the national economy, as well as its sustainable development, is impossible without the consolidation of efforts of state authorities and the business community. In many countries, public-private partnerships are becoming the most common form of cooperation between government and entrepreneurship, because it often finds services and solutions more cost-effective than traditional management approaches.

The term public-private partnership (PPP) describes a relationship when public and private resources are combined to achieve a goal or set of goals that are mutually beneficial to both the private entrepreneur and the state. In addition, public-private partnerships, as international practice shows, play an important role in the integration of science, education, production and finance in the interests of increasing the competitiveness of industry and developing an innovative economy.

The latter aspect is the most important for Uzbekistan, where more and more attention is paid to the rational use of the scientific potential of the country, to increase the investment of public and private funds in innovation, research, development and technological work. Moreover, the emphasis is on innovative approaches to organizing relations between the state and business, in particular on public-private partnerships (PPPs). Public-private partnerships are considered to be one of the most effective forms of increasing the efficiency of innovative processes worldwide.

2 Partnership between government and business

The interaction of the state and the private sector to solve socially significant problems has a long history. The most significant experience of public-private partnerships has been gained in the UK ("public-private partnership" in financing the development of infrastructure in 2000) and, mainly, as an alternative to privatization, is a way of attracting the experience, knowledge and resources of private business in the budget services sector. In foreign countries, the term "PPP" is often used for almost any form of cooperation between government and private business. Throughout the world, public-private partnerships are considered to be one of the most effective forms of increasing the efficiency of innovative processes.

PPP is also supported in the manufacturing sector in the European Union, where 25 projects have been approved for public-private initiatives that focus on four areas of innovation: 1) high-tech manufacturing enterprises using the latest ICT achievements in creating the next generation of robotics, automated lines, in planning and stimulating ; 2) production with digital technologies that reduce the need for physical prototyping; 3) manufacturing enterprises where new methods or new "green" technologies are installed and used, aimed at human needs; 4) production of new composite materials. Other sectors that use PPP to carry out their activities in basic research and basic services are the agricultural sector and health care.

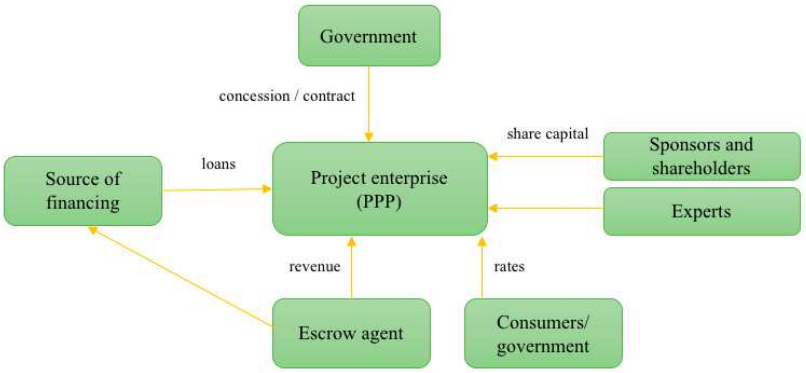
With this type of relationship, partners share risks, rewards, and responsibilities according to their share of the investment. As world practice shows, the structure of PPP involves three types of agreements. According to the first, it can be used to introduce private sector property into the

production process of state enterprises through state listing or sale of a certain part of the property (shares) of an enterprise. According to the second type, it can become a private financial initiative when the government transfers management of the enterprise on long-term terms to a private partner, which implies responsibility for the construction and maintenance of infrastructure for the provision of public services. And according to the third type of agreements, PPP can cover the sale (sale) of public services to private sector partners, which will more effectively use the commercial potential of state assets. That is, a private sector consortium performs the typical functions of special (special) companies - to develop, build, maintain, and manage assets during the contract period.

3 PPP in the development of innovation

In accordance with the World Bank classification, Uzbekistan is currently at the stage of transition from a factor-oriented stage to a mixed investment-innovative model of economic growth. In order to intensify innovation in Uzbekistan, the resource potential of the private sector of the economy should also be used. The primary task of the state in this regard is to fully promote private investment in the innovation sphere. According to a study by Chen, Hu & Yang, countries with a higher share of private investment in research and development achieve relatively higher efficiency in this area. (If the private sector of China in 1996 accounted for only 2% of global R&D expenditures, then in 2017, according to GII-2019, it was already 27%.) At the same time, a substantial expansion and qualitative transformation of the system of supporting innovative processes for account of state resources in terms of both non-repayable (grants) and repayable (lending and investing) state financing of innovative projects. The resource potential of the private sector of the economy should be used to promote innovation in Uzbekistan.

Public-Private Partnership Project Structure



Source: Global Innovation Index 2012, p. 82

A key barrier for innovation promotion in the country is low demand for domestic innovative products and services. PPP, being, first of all, a method of involving extrabudgetary funds in the process of creating innovative products and promoting them on the market, can be an effective tool for creating mechanisms for stimulating innovative development, including still underdeveloped systems of venture lending for innovative developments. When implementing PPP projects, a business shares risks with the state, receiving money from the state only if there are agreements with one or more private investors. Only in countries with transformational economies are private entrepreneurs in no hurry to share these risks. This is due to some extent to the lack of the necessary trust in the state as a business partner. Therefore, when harmonizing the interests of private and state founders, asymmetric models are applied in the world practice, which imply providing private investors with more favorable commercial conditions than state investors. For example, this is how the Australian Investment Fund operates, which finances up to 2/3 of the capital of venture capital funds, but returns only 10% of its income, the remaining 90% is distributed among private investors.

Legal frameworks and policies aimed at making the use of PPPs more transparent and more integrated in the national context, as the practice of many transformational economies show, are faced with inadequate interaction between science, the higher education system and production. In order to strengthen and increase the effectiveness of PPP forms, measures are required to expand research and development, reorienting technological and innovative policies towards strengthening and organizing cooperation between enterprises and research institutes at the pre-competitive stage of research with high potential for commercial use.

4 The state of innovation in Uzbekistan

Uzbekistan is in the group of countries in the world in which the state mainly creates innovations with minimal participation of the private sector and universities and where public-private partnerships in the scientific sphere are not well developed. Due to the insufficient level of advancement of the private business sector, there is a weak demand for domestic innovative products and services, which is a key factor holding back innovation progression in the country. Enterprises bear a significant part of the costs of innovation through the purchase of foreign equipment and technology, which is also due, in our opinion, to insufficient measures to stimulate the interconnection and cooperation of domestic science and business.

Effectiveness of science is regarded as the most critical marker in the innovation sphere, which is expressed in the

indicators of innovative activity of the public and private sectors in the national economy. Since the mid-2000s, R&D costs have increased significantly, but the republic is still behind the global average in terms of funding. The state funds most of the research, and the private sector is virtually not involved in the innovation process. Venture funds have not yet been widely developed, and small and medium-sized businesses are not willing to invest in innovation due to the high risk of innovation projects and the lack of financial resources. All this suggests the need for new approaches in an innovative policy that allows obtaining adequate results from the relatively highly qualified human capital and scientific potential of the republic. This is also indicated by the rating indicators of The Global Innovation Index 2012 (after 2013, Uzbekistan is not included in this index due to the failure to provide all the necessary data), wherein the subgroups "Human Capital / R&D" and "Absorption of Knowledge," the Uzbekistan took, respectively, 35th and 11th places among 141 countries.

In recent years, serious changes have emerged: innovation is becoming a priority in the policy of modernization. An appropriate legislative sphere has been formed and development institutions created - the Reconstruction and Development Fund (FRRU), the Technology Transfer Agency (ATT), the Intellectual Property Agency (AIS), the Fund for Supporting Innovative Development and Innovation, which should finance and facilitate the development of all stages of "innovative elevator" (from the manufacturer of the development to the user); the research sector is being established in higher education institutions and innovation activity in state-owned corporations is being stimulated. However, the changes have not yet contributed to an increase in innovation, economic development, and the well-being of the population.

This is largely due to a number of institutional imbalances. There is a low demand for innovation from the business side. To some extent, this is due to the low degree of involvement of domestic enterprises in world markets with their focus on local markets with a low competitive environment, and, accordingly, low motivation for long-term investments in innovation and technology, since more than 60% of the structure of innovative costs carried out through the import of machinery and equipment. Hence, against the backdrop of significantly increased government spending on R&D, private sector spending is low.

TABLE 1 Indicators of innovative activity in the Republic of Uzbekistan

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018
Government R&D expenditures (per employee, soums)	4520	5921	9715	13640	15074	17834	19644	21032	17242
Private R&D costs (per employee, soums)	2,5	4,9	4,4	5,3	7,3	10,1	13,5	13,8	16,6
Number of Patent Applications	134	165	160	176	565	189	243	296	289
The number of patents per 100 thousand employees	1,5	1,5	1,3	1,4	4,4	1,5	1,9	2,2	2,2

Source: Key indicators of scientific and technological potential. Statistics Bulletin. - State Committee of the Republic of Uzbekistan on statistics; WIPO Statistics database

A significant increase in government investment in R&D did not adequately affect the growth of publications and patents. In comparison with international standards, the costs of introducing innovations are low for such an indicator as the acquisition of international patents for the Madrid system for registering and managing trademarks around the world, Uzbekistan ranked 135th in 2015). Moreover, the R&D sphere remains underfunded (0.2% of the country's GDP). This affects the low competitiveness of NIS (National Innovation System), which is experiencing difficulties in the production and export of high-tech high-tech products to world markets.

5 PPP development in Uzbekistan

In Uzbekistan, public-private partnerships until recently were not sufficiently known and widespread. There is a fair amount of experience in attracting private investment in infrastructure (telecommunications and water supply) in the framework of EU TRACECA projects; pilot projects in the field of electricity and natural gas supplies to the population, the creation and development of roadside services on the Tashkent-Samarkand-Bukhara highway. The scheme for co-financing research cooperation between industrial companies, research institutes and universities began to be applied in 2010 (the Uzbekneftegaz corporation and the Institute of Energy and Automation of the Academy of Sciences of the Republic of Uzbekistan jointly participated in the creation of start-up production of innovative products for the oil and gas industry). But, basically, PPP is still considered as a tool financing whose subjects can attract additional finance without investment in research and development. The government has spent a substantial amount of money on R&D, but it did not have an impact on the growth of publications and patents.

The state plays an important role in establishing partnerships between representatives of research institutes and the private sector. The state plays an essential role in establishing partnerships between representatives of research institutes and the private sector. There is a lack of competence of private companies in the market area and scientific organizations in the field of research. The government should act as an intermediary that facilitates the formation of partnerships through material incentives, supporting the manifest of these sector initiatives, and creating adequate legal conditions.

Researchers highlight a number of benefits that state-owned corporations in the field of innovation possess, as they can:

- carry out business activities to achieve the goals for which they were created, i.e. they do not have the goal of immediate profit;
- take loans at low interest rates

They can attract not only public but also private investments. Thus, the presence of a powerful financial base allows state corporations to support not only internal developments, but also to acquire and employ foreign technologies.

As part of ongoing modernization programs economies in the country are declining sectoral and regional polarization by indicators innovation activity. Hence, it is necessary to ensure coordination innovative strategies state

corporations budget research institutes, universities and government agencies. This requires regular monitoring and evaluation of innovative initiatives.

6 Strengthening the role of PPP in innovation

The country has the necessary conditions for improving existing schemes and new initiatives in PPP, which could increase the scope, depth and economic return from the national sphere of research and development. There are good conditions for using the potential of PPPs for innovation in the telecommunications sector: the use of telecommunication providers in solving critical social problems, such as distance education, improving medical services, quality education and a more open government.

A special incentive regime for public-private partnerships should reduce the adverse business sphere in combination with high commercial risks associated with innovations and become important tools to facilitate the conditions for interaction in innovation activities. For this, it is necessary to revise the taxation system of emerging start-up enterprises and the conditions for the transaction of intellectual property rights that take into account innovative costs (costs of developing related technologies, design, engineering and training) of exporters of innovative products and services.

The main forms of public-private partnership in the economy can be implemented in the form of contracts or concessions. As the practice of foreign countries, countries of the former Soviet Union shows, it would be advisable to create a Center for public-private partnership in the form of a joint-stock company under the Ministries of Innovation Development, which will coordinate issues arising from such a partnership between business and government.

To promote linkages in the chain of universities — production needs to be widely developed innovation infrastructure - business incubators, technology parks, engineering centers and centers for the collective use of scientific and technological equipment and scientific and technical information. The state, as shown by the practice of foreign countries should do this on a competitive basis through subsidy programs. Now the technologies of scientific institutions are not sold to small and private enterprises. This is because the organization-developer cannot set the price itself, which, of course, would be adequate.

With the existing system of technology cost formation involving large number of departments the price is too high. Therefore, it is necessary to provide independence to the organization-developer to determine the price of its technology and innovation, and also have the right to its transfer to business representatives for use. Also important is the formation of a network to promote the promotion of the results of scientific and technological activities in production.

Promotion of communication and pre-competitive cooperation, based on partnership among leading manufacturers, suppliers, research institutes, universities and engineering companies within specific technology platforms play critical role. They include bio-industry, nanomedicine, computer technology, green energy, renewable energy, new polymers and composite materials.

7 Conclusion

Thus, measures of the government's innovation policy are already yielding positive results - an increase in absolute indicators of investments in R&D of the state, business and universities, and emerging venture capital. But the etimers do not yet have a special effect on the institutional structure, and the socio-economic consequences.

From this perspective, PPP can become a decisive condition for the development of innovations, creating a space for research and development outside government structures, which creates a favorable environment for the introduction of innovations. Partnership helps to attract talents and qualified personnel more widely in the innovation process, as well as to create a disciplined and responsible work culture in this area, stimulating creativity and innovative thinking. Finally, the partnership between the state and private business reduces the risks of ineffective solutions in the field of science and innovation.

The most favorable environment for the development of public-private partnerships can be considered the ICT sector. Most of the innovations introduced in various business sectors of the economy depend on ICT. Thus, on the one hand, the PPP model can be an ideal mechanism for financing ICT projects, contributing to the development of the necessary infrastructure with a certain degree of guarantee of return on investment. On the other hand, information and communication services are provided within financial reach for millions of consumers in rural and urban areas. In view of this, public sector service goals can easily be tied to the goals of ICT service providers. It is also important that the development of social services becomes largely dependent on the communications network, and the state and private sector institutions work together to provide the necessary ICT infrastructure in places accessible to business and individual citizens.

References

[1] The Global Innovation Index 2012 p. 82[8]
[2] Key indicators of scientific and technological potential Stat Bulletin - State Committee of the Republic of Uzbekistan for Statistics, 2019
[3] UN ESCAP (United Nations Economic and Social Commission for Asia and the Pacific) 2011 A Guidebook on Public-Private Partnership in Infrastructure, Economic and Social Commission for Asia and the Pacific Bankok: UN

Cost of production and inflation in Latvia

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Abstract

According to statistics for 2019 year, Latvia is one of the countries of the European Union with the highest level of inflation.
Cost of production – one of the viewing categories studies of modern economy. Its task is to determine the size of the cost of production of branded products, which provided the company with stable prosperity. Producing too much is just as dangerous as well as too little. When spending grows faster than revenue, it results in a rapidly growing business up to bankruptcy. Also, costs are affected by the inflation rate in the country. Nowadays there are very few countries that have low or missing indicator of inflation rate. Because of the increase in production costs goods become more expensive and for the same money can buy a smaller amount of goods. Money becomes worthless, the purchasing power of money decreases. So inflation arises.

Keywords: inflation, deflation, production costs

1 Introduction

To understand how production costs affect inflation and whether they are related in principle, we need to conceptualize these costs and consider their types, we will do this with tables and graphs. After we have looked at all this, we will also have to define the meaning of inflation and consider its type. Let us look at the formula we can use to find inflation. When these two problems are solved, we will be able to figure out what inflation is currently happening in Latvia.

2 Conclusion

In the course of the work it became clear that production costs are indeed closely linked to inflation. It should be noted that production costs are one of the main factors influencing the inflation rate. Research methods: theoretical, data collection.

References

[1] https://www.csb.gov.lv/lv/statistika/statistikas-temas/ekonomika/pci/meklet-tema/2631-paterina-cenu-parmainas-2020-gada-februari
[2] https://www.fm.gov.lv/lv/sadalas/tautsaimniecibas_analize/tautsaimniecibas_analize/inflacija/
[3] https://www.dictionary.com/browse/inflation
[4] http://profizgl.lu.lv/mod/book/tool/print/index.php?id=647

Foreign experience of providing socio-economic security of the region

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Abstract

Regions worldwide play significant role in creating the state socio-economic policy, take an active part in ensuring economic security. The world experience of providing social and economic security of the region is investigated. Objects, tools, innovations and directions for stimulating economic growth and ensuring socio-economic security in the region are identified. Authored by in economically developed countries, science plays the role of a major economic and regenerative factor, enabling creation and implementation of more effective development concepts at all levelp.

Keywords: socio-economic security region

1 Introduction

The annual World Economic Forum in Davos (Switzerland) constantly discusses experience of different countries worldwide regarding economic models of development. Each national economic system is unique and mechanical borrowing of its achievements is impossible. It is necessary to identify the most attractive sides of different economic models, as well as their causes and mechanisms of reproduction. The efficiency of an economic model is determined by its viability, ability to respond constantly and adequately to internal and external imbalances [1, p. 187].

Co-operation between territorial units is an important tool against territorial separation and division. In the legislation of individual countries this kind of cooperation between territories is defined by special legislation, in particular, in Germany, Hungary and Italy. In other countries, the state has a significant influence on territorial entities of intermediate level, since it derives from the nature of the state itself – to regulate or control the activities of lower-level territorial communitiep. In unitary countries, such as Ukraine, for example, the central government reserves the right to regulate relations between territorial communities of all levels: provincial, local, regional, and etc. All overseas examples of territorial development successful regulation were provided by not only high economic potential of states and individual territories, but also by sufficiently developed legislation, highly qualified and moderately corrupt officialp. All of these are not available in our present-days country.

As the world experience shows, combination of centralized and decentralized approaches to forming a regional economy and ensuring economic security, taking into account the national specificity of Ukraine, can have the best effect [2]. We suggest considering a generalized foreign experience in the main areas and their content (Figure 1)

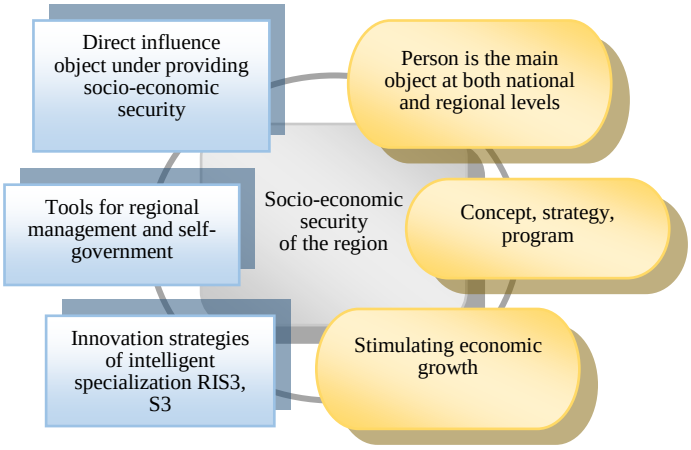

Figure 1 The most interesting foreign experience of providing socio-economic security of the region

Analysis of economic and organizational foundations of local self-government functioning in other countries is very useful for Ukraine as for a country striving to become truly democratic. A proper understanding and effective use of experience of improving the local self-government basics are needed when pursuing fiscal decentralization reform.

Identification of new institutional characteristics of local self-government in terms of of transformation of the country's social system, is achieved by generalization of its formation and positive experience development, substantiation of options for effective territorial organization, productive distribution of powers, between municipalities of different typep. Regional programming appears to be effective, which is a specific complex systemic state influence on local regional situations, first of all, aimed at developing the most promising nationally and withdrawing certain territories from the depressed state through the spatial forms of its organization. Regional

programming, being a system of medium and long-term development programs, actively influences the processes of the territories economy development.

In economically developed countries, science plays the role of a major economic and regenerative factor, enabling creation and implementation of more effective development concepts at all levelp. The level of budget expenditures on science and education is indicator of potential opportunities for territorial and national economies development. For Ukraine, such a turn in methodology of space organization is rather new, since in the pre-reform period the deductive approach – from general to elementary – dominated. The new methodology assumes simultaneous solution of both the problems of an individual and particular territorial community (community).

Summarizing the results of research carried out by a team of scientists [3, p. 97-98] we will compare different indicator systems used for regional studies. In general, we can point out imperfection of the Ukrainian system of indicators for researching the socio-economic condition of the region [4].

Systems of indicator that are used, for example, in the US are the most generalized. In France, the indicator system is more focused on economic outcome and control of inflationary trendp. Russia's indicator systems are closely linked to reform programs and socio-economic development. Indicators used to assess the level of economic security must be consistent with the national economic security model chosen.

Ukraine needs a unified, scientifically sound system of indicators for the socio-economic development of the region, which will be used by scientists, authorities and otherp.

References

[1] Teoretyko-metodolohichni transformatsii ekonomichnoi nauky u XXI st.: perspektyvy novoi paradyhmy: materialy Vseukr. nauk.-prakt. konf. (Kyiv, May 28-29. 2019) Kyiv: Kyiv National Trade and Economic University 2019 344 p

[2] Onyshchenko S, Masliu A 2018 Ukraine regions social and economic security provision preconditions Economy and region 1(68) 14-20 E-source: http://journals.pntu.edu.ua/eir/article/download/1009/844

[3] Rehionalna ekonomika [Text]: navchalnii posibnyk / [A.M. Zolotarov, N.K. Hikovata, A.V. Kudlai ta in.]; za red. prof. A.M. Zolotarova. – Kh.: VD «INZhEKT», 2009 368 p

[4] Onyshchenko S, Varnaliy Z 2018 Construction complex development influence on region social and economic security International Journal of Engineering & Technology **7**(3.2) 469-72 **E-source:** https://www.sciencepubco.com/index.php/ijet/issue/view/345/ DOI: 10.14419/ijet.v7i3.2.14574

Coronavirus pandemic crisis impact on startups and technologies

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Abstract

One of the most ambitious economic crises development in the world economy is considered, which was caused by the coronavirus pandemic. The development trends of startups and technologies are analyzed. New government programs to support the development of startups and technologies are considered.

Keywords: crisis, startup, technology, pandemic

1 Introduction

Obviously, no one "wins" when it comes to the coronavirus pandemic, which has now spread around the world to infect more than 1.2 million people (at the time of publication). In Europe, the residents of Italy, Spain, Germany and France suffered the most, and the situation unfortunately only becomes worse. In the context of pandemic, one of the largest economic crises in the global economy is developing.

2 Overview

Coronavirus hit the global economy hard. In the United States, stocks of the largest companies that find themselves in a difficult situation on stock exchanges are actively buying up. Shares of Microsoft, Apple, Facebook, Amazon and Alphabet jointly lost more than $1 trillion per month (Figure 1 [1]). However, there are those whom the crisis has brought to new heights. One of the most important and well-known companies in the world suddenly became one of the successful and brisk startups of Silicon Valley, a rare "unicorn" that managed to reach profit even before the IPO – Zoom, a video conferencing service. Now the company, which entered the IPO in April last year, is worth $36 billion (Figure 2 [1]).

The consequences of coronavirus for startups and technologies are more depressing, but some companies, on the contrary, show development dynamics.

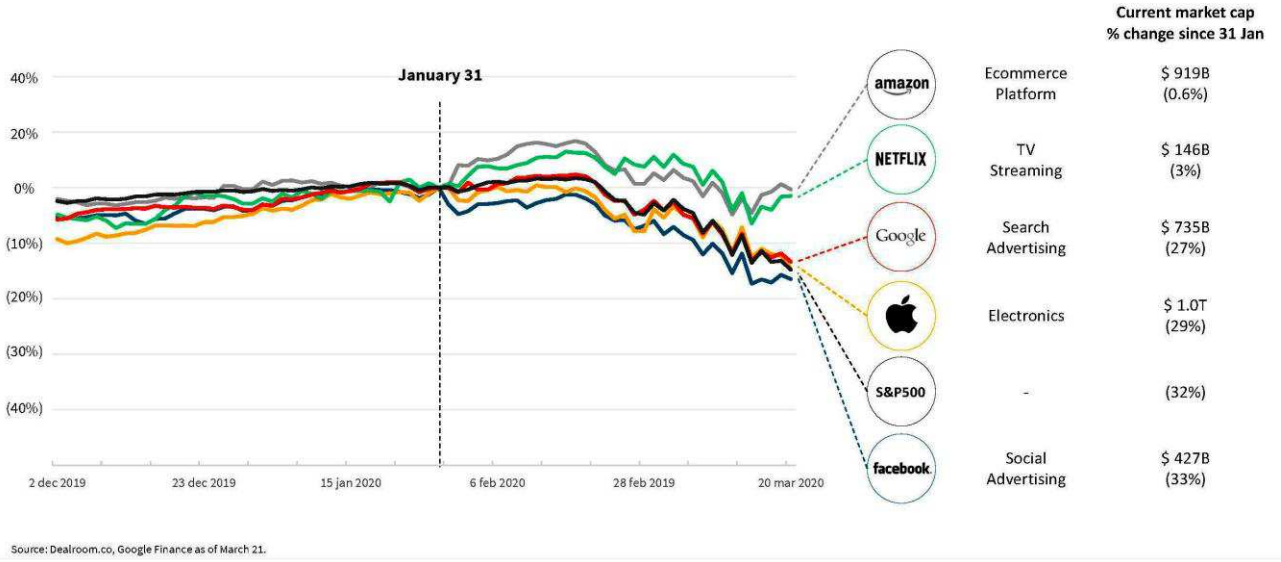

Figure 1 Share price performance

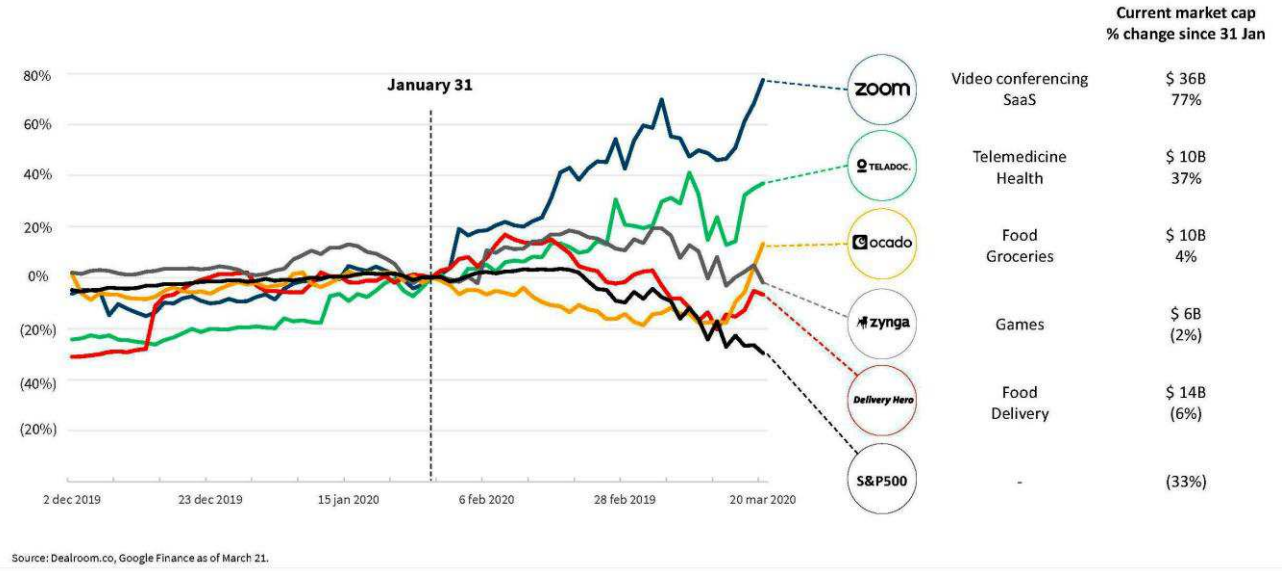

Figure 2 Share price performance

At a time when many companies are struggling to work in bustle movement conditions, others are capitalizing on the health crisis, providing much-needed medical solutions. This year, some London founders even launched a brand new start-up to help keeping track of contacts between employees and visitors by tracking where they visited and analyzing the calendar on their smartphone.

European unicorn companies have a margin of safety to deal with this situation, but not everyone can afford to stop working and go to quarantine and remote mode.

Obviously, it will affect dozens of sectors: concert booking apps, dating apps, edtech educational technology, fitness apps, remote work tools and recruiting startups are just some of them.

3 Conclusion

Amid the general crisis, governments, realizing the importance of supporting the economy, are actively starting to develop plans to support the development of startups and technologies. The German government will provide additional financial support of 2 billion euros to innovative and promising start-up companies to overcome the effects of the pandemic crisis [3]. In France, they plan to allocate up to 4 billion euros for startups as part of government business support plan [4]. The British government decided to allocate £ 330 billion to support business, which suffered from the outbreak of coronavirus, the amount is called unprecedented: it is about 15% of British GDP and more than a third of the Kingdom's budget [5].

References

[1] Impact of the Corona crisis on startups & tech, Dealroom 2020 **E-source:** https:/dealroom.co/wp-content/uploads/2020/03/Corona-vFINAL.pdf
[2] What are the opportunities for startups in the midst of the coronavirus pandemic 2020
[3] Jennen B, Syed S 2020 Germany to Help Startups with $2.2 Billion Aid Package Bloomberg
[4] Fouquet H, Syed S 2020 France Pushes $4.3 Billion Support Package for Startups Bloomberg
[5] Guidance for employees, employers and businesses in providing advice about the novel coronavirus (COVID-19) UK Department for Business, Energy & Industrial Strategy

Role-based design model for educational multimedia complex

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Abstract

The article emphasizes the importance of the interaction of teachers and IT-specialists in order to create a joint educational multimedia complex for teaching students of the 5th grade the basics school of algorithmization and programming. The approbation of a role-based design model of the multimedia complex, which focused on practical consolidation of acquired knowledge.

Keywords: educational multimedia complex, role-based design model

1 Introduction

The creation of an educational multimedia complex requires the work of qualified specialists and relevant investments. The preparation of this type of issue requires not only the knowledge and skills of school teachers of computer science but also IT specialists (graphic designers, programmers, etc.) and project managers. Work on an educational product requires a single conceptual framework since some terms are interpreted differently by teachers and IT professionals. In addition, not all teachers of computer science possess all the necessary innovative knowledge and the concept of trends in modern information technologies. Therefore, IT-specialists do not possess the knowledge of developmental psychology, pedagogy, and methods of teaching children.

2 Decision

The scientific works of Bent B. Andersen, Katya Van Den Brink [1], and V.V. Zhumaev [2] are important for studying this particular scientific problem. They include the concepts of multimedia textbooks, design aspects, and building collaboration with different specialists are considered.

After analyzing their performance, and based on our own experience, it has created its own role model design educational multimedia complex. Consider the design stages and those involved in them from specialists:

1. The pedagogical scenario for the use of the educational multimedia complex. This stage includes the search, selection and analysis of the necessary information, and the development of a lesson plan. Responsible for the results at this stage are educators and methodologists.
2. Formation of technical specifications – it is created based on the needs of the parties. It includes: goals, objectives, and functionality of the product being developed, type of issue, planned results, general structure, selection of technical equipment for which the complex is created (tablet, PC or interactive whiteboard), intermediate and final dates for submitting of the development materials. Responsible – educators and IT professionals with managers.
3. Psychological and pedagogical basics for creating a multimedia educational complex. It implies a description of teaching methods, forms, and means of learning, consideration of the problem of perceiving and presenting information, the role of the user interface, ergonomics of on-screen forms of presenting information, ease of use of graphical interface elements; selection of the main characters for the educational complex; the target audience analysis (conducting a survey of students of the 5th grade the basics school). Responsible – educators and IT professionals.
4. Design. This stage includes the selection of software (information technology), the creation and analysis of the main characters for the educational multimedia complex, UX/UI design, masthead. Responsible – IT-specialists.
5. Product Evaluation and Testing. Testing (alpha and beta) of the educational multimedia complex on different devices with different system requirements (performance assessment, interactivity, multimedia components, ergonomics indicators); evaluation of the issue for compliance with pedagogical requirements, the official school curriculum, and gender standards. Testing the publication in one of the schools. Responsible – IT professionals, educators, and methodologists.
6. Methodological and legal aspects of the use. This stage involves: a) the creation of teaching materials, instructions for using the established product; b) copy protection, as well as copyright registration in accordance with the laws of the country in which the product is created or using a Creative Commons license; c) differentiation of access rights, editing, and work of the student, teacher, system administrator. Responsible - managers, educators and IT professionals.

3 Research results

In October of the year 2019, the creative team of the educational multimedia issue was created - a student-developer (the author of this thesis), a teacher-consultant (mentor) from Simon Kuznets Kharkiv National University of economics and a teacher of informatics (Municipal establishment Kkharkiv Humanitarian-pedagogical Academy" of the Kharkiv regional council). Based on the developed role-based design model, a prototype of the training multimedia complex was created (Figure 1, Figure 2). Also, this prototype was officially tested in Kharkiv Lyceum 89.

FIGURE 1 Screen copy of the pages of the created educational multimedia complex

FIGURE 2 Screen copy of the pages of the created educational multimedia complex

4 Conclusion

The proposed role-based design of educational multimedia complex simplifies the process of communication between teachers and specialists from various IT fields, which will allow creating better publications.

References

[1] Andresen B B, Van Den Brin, Katj 2013 Multimedia in Education Curriculum Press: UNESCO Institute for Information technologies in Education

[2] Zhumaev V V 2014 Determining the requirements for pedagogical functions and the structure of computer-based learning tools to achieve the planned learning outcomes of students in accordance with the requirements Journal of Informatics and Education **2**(251) 46-59

Formation of the organic product brand in Ukraine

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Abstract

Theoretically objective nature need branding of organic products in the context of the key success factors of agricultural enterprises in the target markets is based. Described the necessity of organic branding, from creating the product and its continued existence in the market, an important part of marketing activities leading producers.

Keywords: agrarian marketing, agrarian enterprise, organic production, branding, competitiveness.

1 Introduction

Analyzing literary sources shows that worldwide there is increasing consumer interest in how food is produced, how it affects health, and how it is produced in the environment. Organic agriculture has proven not only to be a source of high quality products obtained without the use of chemicals, but also to promote the conservation and restoration of natural resources. It should be emphasized separately that the feature of modern business is that organic products are certified by authorized companies, and this is considered as a guarantee that each product with the appropriate marking was produced in accordance with the requirements of organic production.

Currently, organic food can be found in every major supermarket in Western Europe and the US, as consumers in these countries are well aware of the benefits of such products. Instead, most consumers in Ukraine do not know or do not know what "organic product" means. Therefore, joint efforts by manufacturers and trade representatives should, among other things, be aimed at communicating to the consumer clear messages. The practical implementation of this is seen in the implementation of properly focused branding. However, these issues remain poorly understood in Ukraine.

2 Overview

It is known that the innovative way of development is an effective way of survival of the company in the market of fierce competition and its strategy of competitive struggle. Therefore, the development and promotion of any innovation (and even more environmental) in the current economic environment is viewed very positively from the standpoint of an individual producer (strengthening its competitive status in the market) and from the position of the consumer (benefits from a new environmental product, service). Marketing of any innovation (including environmental) is an important link in the production chain of an enterprise and an element of branding policy. It is successful, efficient and effective to "deliver" eco-innovation to the market, to create its image and to earn decent profits from its realization to the consumer - the priority tasks of eco-branding and marketing of innovation. Finding out about the role and place of marketing innovations in eco-branding and how they relate is also a pressing issue.

The general theory of branding provides the following basic functions of focused branding:

- maintain the planned sales volume in a specific market and implement a long-term program to create and consolidate in the minds of consumers the image of a product or product group;
- to ensure an increase in profitability as a result of the expansion of the range of goods and knowledge of their common unique qualities, implemented through a collective image;
- to convey in the promotional materials and campaigns the culture of the country, region, city where the product is manufactured, take into account the requests of consumers for whom it is intended, as well as features of the territory where it is sold;
- use three factors that are important to reach an advertising audience: historical roots, national mentality, current realities, and outlook.

The identity of a brand that has to do with the properties of "organic" should be presented / perceived as: 1) healthy, 2) safe, 3) creative, 4) delicious, 5) interesting, 6) trendy.

It is highly probable that understanding of the unique features of organic produce in Ukraine is a matter of the next few years, and this time may sharply decline as the European integration process deepens. However, to increase the effectiveness of promotional and sales activities, you should focus on the following two target groups:

1. Middle-aged people (25-45 years old) living in cities, educated, with or without children, are middle or upper class.
2. Seniors (55+), educated, open to new trends that are middle class or above. All other audiences need significantly higher branding costs. The overall promotion of organic products should be particularly attractive to the two target groups. It is necessary to carry out special measures for the promotion of certain goods aimed at particular subgroups (for example, cereals, dairy products, etc.) [2].

In turn, branding of this type should be based in Ukraine on the appropriate concept of organic marketing. This concept aims to focus communication on the target consumers. The purpose of this is to form a clear understanding of the value added that can be obtained through the consumption of organic products compared to alternative products. At the level of promotion and marketing of organic produce, there are 5 components (so called 5 P) that should be used in concert. From this point of view, the overall impression that consumers will have regarding 5P should be fully consistent with their

impression of an organic product: product / product, place / place, packaging, promotion, price / price [3].

3 Decision

The production and promotion of organic agri-food products involves the formation of fundamentally new value orientations for all groups of influence, namely: consumers, producers and rural society. Against this background, it is advisable to develop a structural model of the organic produce brand on the basis of the mental field that exists in four dimensions - functional, social, mental and spiritual. Yes, a functional dimension describes the unique characteristics of a product or service, as well as the perceptions of its utility that are associated with a brand; the social dimension refers to the ability to identify with a particular social group and reflects the relationship between buyers and the social group to which they wish to belong; mental dimension reflects consumers' self-perception and self-identity, as well as their readiness for change; Spiritual dimension refers to a larger system of which the brand, the consumer and his social environment are part.

There are several marketing approaches to attracting customers who are used in environmental branding. First, it should be noted at the outset that traditional marketing "trick" - "if you have nothing to say about yourself or your product, pay attention to the packaging" - as practice shows, is not effective in this type of activity. The eco-friendliness itself places serious restrictions on appearance because it does not usually provide very bright colors and fonts or design flairs. And if the "pioneers" of this market were able to stand out from the general background just by their restrained design and natural color scheme, today it is much more difficult.

Other approaches (eco-tools), such as:

1) "environmental legend
2) the image of the environment.
3) production know-how.
4) manufacturer personalization.
5) phyllo-copywriting, or simply, the correct naming of the product.
6) merchandising.

4 Conclusion

It is difficult to overestimate the role of branding in launching and promoting a product on the market. It is the brand that identifies the product with its manufacturer, shapes the image and is the key to quality. Branding policy, starting with the creation of a product and continuing its existence on the market, is an important component of the marketing activities of leading manufacturers. For the manufacturer to achieve consumer loyalty and commitment to his product - the main task of his branding policy.

References

[1] Tulvinh E 1973 Specific encoding and playback processes in episodic memory Psykholohichna Ohliad 352-73
[2] Solovjov I O 2008 Ahromarketynh: systemna metodolohiia, realizatsiia kontseptsii [Ahromarketynh: systematic methodology, implementation of the concept] Oldy-pliuch, Kherson, Ukraine
[3] Zajchuk T O 2009) The domestic market of organic foods and ways of its development Ekonomika i prohnozuvannia **4** 114-25

The role of financial control as a system of effective governance by joint activities

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Abstract

The theoretical approaches to the definition of the essence of concepts "controlling" and "financial control" are generalized and analyzed. As a result, it was discovered that scientists consider financial control as a subsystem controlling an enterprise or as an enterprise management system as a whole. Proposed self-determination of financial control of joint activities. It is substantiated that financial control is a system of effective management of financial and economic activity of a joint venture, which includes planning, accounting, control, analysis, management information provision for achievement of strategic and operational objectives of joint venture. The strategic focus of financial control is emphasized.

Keywords: controlling, financial control, planning, control, management, joint venture, joint activity.

1 Introduction

The conditions in which domestic enterprises are created and developed require the management personnel to constantly improve their business operations. A comprehensive approach to managing a business through a financial control system, as evidenced by the experience of businesses in developed countries, is one of the best ways today to achieve high business results. Exacerbation of the global financial crisis, growing dynamics of changes in the external economic environment, Ukraine's desire to integrate into the European market require enterprises to apply modern and effective management technologies. Increased competition, including from foreign firms, shortening the life cycle of products, ensuring the achievement of long-term goals set by enterprises lead to the need for prompt processing of a large amount of various financial and economic information, timely providing it to the heads of all departments for making management decisions, plans, coordination and ensuring effective control of their implementation at enterprises, including implementing companies joint activities.

2 Overview

Today for enterprise controlling is a necessity as prediction and prevention activities, in particular risk – one of the major challenges facing local entrepreneurs. Therefore, controlling is an important tool for the successful functioning of the enterprise because: provides management and shareholders with the necessary information for making management decisions by integrating the collection, processing, preparation, analysis, interpretation of information; provides information for the management of human and financial resources; ensure effective use of resources and financially stable; contributes to the optimization based on "revenue – expenses – profit.

Grigorov O.O. [5] regards controlling as an adaptive, complex dynamic set of interconnected elements that serve the purpose of ensuring the long-term effective functioning and development of the enterprise by coordinating and directing the efforts of all divisions and services.

Lipich L.G. and Gadevich I.O. [13] interpret the concept of controlling as a set of methods and procedures that are intended to provide a methodological and organizational basis for supporting the basic functions of management activity in the enterprise: planning, organizing, motivating, regulating and controlling.

Prymak S.V. [19] Under control should be understood the system of information support for management decisions based on the use of a set of methods and procedures for financial diagnostics, methodological and consulting support, as well as for coordination of planning.

Meyer E. defines controlling as the guiding concept of effective management of a firm and ensuring its long-term existence. [14, p. 9] He emphasizes that feedback is provided in the control loop. Controlling ensures the survival of an enterprise in two aspects: short-term - profit optimization and long-term - maintaining and maintaining the harmonious relations and relationships of this enterprise with the social spheres: natural, social, economic. [14, p. 88] Gradov A. states that controlling is necessary to ensure the survival of the enterprise at the stages of strategic and tactical management [4, p. 217]. Antashov V. emphasizes that controlling, as a certain concept of enterprise management, is focused on its long-term and effective functioning in constantly changing economic conditions. [2, p. 93]

From the point of view of Karminsky A., Oleneva N., Primak A., Falko S. Controlling is the philosophy and way of thinking of managers who are focused on efficient use of resources and development of the enterprise (organization) in the long run. [10, p. 12]

Thus, these definitions emphasize the focus of controlling on ensuring the survival and long-term effective functioning of the enterprise.

Mann R., Mayer E. Define Controlling as a Management System for the Process of Achieving the Ultimate Purpose and Performance of a Firm, the Enterprise Profit Management System [14, p. 8] Cost is one of the main factors affecting a company's profit. Therefore, scientists specify the content of controlling as a system of cost and performance management, which helps to achieve the goals of the enterprise, avoids surprises and promptly turn on the red light when the economy of the enterprise is threatened by the danger that

requires taking counter-measures. [13, p. 21]

Zagorodniy A. states that controlling is a functionally separate line of economic work in an enterprise, connected with the realization of a financial and economic commentary function in management for making operational and strategic management decisions. [7, p. 230]

In scientific works it is possible to allocate approach to defining the essence of controlling with emphasis on supervision. Borisov A. argues that the controlling – the system of continuous evaluation of all aspects of activity of the enterprise, its departments, officers, employees terms of timely and quality execution of tasks of the strategic plan, identification of deviations and acceptance of urgent, robust measures that set targets were achieved in all the changes in the economic situation. [3, p. 330] of Louth Yu., Gerasimov B. define controlling as a control system, which provides the concentration of control actions on the most priority directions of financial-economic activity of the enterprise, the timely detection of deviations of actual results from planned and management decisions to ensure its normalization [12].

This view is supported Grigorash I. A. that determines that the controlling is a system of business management that integrates, coordinates and directs the activities of all divisions on achievement of short-and long-term goals. [6] that is controlling, is designed to ensure the achievement of business objectives through coordination of activities of all departments and management subsystems.

Considering controlling as a system, scientists distinguish several of its elements. Stefanyuk I. defines controlling as an accounting and analytical system that implements the synthesis of elements of accounting, analysis, planning, control, provides both operational and strategic management of the process of achieving the goals and results of the enterprise. [20, p. 149]

From the point of view of Petrenko S., the controlling system is a synthesis of elements of accounting, analysis, control, planning, implementation of which ensures the development of alternative approaches during the operational and strategic management of the process of achieving the ultimate goal and results of the enterprise. [17, p. 15].

Anankina E., Danilochkina N., Danilochkin S. argue that controlling is a complex structure that integrates such diverse elements as goal setting, planning, accounting, control, analysis, management of information flows and making recommendations for management solutions [1, p. 22].

According to Tereshchenko, O. controlling is a special self-regulatory system of methods and tools, which is aimed at functional support of enterprise management and includes information support, planning, coordination, control and internal consulting [21, p. 404].

In practice, there are different areas (sectors) of controlling: financial control, sales control, divisional control, production and purchasing control, etc.

Depending on the control object allocate financial, investment, marketing, production controlling, personnel controlling. The study revealed that financial controlling is interpreted in a narrow and broad sense. In the narrow sense of financial controlling is the subsystem of controlling of enterprises implementing result-oriented management of the finances of the company through the use of methods and tools of financial management, ensure a continuous flow of internal and external information to make management decisions [10].

A. Tereshchenko, argues that financial controlling is an information management system for coordinating all management subsystems and involves the use of methods and procedures of budgeting, strategic planning, management accounting, financial diagnostics, investor relations, risk management and internal control, which collectively focused on improving the efficiency of financial and economic decisions and increase the value of the company [21].

3 Decision

The ambiguity of the interpretation of the essence of financial controlling is related to the historical development of views on the process of managing the financial and economic activity of the enterprise, with the complexity of management and accounting functions, their distribution in time and between departments of the enterprise.

Financial control is based on a system of costing, determining the relationship between output, cost and profit, the amount of time spent on production, the cost of operating machinery and the management of other indicators that characterize the level of production capacity and resources of all types.

Therefore, financial controlling as a science is related to the management and regulation of financial activity, which uses a system of obtaining and processing financial information on the technical and economic performance of the enterprise. It should be noted that the control services do not make decisions directly, but carry out their preparation, functional and information support and control over the implementation.

Management information should be provided in a user-friendly form. To this end, relevant information is first processed, summarized, analyzed and submitted to users in the form of reports, reports, notes, summaries, recommendations, forecasts. In Ukraine, financial controllers mainly need foreign-owned companies, branches and representative offices of international corporations, as well as those companies that plan to enter the global securities market.

4 Conclusion

Thus, the constituent elements of financial control, as an enterprise management system, are the purpose, tasks, functions, principles, methods, tools, information support, workflow system, controlling service.

Financial Controlling is an effective technology for managing a joint venture of an enterprise, focused on the future with an integrated system of elements of information support, accounting, analysis, control and planning. Financial Control ensures the achievement of strategic and operational goals of the enterprise on the basis of coordination of plans and activities of all divisions.

Harmonization of theoretical approaches to determining the essence of financial controlling is the basis for developing a system of theoretical, methodological and practical recommendations for its implementation at joint ventures, taking into account the features of the external and internal environment of the functioning of joint ventures at present.

References

[1] Anankina E L, Danilochkin S V, Danilochkina N G, et.al. 2003 Controlling as a tool of enterprise management M.: YUNITI-DANA 279 p
[2] Astashov V A, Uvarova G V 2009 Economic adviser to the Manager M.: of akdi "Economy and life" 384 p
[3] Borisov A 2003 Would. Big economic dictionary Moscow: Book world 895 p
[4] Gradov A P 1996 Strategy and tactics of crisis management firm SPb.: Special literature 512 p
[5] Grigorash A I 2010 Controlling as a modern enterprise management system Actual problems of Economics **11**(113) 96 – 107
[6] Grigoriev A A Theoretical foundations of controlling **E-source:** http://www.nbuv.gov.ua/portal/Soc_gum/aprer/2009_5_2/33.pdf
[7] Zagorodny A G, Vozniuk G L, Smovzhenko T S 2002 Financial dictionary Lviv: T-vo "Knowledge", KOO; Appearance. Lviv. Bank. Dr-Tu NBU 566 p
[8] Zadorozhnaya G P 2010 Controlling as a concept of management of financial-gospodarica the activity of the enterprise Vestnik **1**(11) 46 – 50
[9] Zorina A A 2011 The Problems of interpretation of the controlling Statistics of Ukraine **1** 40 – 4
[10] Karminsky A M 1998 Controlling in business: methodological and practical principles of design of open controlling in organizations M.: finances and statistics 256 p
[11] Kokovin A A 2012 the Need for financial controlling as a system of effective management of the enterprise activities railway transport Journal of transport Economics and industry **38** 196 – 9
[12] Louth Yu 2005 A system of controlling an industrial consultation.Tambov: Publishing house Tamb. GOS. tehn. University press 96 p
[13] Lipic L G Controlling in the crisis management system **E-source:** http://www.nbuv.gov.ua/portal/natural/Vnulp/Menegment/2012_722/72.pdf
[14] Mayer E 1993 Controlling as a system of thinking and management M.: finances and statistics 76 p
[15] Mann G, Meyer E 1992 Controlling for beginners M.: finances and statistics 208 p
[16] Odevalki V I 2009 Controlling – the modern concept of sustainable development of enterprises Actual problems of Economics **6**(96) 127 – 30
[17] Petrenko S N 2004 Controlling: proc. manual. K.: Nika-The Center, Elga 328 p
[18] Peach G, Sherm E 2001 Clarification of the content of controlling as a function of control and its support Problems of theory and practice of control **3** 102 - 7
[19] Pryymak S V 2008 Diagnosis of the financial state of the enterprise in the controlling system: author. diss. for the sciences. degree of Cand. econom. Sciences: Special. 08.00.08 **E-source:** http://www.irbis-nbuv.gov.ua/cgi-bin/irbis64r_81/cgiirbis_64.exe
[20] Stefanyuk I B 2005 Concepts, essence and causes of controlling Finance of Ukraine **2** 146 - 53
[21] Tereshchenko O O 2006 The concept of "controlling" and "management accounting" in theory and practice Finance of Ukraine **8** 137 - 45

Improving the competitiveness of sugar production in Ukraine

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Abstract

The article considers the features of sugar production operation, its current state, as well as identifies ways to improve the competitiveness of the product.

Keywords: competitiveness, sugar, production, efficiency

1 Introduction

In current market conditions, the operation of sugar factories requires a comprehensive study, as well as the development of ways to increase the level of products competitiveness.

The current state of the agro-industrial complex, unstable political situation as a whole, tax and credit system imperfection, pricing miscalculations, insufficient state support and domestic market insecurity from the expansion of raw sugar importers, unstable financial condition of most agricultural enterprises have led to a decline in sugar production. The reduction of sown areas, low sugar beet yields have led to a production volumes decrease and over the past few years have turned Ukraine from the largest exporter in Europe to a sugar importer

2 Main part

Product competitiveness is a combination of quality and cost characteristics of a product that provides advantages in meeting the needs of customers compared to similar products on the market in a competitive environment [2].

In beet sugar production, there are various forms of competition. So, sugar beet producers have perfect competition; state sugar market - monopoly; individual sugar factories and agricultural holdings - monopolistic competition, with possible conspiracies of individual producers - oligopoly [1].

In the world, two types of raw materials are used to produce sugar: sugar beets and sugar cane. At present, cane sugar production dominates taking about 65% in 71 countries. Sugar cane is simple to cultivate, can be grown on the same field for about seven years and can be harvested 2 times a year. The sugar content in sugar beets is about 16-20%, and in sugar cane it is 12 - 15%. But the yield of sugar cane can reach 60 tonnes per 1 hectar, while for beets it is not more than 35 tonnes / ha.

Due to the higher yield of cane compared with sugar beets, the cost of sugar from it is three times lower than from beet. Therefore, the product competitiveness of Ukrainian sugar factories is lower than of sugar producers in Asia. Because of the higher yield of cane compared to sugar beets, the cost of cane sugar is three times lower than the cost of beet sugar.

The competitiveness of beet sugar production directly depends on the technical and technological support of the industry, the availability of quality resources, compliance with growing technologies, a stable production process, the sale of finished products and other factors.

The current state of sugar beet production is characterized by a decrease in cultivated areas, sugar content fluctuations, a tendency to reduce the number of beet processing plants. Over the past 5 years, from 2015 to 2019, cultivated areas increased until 2017, then decreased. In 2015, 236.9 thousand hectares were planted with beets, in 2016 - 291.1 thousand hectares, and in 2017 - 311.3 thousand hectares, which is 74.4 thousand hectares more than in 2015. Further, a downward trend was observed: in 2018, 274.7 thousand hectares were sown, which was 36.6 thousand hectares less than the previous year, and in 2019, the cultivated area for sugar beets in Ukraine amounted to 218.7 thousand hectares, which is 92.6 thousand hectares less than in 2018.

In 2019, sugar beets were grown in 18 regions of Ukraine, with major concentration in 13 regions (more than 90%). The largest areas for this sweet culture were in the following areas [4]:

- Vinnytsa (44.8 thousand ha);
- Poltava (26.9 thousand ha);
- Khmelnytsky (27.2 thousand ha);
- Ternopil (22.9 thousand ha).

In 2019, 33 sugar factories processed sugar beets (in 2018 – 42 plants; in 2017 – 46 plants). In 2019, there were the smallest number of plants for the years of Ukraine's Independence, with the previous record of 36 enterprises in 2015. The number of enterprises of the industry tends to reduce, but, apparently, this is a global trend, because sugar factories are also closing in the EU countries.

Sugar beet yield amounted to 44.4 tonnes per hectare in 2019 on average in the country, which is 6.3 t / ha less than in 2018 (50.8 t / ha) [3].

The problem of energy consumption and energy conservation has become particularly important for sugar industry. Now in Ukraine, an average of 35 cubic meters of gas are consumed to process 1 tonne of beets, while European plants use 12 cubic meters. Only a few plants switched to biofuels of their own production, which allowed to minimize the consumption of natural gas. It is also very important to make the quality of sugar produced in Ukraine meet international standards.

According to such indicators as humidity, content of ferro-impurities, color domestic sugar cannot be considered as export goods to these countries. An important component of increasing the competitiveness of Ukrainian sugar industry enterprises is the expansion of the product range. Sugar factories are able to produce crystalline white sugar, sucrose, refined sugar, pressed sugar, natural sugar (yellow), iced sugar, icing sugar, liquid sugar, liquid sugar with flavorings. Regulatory documents (GOST, TU and others) have been developed for these products.

It should be noted that the assortment of sugar products in the world is diverse and continues to improve depending on the specific needs of consumers.

The production of new types of sugar based on crystalline sugar - special sugars, sugars with additives - is expanding abroad, the number of varieties of crystalline sugar, and the production of sugar products from non-traditional types of raw materials are increasing.

The demand for organic sugar is growing from year to year in developed countries, but in Ukraine, only in 2018, for the first time Deddens Agro company (Rivne region) manufactured organic sugar from organic sugar beets in Gnidava sugar refinery. Sugar production was certified by the national certification body "Organic Standard". Sugar volumes amounted to 850 tonnes, 800 of which were bought by a Dutch company, and the other 50 tonnes were sold on the domestic market.

The competitiveness of the Ukrainian sugar market is, first of all, the correspondence of market demand to quality, economic, technical and regulatory parameters.

Economic parameters characterize production efficiency, analyze the costs of production and purchase of goods, technical ones create an effect from the consumption of goods, regulatory ones are regulated by mandatory standards, deviation from which indicates inconsistency of product quality.

Sugar production in Ukraine will be competitive when the revenue from the sale of sugar on the international market exceeds the total cost of its production, estimated at world prices. Moreover, when assessing the actual economic costs of sugar production, the depreciation of equipment at these plants should be taken into account.

3 Conclusions

To ensure the competitiveness of beet sugar production it is necessary to develop a comprehensive state program of effective measures that will provide the relevant legislative and regulatory mechanisms for the development of beet sugar production, taking into account global trends. Improving the competitiveness of Ukrainian sugar is of great importance for the Ukrainian economy.

References

[1] Khatska O P 2013 Competitiveness of products of tsukroburyakovy virobnitzva Zbirnik naukovyh praz Tavriyskogo sovereign agrotechnological university (economic science) **2**(4) 306-13
[2] Ostapenko A V 2015 Viznennennya sutnosti understanding competitiveness galuzi Business Inform **5** 15-23
[3] Statistics Service of Ukraine 2020 **E-source:** http://www.cross.gov.ua, 1, 2
[4] Summary of sugar production in Ukraine in 2019 **E-source:** https://latifundist.com/blog/read/2586-summary-products-sahara-svekly-sahara-zavodami-ukrainy-v-2019-year

Methods of non-material motivation to stimulate and inspire staff

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Abstract

One of the key tasks of personnel management is the motivation for work. In psychology, motive is what activates, supports, and directs behavior. By motivating employees correctly, you increase their work capacity, which means that you have the opportunity to influence the results of work. The goals of non-material motivation of personnel are identical to those set by the company's management when introducing a material incentive system. First - improving the efficiency of employees and the whole company. Due to the regular holding of joint corporate events, trainings, meetings, each employee feels their belonging to a common cause, which is very good for the overall atmosphere in the team.

Keywords: management, staff, motivation, intangible motivation

1 Introduction

An employee who works solely for the sake of remuneration and absolutely does not accept praise and intangible encouragement signs probably does not exist at all. According to Abraham Maslow's theory, everyone needs to fulfill creative needs, respect and recognition of merit. It is on these needs that the intangible staff incentive system and the means of motivation are built. Depending on the situation, corporate culture, financial capabilities of the company, leadership style, different types of intangible employee incentives can be considered [1].

In general, the following types of intangible staff motivation are distinguished:

1. Social motivation. As well as health insurance, training and self-development opportunities, the designation of career prospects. The realization of social motivation implies an increase in the employee's sense of self-importance through involvement in decision-making, participation in the management of the team, delegation of important powers.
2. Psychological motivation. Based on the needs of each person in communication. It is necessary to motivate the intangible method of psychological motivation first. Work on creating a favorable environment in the team is built taking into account the interests of all employees. Also in this type of motivation the example and authority of the manager, regular holding of corporate events, play an important role.
3. Moral motivation. The need for respect from the staff and management of the company is affected. The most effective tool is the recognition of merit, for which you can use oral public praise, plaque, honors and certificates.
4. Organizational motivation. It shows in the care of the employee, the organization of his workplace, eating and rest during breaks in work. This motivational program is usually realized through the purchase of new office equipment for employees' workplaces, the opening of a cafeteria, the arrangement of gyms, recreation rooms.

Intangible motivation is the motivation of a person to fulfill the set tasks qualitatively, fulfilling which the employee achieves and his own goals. For example: to gain self-confidence, to become a professional, to recognize the importance of colleagues, to share knowledge and experience, career. This attentive attitude to the employee's personality and his work, confidence and belief in his ability [3].

Support and understanding when an employee makes mistakes. This behavior and attitude of the manager towards the employees is called inspirational management. Remember the mood you were in when you were involved in successful projects, when you were winning or creating something special. Most likely, you were in a state of inspiration and emotional lift. Tasks and atmosphere can motivate an employee or vice versa reduce the effectiveness of his work.

2 Overview

This work discusses the advantages, disadvantages and conclusions on the following issues:

- Determination of intangible motivation method and analysis of existing species
- Consider the effectiveness of this method
- Mistakes of the manager when not using methods of staff motivation
- Analysis of intangible motivation on the example of transnational companies.

3 Decision

Effective personnel management through emotional intelligence allows managers to discover for themselves that using special knowledge and methods; they themselves can

inspire staff and create a positive atmosphere in their team. For example, Google, Apple, Facebook, Microsoft and other IT giants were among the first to create comfortable working conditions for employees. Their offices are like Disneyland for adults. Cozy lounges, free cafes, game areas, gyms, shops in the office satisfy the needs of employees. Adopting the experience of transnational companies, managers can begin to apply non-material motivation methods with the following steps: update the office environment, add bright colours, change outdated furniture and equipment, improve living conditions, for example, organize a recreation area, lunch delivery on certain days, and review the current social package.

4 Conclusion

The emotional rise of subordinates is the best motivation for high-quality results. In modern conditions, when it is often necessary to save and reduce costs, therefore it is possible and necessary to motivate non-financially, this increases loyalty, strengthens team spirit, with a systematic approach, these methods yield results – work capacity is increased, there is a desire to achieve goals and goals, employees enjoy labor.

References

[1] Mhatre G, Dhole V 2018 Trends In HRM :Innovative Technology for Higher Productivity of Employees and the Organizations
[2] Mcauley M, Dubeley J, Cohen L 2000 The Meaning Professionals Give to Management and Strategy Human Relations
[3] Boselie P, Dietz G, Boon C 2010 Commonalities and contradictions in HRM and performance research
[4] Paauwe J 2014 HRM and Performance: Achieving Long-term Viability

The practice of implementing the concept of continuous improvement at the enterprise

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Abstract

The article examines the management tools that emerged in the XX century. These are Kaizen, Poka-yoke, Kanban, 5S, TQM, Jit and more. They allow not only to form competitive advantages, but also to ensure sustainable development precisely for manufacturing enterprises. There are three groups of methods: methods that are directly aimed at managing business processes; methods that have a different scope but can be used to manage business processes; methods that involve the use of a process approach. The practice of implementation of the concept of continuous improvements is described, which allowed the company to take the leading position and expand the market for products.

Keywords: *c*ontinuons Improvement, sustainable development, kaizen

1 Introduction

Increasing the competitiveness of domestic enterprises is usually associated with a significant release of new products, with new technologies, which should be distinguished by energy conservation and reduced production costs. In a competitive environment, there is a need to ensure sustainable development based on the use of modern management achievements, namely the tools that were formed in the XX century. Kaizen, Poka-yoke, Kanban, 5S, TQM, Jit and more. For Ukraine, which has significant production potential and a large number of problems in terms of energy and resource conservation, product quality, this is relevant. As the processes of globalization and internationalization both open up new opportunities for development and create new threats and challenges every day.

A modern enterprise in a highly competitive environment must constantly improve and implement changes to avoid the danger of stagnation and capture by surprise. Managers managed by businesses need to be open-minded, responsive to what is happening outside of them, in order to maintain leadership and competitiveness in an ever-changing market. At the same time, they must learn not only to make changes, but to manage them and act with care and judgment. This is the first strategic objective. The second strategic goal of managers is to optimize losses in the production and management process. Especially given the experience of Toyota, which has not lost its relevance in recent decades.

2 Overview

In particular, the well-known kanban cards and mugs are widely used by other companies. Thus, on the basis of the analysis of scientific works, it is advisable to identify three groups of methods of continuous improvement (Figure 1).

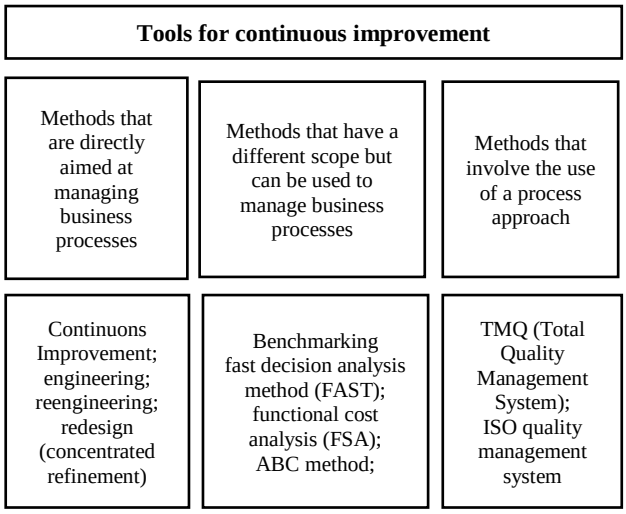

Figure 1 Continuous Improvement Concept Tools [1-4]

These methods, as evidenced by world experience, allow us to ensure sustainable development based on the implementation of the principles of continuous improvement, have their strengths and weaknesses. In Ukrainian practice, not many businesses have experience in using such methods. One of the modern enterprises-leaders in the market of Ukraine is JSC "Mirgorod Mineral Water Plant". Its successful development experience has been based on the use of quality management techniques since 2000.

As a result (table 1):

TABLE 1 Evolution of the quality management system at the Mirgorod Mineral Water Plant [Generalized based on 5]

Year	Achivement
1997	International Gold Award for Commercial Prestige (Spain)
1998	Honorary Certificate for Excellence in Quality Management, Technical Innovation, Business Level and Prestige in the European Market (Brussels). Arch of Europe for Excellence and Quality (Spain).
1999	International American Quality Award (Puerto Rico).
2001	"The Best Trademark of Ukraine" (National Rating, Kyiv) Medal "For High Quality" (Kyiv, "Beer Festival"). Gold medal for the high quality of medical and table waters - "Mirgorodskaya" (Kyiv).
2002	Diploma for active participation in the exhibition-fair Green Week-2002 (Berlin) Diploma of the winner of the All-Ukrainian Competition of 2002 among medium-sized enterprises manufacturing food products (Kyiv).
2003	Diploma "Best Employer of the Year" of the 3rd All-Ukrainian Competition (Kyiv). Diploma of the finalist of the regional stage of the All-Ukrainian competition for the quality of products "100 best goods of Ukraine" (Poltava). Winner of the National Rating 2002 "The Best Trademark of Ukraine" (Kyiv).
2005	Winner of the Festival of Competition "Choice of the Year" in 2005 in the nomination "Mineral Medicinal Table Water of the Year" - "Mirgorod" and in the nomination "Drinking Water of the Year" - "Old Mirgorod".
2006	Winner of the 2006 Choice of the Year Competition in the Mineral Medical Table Water of the Year nomination, Mirgorodska.
2008	Diploma of the finalist of the regional stage of the All-Ukrainian competition for the quality of products "100 best goods of Ukraine" (Poltava).
2009	Myrgorod Mineral Water Plant was ranked 9th in the Annual Ranking of the Top Employers of Central and Eastern Europe in the Big Companies category. The IEOM has become the only Ukrainian company to be included in this category of well-known research conducted annually by the international company Hewitt Associates with the sponsorship of the Wall Street Journal Europe.
2011	Mirgorodskaya Lagidna Mineral Water - Winner of the All-Ukrainian Contest "100 Best Products".

3 Decision

Thus, the quality management system is one of the main areas of continuous improvement, which provides the opportunity to implement the growth strategy in a highly competitive environment.

The next direction of continuous improvements at PJSC "Mirgorod Mineral Water Plant" at the company is the improvement of the organizational and legal form (Table 2).

TABLE 2 Stages of improvement of the organizational and legal form of JSC Mirgorod Mineral Water Plant [generalized on the basis of 5]

Year	Characteristics
1927	Year of foundation
1992	state company
1994	Joint Stock Company
2010	Public Company
2017	Private Joint Stock Company

As an example of a project for testing automation the Siebel CRM testing automation system will be considered. Using a set of open-source software an automated testing system was created that are not inferior to the characteristics of the complete, large, and paid solutions. Technically, the created tests are http queries sent to the server, and test scenarios can be described using any programming language. This makes the solution more flexible and easily scalable. Rejecting the finished programs for automated testing, which requires significant hardware and software resources it was possible to significantly reduce the cost of testing automation and to achieve faster and more reliable tests.

Thus, the management of the company seeks to provide competitive advantages from the organizational form.

In 2018, the following actions are taken by management to hold leadership positions:

- a 5S office system has been implemented (work / space organization designed to enhance corporate culture, improve work area efficiency / manageability, increase employee productivity by reducing wasted time and energy, create comfortable working conditions and a base for continuous improvement.
- continuous improvement of the 5S system in the enterprise (workplace / space organization aimed at creating optimal conditions for performing operations, maintaining order, cleanliness, accuracy, saving time and energy).
- developed a program "Team Change", which is aimed at continuous improvement of all production processes, management, business processes at the level of workplace, shop, department, unit, company as a whole (valid for 9 months, deadline April 2019);
- SMED production system was created and implemented, which made it possible to increase flexibility (work in small batches), reduce the number of deviations from quality standards and ensure process stability.
- constant satisfaction of customer and end-user requirements, which is confirmed by stable quality indicators (coefficient of complaints from the end consumer is 0.3 per 1 million bottles of manufactured goods and the rate of complaints from the retail consumer is less than 1 per 1 million bottles of manufactured products;
- expansion of the scope of accreditation of the measuring laboratory accredited in accordance with DSTU ISO 17025: 2006.

4 Conclusion

Thus, in the mineral water market, which is highly competitive, modern management tools allow us to take leadership positions and ensure sustainable development. Features of development of the given enterprise are constant, systematic improvement not only of production technology, but also of management system. At the present stage, it is the only enterprise in the region where the smallest number of management staff is employed. There is a steady tendency to develop in the conditions of crisis deployment.

References

[1] Adler P, Khunuzidi E, Shper V 2005 Methods of continuous improvement through the prism of the Shekhart – Deming cycle Qyality management merhods **E-source:** http://www.management.com.ua/qm/qm067.html
[2] Kolos I V 2017 Typology of economical production methods Eastern Europe: Economics, Business and Management **2**(08) 147-52
[3] Omelyanenko T, Shcherbina O, Barabas D, Vakulenko A 2009 Economical production:concept, tools, experience Kiev, p.157
[4] Kozachenko A Practical approaches to improving business processes **E-source:** http://easycode.com.ua/2010/11/praktichni-pidxodi-do-polipshennya-biznes-procesiv/.
[5] Official site of the Mirgorod mineral water plant **E-source:** https://landlord.ua/news/keyisy/vyzhyty-v-90-kh-ta-staty-uspishnymy-u-2000-kh-istoriia-perevtilennia-olstas-lon/

Development of digital (informatized) economy at the enterprises of the republic

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Abstract

The article describes in detail the international experience of digital transformation, in particular the peculiarities of digital enterprise creation. It highlighted the importance of the Republic of Uzbekistan to the digital economy, given that digital technologies are important for the manufacturing processes.

Keywords: Industrial structure, digital economy, business, industrial economy, innovation

The project "digital transformation of Industry" (DTI), launched by the World Economic Forum in 2015 year, consists of many years of cooperation with the aim of analyzing the impact of digital technologies on Business and society, better understanding of the possibilities of digital transformation and the risks in the fields and it covers the sectors associated with them and provides the concepts and tools needed to change the business model. In 2015-2016, the project is focused on six areas: logistics, mass media, consumer goods, electricity, automotive and health care. It also explored four areas of interaction: digital consumption, digital enterprise, social impact and platform management. In 2016-2017, the project is aimed at another 8 areas: chemistry, mining and Metallurgy, oil and gas, insurance, aviation and hospitality, professional services, telecommunications and retail trade. Networking topics: platform management, the impact of policy and regulation, social implications and the impact of emerging technologies.

The Fourth Industrial Revolution will bring about rapidly changing transformational disruptions in every sector. By 2022, more than 60% of global GDP will be digitized. Approximately 70% of the new value created in the economy over the next decade is based on platforms that work digitally. At the moment, almost 50 percent of the world's population is currently not participating in the digital economy at all, and the growth of internet adoption is slowing. The G20 global Infrastructure Center predicts a global infrastructure funding shortage by the year 2040.

Industrial structures and business models are reducing barriers to new products and services in terms of innovation, cost structure change, entry and entry of variable value money. Companies need to rethink how to create, distribute and capture value in this new environment. Navigation requires extensive coverage and constant intelligence and intelligence.

While huge funds are being spent on digital transformation programs by the private sector, the results are getting worse. According to calculations, in the current year, companies around the world to carry out digital transformation 1,2 trillion. They spend more than US dollars on capital, and the analysis shows that only 1% of these actions will achieve or exceed their expectations.

Digital Enterprise: a practical guide on how to visualize, construct, and sequence successful digital transformation efforts from experiment to mining. This is to help senior executives in collaboration with the World Economic Forum Bain & Company avoid the usual manifestations of failure and ask the right questions.

How does digitization change production processes?

Almost all economists agree that in the future digital technology will become increasingly important for the production processes. Therefore, it can be assumed that over time, production processes will have capital and technological demands not only in a developed economy, but also globally.

The increased capital and the intensity of technology affect the international competitiveness of all countries of the world.

Increasingly used by robots, computers and machines from human labor, developing countries that require Labor lose a decisive competitive advantage: cheap labor.

At the same time, the competitive situation of rich industrialized countries is improving, as they are able to cover the costs of digital transformation.

1. Western industrial economy

If we look at the current state of gross domestic product per capita, Western industrialized countries have the highest per capita income per capita.

If these countries manage to promote the use of digital technologies, they will become more competitive. As a result, per capita GDP growth is expected. This includes, in particular, the United States.

Industrialized countries that have not achieved digital transformation are losing competitiveness. This applies to economically vulnerable countries with large debts, such as Greece and perhaps Italy. Aging societies can also be included in the group of these countries, because the innovation power and productivity of the aging society are lower.

2. Emerging economies of Asia

Many developing Asian countries have experienced strong economic growth over the last 20 years. Therefore they have financial resources for digital conversion. This applies not only to China, but also to other economies in Asia, such as South Korea, Indonesia, Thailand and Taiwan.

3. Developing countries of Africa

On the one hand, African countries have a young and growing population. If these countries succeed in building digital infrastructure and developing the educational sector, it can lead to strong economic growth.

Some of these countries may even take a technological step further. Economists call it "jumping". For example, a country

that does not yet have a telephone connection is setting up a cellular network, and therefore at the same technological level as the country in which the industry developed.

On the other hand, this becomes difficult for a poor, developed economy that does not have valuable raw materials and does not have access to the capital market. Because they are losing competitiveness, there is a risk of leaving them behind more economically.

With the improvement of competitiveness, the country can produce more goods and services, thereby increasing the GDP and per capita GDP. Global prosperity is being redistributed: successful digital transformation increases people's well-being. In countries that have not been able to do this, one per capita GDP will decrease.

Thus, digitally changing its economy will be a necessary condition for ensuring and improving the prosperity of the country.

Development of transformational roadmaps for a digital enterprise.

Over the past two years, the Digital Transformation Project has managed to raise awareness about the impact of digitizing business and society, and has achieved significant growth in 220+ partner organizations. Now leaders recognize digital data as the subject of strategic institutional priorities, which radically disrupts their business conduct, rewrites the rules of reconciliation and cooperation, redefines relationships with customers, and establishes a new context for policies and sectors, and for sectors. Among the leaders there is an increasing need and desire to adopt digitization, to better understand its consequences and to change it to respond to a new reality. However, there is a huge gap between willingness to adapt and understanding how to do it. The proposed project to activate a digital enterprise is aimed at eliminating the gap between the digital strategic intent of partner organizations and the uncertainty surrounding its implementation. On the way to become a digital enterprise, companies in the networks are experiencing a wave of development, in which it is necessary to make fundamental decisions. These waves can be divided into three interrelated areas: those that affect the demand, supply side and business models of companies. Important points of the decision include the following.

1. Business model: how do companies adapt their business models in new digital reality conditions? What new business models for organizations to cover digital business (for example, investment, incubation) are included in the areas of availability analysis? How will collaboration models change in the digital world? How will the innovation participants with the new business models of bazar affect the current leaders? So how to by pass the culprits by the newcomers? What are the practical ways to access digital travel?
2. How will the consumption regime change due to digital, and how can businesses adapt to offer their services? Critical opinions include how product-oriented organizations (asset-heavy) turn into service-oriented business (asset-light). How to transition from products and services to experience? How to hyper-personalize these experiences? Customers are no longer required to own the asset, but to pay for it (transport, accommodation, etc.). What are the consequences if you want to have?
3. Supply: How can companies react to the new digital reality? The questions are: how to lead the digital age? How does this affect the business models and methods of performance of organizations? How do decision-making processes affect? It is necessary to identify, attract, develop and retain critical talent. How to do this and how to change organizational culture in the process? What digital measurements to achieve success?

Based on the analysis of the best practical examples of digital leaders recognized globally for each of these waves, the project identifies important decisions and creates practical tools and recommendations that companies can use to adapt to the new digital context. A better understanding of these dimensions is essential for the successful management of digital travel across our partner organizations.

In Uzbekistan, too, important steps are being taken to strengthen the regulatory and legal framework for the formation of the digital economy. In particular the decree of the president of the Republic of Uzbekistan № PP-3832 “On measures for the development of the digital economy in the Republic of Uzbekistan” dated July 3, 2018 was adopted, in accordance with which the authorized body in the field of introduction and development of the digital economy was established, the issues of turnover of crypto - assets and its regulation.

In the program for the development of technologies "Blok chain", adopted for 2018 - 2020 years, the introduction and development of activities in the field of crypto - asset turn over, including through the creation of the legal framework for the organization of this activity, that provides for the possibility of realization of crypto-assets on local and international crypto-exchanges, starting from 1 January 2021, in the provision of public services, it is envisaged to apply in the verification of information about the individual, to the corporate governance system of large commercial organizations, the priority of which is the participation of the state in the charter fund, including the improvement of business processes, the optimization of production, administrative and operational processes, as well as the implementation of modern management.

Decree of the president of the Republic of Uzbekistan “on measures to organize the activities of crypto - exchanges in the Republic of Uzbekistan” PP-3926 and “digital trust” on the establishment of the fund to support the development of the digital economy” PP-3927 on September 2, 2018 also play an important role in the development of the digital economy.

By the decision of the head of the country on September 2, 2018, the free activity of companies in the field of crypto-asset and Block chain Technologies was launched.

The Foundation “Digital Trust” was established, aimed at implementing the most promising and strategically important projects for the development of the digital economy, as well as other measures for training personnel in the field of development and implementation of block chain technologies.

The main directions of development of the digital economy in Uzbekistan have been identified

The draft document on the development of the digital economy, introduction of modern information technologies in the Republic of Uzbekistan and ensuring information

security in the Republic of Uzbekistan was announced on the portal of discussion of projects of normative-legal acts of the Republic of Uzbekistan.

The press service of the ministry for the development of information technologies and Communications reported that the draft decision of the Cabinet of Ministers establishes the following directions for the development of the digital economy in the Republic of Uzbekistan:

- identification of state and economic bodies, local self-government bodies on the basis of necessary information systems and sources, programming and electronic introduction of services;
- to create favorable conditions for attracting foreign investment to the country through the establishment of technology markets and techno-parks on the basis of digital economy, Information Technology Market, including public-private partnership;
- coordination of modern telecommunication infrastructure, development of communication technologies and networks, introduction of modern telecommunication services;
- - increase the digital economy through the introduction of electronic services in the field of Public Administration and economics, the development of the e-commerce and software market;
- Development of proposals for the development of the national segment of the internet, organizational, material-technical and economic provision of digital media content;
- development of " intelligent systems " for the management of urban and regional infrastructure, in particular housing utilities, transport logistics, safe and smart cities;
- improvement of qualified personnel training system.
- The tasks of the commission are as follows:
- The state of information and communication technologies in state bodies, including the inventory of Information Systems and the provision of personnel within 2 months;
- to submit proposals to the Cabinet of Ministers on improvement of this direction to 2018 year.

At the same time, it is planned to implement measures for the development of the concept of "digital Uzbekistan" until 2030. The draft resolution will be discussed until 31 August this year.

References

[1] Decree of the president of the Republic of Uzbekistan № PP-3832 “On measures for the development of the digital economy in the Republic of Uzbekistan” dated July 3, 2018
[2] Decree of the president of the Republic of Uzbekistan “digital trust” on the establishment of the fund to support the development of the digital economy” PP-3927 on September 2, 2018
[3] http://weforum.org/digital economy
[4] www.lex.uz

SMM-marketing – a modern marketing development tool

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Abstract

The article explores the role and importance of social media marketing as a tool for developing enterprise marketing. It is determined that social networks have become one of the main means of communication that unites people in business and in life. It is established that SMM is now a unique field that enables the enterprise to interact directly with the consumer and to create competitive advantages.

Keywords: SMM-marketing, management, publicity, Facebook, Instagram

1 Introduction

The development of a modern society requires the availability of an information space that shapes and refines the information infrastructure for efficient deployment and use of information resources. The strength of the information resource is that its use saves other resources of society. Communication as a means of communication allows you to transmit and receive any information. Modern enterprise maintains communications with its intermediaries, consumers, different audiences. At the same time, each group in this chain maintains communication feedback with all participants in the communication. That is why the success of the company depends largely on a well-established communication policy, which plays a strategic role for marketing. Social media marketing, or SMM in short, is a fairly new field of activity that is trying to capture a large number of leading and up-to-date businesses, firms, organizations and corporations. After all, today everyone is on social media, which means that everyone has access to a particular social network and has a social page on Facebook, Instagram, Twitter. And all this is just a small start to recalculating existing networks on the Internet.

2 Overview

The emergence, development and development of various types of communications has become a dialectical response to the loss of effective influence on consumer choice of previous options for increasing client activity. At the present stage of development of the Internet network, social networks and media marketing are attracting more attention and popularity. Social networks have gradually become one of the main means of communication that brings people together, both in business and in life. Moreover, the intensity of this fact is constantly increasing and increasing. On social networks, people are used to buying various products, ordering services, finding like-minded people who live and live in different parts of the world. A large number of internet users have lost their trust in traditional media, so the adverts like social media marketing have replaced traditional advertising.

3 Decision

Currently, SMM is a unique field that enables the enterprise to interact directly with the consumer. An example of this is the reviews and comments posted on various sites. Through discussions on social networks about a particular phenomenon or product, a brand, business or event thus attracts a large number of consumers, which is also a very important point of social media marketing. Thus, SMM is a special internet marketing tool that promotes a product, service, company or brand through the use of social media, the content of which is created and updated by the efforts of their visitors and owners. In order to better understand the essence of SMM and where best to use it, such social media was identified and listed (Figure 1).

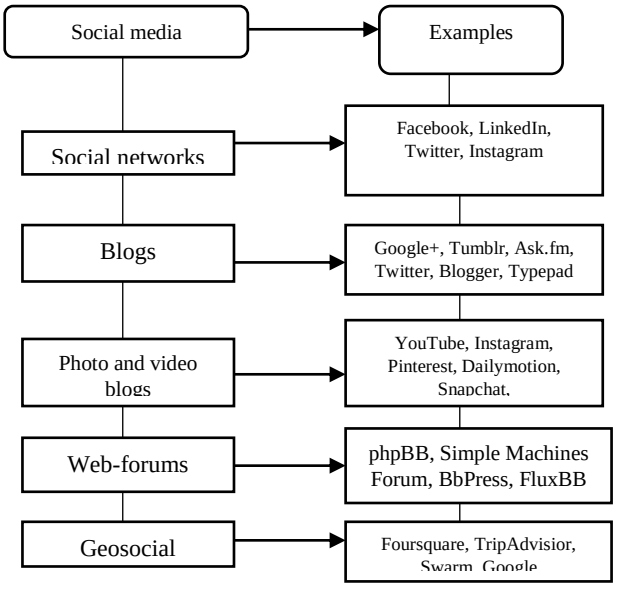

Figure 1 Social Media Examples. [Generalized Based on 1.2]

There is a huge list of social media in the world that is functioning quite successfully. But, as we can see, for 2019, social networks have the advantage. After all, if you are not in any of them, this already raises questions from your environment. In 2019, it is already clear that the only leading online network that is not inferior to any of its visitor metrics is Facebook. On Facebook, we can run the most engaging ads, create a page or blog of our own, live broadcasts, and connect and build successful brands through social media marketing.

Of course, one cannot say that other networks give up their positions and are inactive and ineffective. The list above is one of the most successful social networks. And each of them is responsible for its directions. You can also see that networks like YouTube, WhatsApp and Messenger receive similar numbers of visitors per year. The big advantage of these networks is that they support all languages of the world, which is also not important for the creation of ratings and statistics. You should also pay attention to the latest rating of the most popular networks - Telegram. It is also a social network where SMM is used quite powerfully.

In 2019, it should be understood that without a properly formed SMM, there cannot be a social page that is profitable. The consumer should constantly see information about your business, product or business. After all, there is a lot of competition in this market and if social media marketing of your product ceases its activity at least for a day, then tomorrow everyone will go to your competitor, because it has newer information, fresh content and quite interesting copywriting.

4 Conclusion

Using SMM and its tools on the Internet today is a leading field that not only allows you to effectively communicate with potential and real consumers of goods and services, but also solves a large list of other quite important tasks: promotes brand, builds trust and loyalty in the target audience, helps be better than your competitors, increase your sales. It can be said that social media marketing is being introduced into an enterprise or a particular business in order to make you a tad higher than competitors in which internet marketing is absent or poorly developed.

In today's world, SMM is a more subtle and effective tool than traditional outdoor advertising or promotion we are used to. Now information on social networks is spreading with incredible speed, just start a new wave of info-drive and everyone will know about it.

Thus, there are no more relevant and effective ads today than on social networks. It is important to understand that the time has come when you can promote both the clothing store and banking on the Internet. No need to collect phone or phone feedback from acquaintances or friends about a particular product. You have the opportunity to find out everything you need through an online resource in minutes. Therefore, it is advisable to develop social media marketing for today as the best and the strongest.

References

[1] Grischenko O F 2013 Social media marketing as an enterprise product promotion tool Marketing end Innovation Management **4** 231-4

[2] Danchenko L A 2013 Marketing in social media Internet marketing Communications, Moscow p.288

Institutional and legal support for information security of the national economy

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Abstract

In the context of digitization, the study of information security of the national economy on the basis of an institutional approach is the basis for determining the priority directions of its provision. Substantiation of the institutional and legal support for the information security of the national economy makes it possible to determine the strategic directions of the state regulatory policy by which the national economy will be safe.

Keywords: information security, national economy, digitization, institutional and legal support

1 Introduction

In the current conditions of market transformations, the study of the institutional environment, interdependence, complementarity of the institutions that form the information security system of the national economy becomes the dominant basis that defines and shapes the systematic basis of a new, digitized economy based on the conceptual model of synergistic influence on the intensification of interconnectivity. The use of an institutional approach in the study of information security of the national economy will allow to form an institutional architectonics and a mechanism for its provision

2 Body text

In the context of research, it is legitimate to define institutional support as a dynamic process of institutional formation (rules formed by formal and informal formations of socio-economic formations that affect the behavior of market participants) and institutions (organizationally formulated system of rules and norms), which are consolidated in the form of organizations (enterprises infrastructure, state bodies), laws (regulations) and rules (economic laws of a market economy) in the process of evolution of a market mechanism [1].

Institutional provision of information security of the national economy is a collection of state and non-state institutions that ensure the legal, organizational and economic conditions necessary for ensuring information security of the national economy.

Within the institutional support for information security of the national economy, it is legitimate to distinguish three components:

- institutional and legal support is a system of normative legal acts that regulate relations in the sphere of information security of the national economy;
- institutional and organizational support is a system of organizations (authorities) that provide information security of the national economy;
- institutional and personnel support is a system of training for ensuring the implementation of the state regulatory policy in the field of information security of the national economy [2].

Institutional and legal support of information security of the national economy gives purposefulness, consistency, structured activity of regulatory bodies, defines effective directions of ensuring information security. Thus, the legal form not only legally fixes the status of various bodies in the system of ensuring the implementation of a certain function of the mechanism of information security of the national economy, but also determines the forms of implementation of the requirements of the current legislation and coordinator of the implementation of legal ideas [3].

The analysis of the current legal framework allowed us to identify the following levels of institutional and legal support for information security of the national economy.

The first level of regulation forms the basic law of our state - the Constitution of Ukraine. According to Art. 17 of the Constitution of Ukraine, protecting the sovereignty and territorial integrity of Ukraine, ensuring its economic and information security are the most important functions of the state, the cause of the entire Ukrainian people.

The second level of regulation is formed by the Law of Ukraine "On National Security of Ukraine", which is the basic one on the issue under investigation and the Law of Ukraine "On Information". In particular, the Law on National Security of Ukraine stipulates that the national security of Ukraine is ensured by conducting a prudent state policy in accordance with the established doctrines, concepts, strategies and programs in political, economic, social, military, environmental, scientific and technological, informational and other areas.

The third level of regulation is formed by other laws on

information security or on the activities of subjects of information security of the national economy: Law of Ukraine "On the Concept of the National Program of Informatization", Law of Ukraine "On Basic Principles of Development of the Information Society in Ukraine for 2007-2015".

The fourth level of regulation is formed by subordinate normative documents (normative acts issued on the basis of the law, in accordance with the law and aimed at its implementation by specifying legislative prescriptions or establishing primary rules). Prominent among them are the Presidential Decree "On Decisions of the National Security and Defense Council of Ukraine of January 27, 2016 "On the Cybersecurity Strategy of Ukraine", Decree of the President of Ukraine On the Decisions of the National Security and Defense Council of May 6, 2015 "On the National Security Strategy Of Ukraine", Decree of the Cabinet of Ministers of Ukraine "On approval of the Concept of development of digital economy and society of Ukraine for 2018-2020 and approval of the plan of measures for its implementation", etc.

The quality of the result of any activity, including regulatory activity, is ensured by the quality of organization of its process. The legal and organizational principles of the implementation of the state regulatory policy in the sphere of economic activity are determined by the Law of Ukraine "On the principles of the state regulatory policy in the sphere of economic activity". Accordingly, the quality of implementation of state regulatory policy and institutional and legal support of information security of the national economy as a whole depends on the level of compliance by regulatory bodies with the requirements of the legislation [4].

3 Conclusion

The use of institutional frameworks in the study of information security of the national economy helps to avoid excessive formalization and to focus on the behavioral aspects of the participants in the process. The key to the effectiveness of the institutional support for information security of the national economy is an efficient and harmonized system of regulatory bodies, a sound legal basis and quality staffing.

References

[1] Stupen M, Shumlyanskiy B 2015 Clarification of the conceptual and categorical apparatus of institutional support of investment activity of the forest sector of the economy Applications **E-source:** http://nbuv.gov.ua/UJRN/econ_2015_1_9 (in Ukrainian)
[2] Glushko A D 2013 Areas of improvement of the institutional support of the state regulatory policy Innovations and Traditions in Modern Scientific Thought: Ninth International Scientific and Practical Internet Conference (Kyiv, August 15 - 17, 2013): **part 1** 15–19 (in Ukrainian)
[3] Onyshchenko S V 2016 Institutional Assurance of Budget Security of Ukraine Bulletin of Taras Shevchenko National University of Kyiv Economy **5**(182) 31–9 (in Ukrainian)
[4] Glushko A, Marchyshynets O 2018 Institutional provision of the state regulatory policy in Ukraine Journal of Advanced Research in Law and Economics ASERS Publishing House **9**(3) 941–8

Risks to the economic security of the region from the implementation of budget decentralization

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Abstract

Impact of budgetary decentralization on the economic security of the region is clear. More economically active communities will obtain resource base an expansion, as most of their income will remain in local budgets. Communities of isolated rural district budgets that have a narrower tax base, where ability to collect new taxes is much smaller, feel the negative effects of the reform (more stress), as the resource base of such budgets will only be reduced. The essence of the economic security of the region in terms of budget decentralization lies in the ability and capability of economy to ensure the quality of population life at the proper level, socio-economic and socio-political stability, prevent emergence and counteract the impact of internal and external threats at the optimal cost of financial resources and their rational use.

Keywords: economic security of the region, budget decentralization, risks of budget decentralization implementation, ensuring economic security

Economic security of a complex entity such as a region cannot be determined only by the state territory's economic system. Achieving economic security at the regional level is hampered by a number of unresolved issues. Thus, economic security of regions is threatened not only by legal insolvency of many issues, destruction of scientific and technical potential, lack of environmental protection system, migration of human resources, shadowing of the economy, growth of economic crime, territorial disparities and low professional competence of management but the main thing is the lack of security priorities in their social and economic development.

Ensuring economic security of the regions should become the most important function of the state in terms of budgetary decentralization, and at the local level, it is possible to confront some of its threats. Realization of opportunities to achieve the level of economic security of the region is influenced by many factors (threats): economic, political, psychological, scientific, technical, social and many others, which understand the cause and effect relationships existing in the system security, and are the driving force behind opportunity transformation into reality and maximize efforts to use internal reserves.

To assess the ability of the regional economic system to counter threats, it is necessary to analyze: structure of threats to the economic security of the region; sources of threats; negative effects of threats. Sources of danger are conditions and factors that, under certain circumstances, manifest hostile intentions, harmful properties that are destructive in nature.

In the current environment, economic policy should be aimed at strengthening the financial position of regional economic entities and increasing their self-sufficiency through fiscal decentralization. In economic terms, budget decentralization aims to increase efficiency of the budget system by delegating powers to the local authorities and autonomy in decision-making when generating revenues and using budgetary resources. Decentralization of budgetary resources enhances the incentives to eliminate shadow business in a particular territory, as the mechanism of distribution of funds and openness of political decisions in the interests of the territorial community becomes more transparent, which will significantly strengthen economic security at the regional level.

A rational approach to spending the budget means minimizing the budget deficit. Successfully conducted budget decentralization contributes to the financial capacity of the territory, activation of investment activity, stimulation of entrepreneurial activity, which ultimately strengthens the economic potential of the region [14, 69].

At the same time, while characterizing budgetary decentralization as a positive progressive process, the problems it can create must also be taken into account.

In particular, in the context of decentralization, it is more difficult to reconcile the local needs of individual territorial communities with the macroeconomic goals of the entire state. Excessive decentralization of the budget system complicates the implementation by the state of such a function as stabilizing and redistributing revenues through the budget and managing the budget process in general, since it is more difficult for the central government to decentralize responsibility for tax sources than for local budget expenditures. In the face of financial and economic instability, the goals of the state and regional authorities in the implementation of budget policy may have different priorities, and e equalization of budgetary security may be ineffective, which will lead to increased differentiation of regional development. Transfer of spending power to the regions and the right to set local taxes independently is advantageous, above all, for high-income regions, because the opportunities to provide public services in the "rich regions" will continue to be higher than in the "poor regions" that is, economically powerful regions and further become stronger.

Therefore, when extending the powers of local

governments to make management decisions about budgeting and use, it is necessary to understand clearly the benefits and risks of budgetary policy implementation, to determine the necessary and sufficient level of its implementation, since deepening of budget decentralization is capable of promoting horizontal regional budgeting. cause horizontal budget imbalance in future; the readiness of the central government of the state and society as a whole for such changes.

References

[1] Sukhorukov A I, Kharazishvili Yu M 2012 Modeling and forecasting of socio-economic development of regions of Ukraine: monograph NISD: Kyiv p 368 (in Ukrainian)
[2] Onyshchenko S, Maslii O 2018 Ukraine regions social and economic security provision preconditions Economics and region **1**(68) 14-20
[3] Zaiats T A 2017 Rozvytok silskykh poselen Ukrainy v umovakh detsentralizatsii: mozhlyvosti ta ryzyky Demohrafiia ta sotsialna ekonomika **3**(31) 48-60
[4] Komelina O V, Onyshchenko S V, Matkovskiy A V, Puhach O A 2013 Economic security of the state: estimation and strategic guide of maintenance PNTU: Poltava p 202
[5] Borodina O A 2012 Udoskonalennia derzhavnoho upravlinnia rozvytkom rehioniv z urakhuvanniam zarubizhnoho dosvidu Pravo ta upravlinnia **1** 101-21

Qualimetry of financial risks in enterprise activities

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The protection of the enterprise from various existing or possible threats does the system of economic security, which represents the organizational and technical complex of managerial, technical, sensitive, preventive and promotional activities, aimed at high-quality implementation and protection of the interests of the enterprise from internal and external threats.

The risk that the action aimed at attractive goal that is associated with the element of danger, the threat of losing or failure.

Entrepreneurial risks represent the likelihood that the entrepreneur will incur losses in the form of additional costs in excess of those foreseen by the forecast, or will receive income below those on which he relied on the implementation of which or from alternative solutions.

The most common types of entrepreneurial risk include:

- financial risk arising from various kinds financial transactions;
- production risk associated with the implementation of production activities;
- commercial risk arising from the sale of goods and services;
- market risk associated with fluctuations in market interest rates of the national monetary unit.

The most common risk of economic security of the enterprise, as well as the main reason for the deviation of the actual development of the enterprise from the strategic plan is financial risk. Financial risk is unpredictable threat to the economic security of the enterprise and its sustainability functioning. Its essence and significance is determined by the structure long-term sources of financing, the higher the leverage ratio capital, the higher the risk level. [1]

The key is the second stage - risk analysis. It is at this point determined the probability of possible damages reveals the magnitude of the risk.

The analysis is qualitative, quantitative or complex. The qualitative analysis revealed possible risk, examines the factors affecting the degree of risk. The factors are divided into external (political situation in the country, tax system, competition, ecological disaster, etc.) and internal (strategy, organization, qualifications of management, internal procedures and policies of the enterprise, etc.). In the quantitative analysis revealed the concrete amount of money damage separate subspecies and financial risk in general.

Qualitative analysis can be performed by various methods, including the method of using the analogues and the method of expert evaluations [2].

The method of using the analogues is the application of experience financial manager in dealing with similar issues. The method of analogues is used in the case where the use of other methods any reason impossible. This uses a database of similar objects to identify common dependencies and transfer them on the object under study.

The method of expert estimates is the use of complex logical and mathematical-statistical methods and procedures for processing survey results of the expert group, the results of the survey are the only source of information. In this case there is the possibility of using intuition, life and professional experience of survey participants. Method is used when a deficiency or complete lack of information does not allow the use of other features.

A quantitative analysis of financial risks is carried out using mathematical and statistical methods:

- statistical;
- minimize losses;
- mathematical;
- modeling of the "decision tree";
- assessing the likelihood of expected damage;
- analysis of the financial condition of the enterprise.

Issues of assessing financial risks of business entities and finding ways to manage them in order to minimize or neutralize and ensure economic security on the example of **Ilyich iron and steel works**.

The risk of decrease of financial stability (risk of losing financial stability), which occurs for unsatisfactory capital structure of the company, namely: which entails significant future cash flows of the company during periods of repayment and payment of interest.

As an example of such an unsatisfactory capital structure, can produce a structure on the example of **Ilyich iron and steel works** (table 1).

TABLE 1 Dynamics of indicators of financial stability of Ilyich iron and steel works

Indicator	Standard	2010	2015	2018	deviation from the norm		
					2010	2015	2018
Autonomy indicator	>0,5	0,63	0,53	0,35	+0,13	+0,03	-0,15
Financial stability ratio	>1	1,73	1,13	0,54	+0,73	+0,13	-0,46
Permanent capital ratio	>0,5	0,64	0,65	0,43	+0,14	+0,15	-0,04
Ratio of capital structure	<1	1,84	0,88	0,46	+0,84	-0,12	-0,56

Source: calculated by the author based on enterprise data [3]

After calculations, we can draw the following conclusions: 1) at the end of 2018, the coefficient of autonomy **Ilyich iron and steel works** has a low value, below the standard; values of the indicators of financial dependence and autonomy indicate that the company has a high level of dependence on borrowed sources of financing; 2) the financial stability indicator is within the regulatory limits at the end of 2010 and 2015, therefore, they are

satisfactory and at the end of 2018 the indicator was low; 3) the rate of permanent capital at the end of 2010, 2015 is within the standard value, and the end of 2018, the value and at the end of 2018, the value of the indicator decreased, which indicates a high proportion of current liabilities, namely satisfactory structure of borrowed capital **Ilyich iron and steel works**; 4) the ratio of capital structure in 2010 was within the normative value, and at the end of 2015, 2018 decreased, indicating a low level of equity capital at the end of the respective years. Values of indicators of financial stability show a low financial sustainability of the enterprise during the analyzed period [3].

The risk of insolvency (risk of unbalanced liquidity) that occurs together with a decrease in the liquidity of current assets, which also causes the imbalance of incoming and outgoing cash flows (table 2).

TABLE 2 Dynamics of liquidity indicators of Ilyich iron and steel works

Indicator	Standard	2010	2015	2018	deviation from the norm		
					2010	2015	2018
Absolute liquidity ratio	0,2	0,06	0,03	0,03	-0,17	-0,07	-0,14
Intermediate liquidity ratio	>1	0,91	0,81	0,8	-0,09	-0,19	-0,2
The total coverage ratio	2	1,26	1,02	1,03	+0,14	+0,15	-0,04

Source: calculated by the author based on enterprise data [3]

The risk of insolvency (risk of unbalanced liquidity) that occurs together with a decrease in the liquidity of current assets, which also causes the imbalance of incoming and outgoing cash flows. Therefore, this type of risk that is present in the enterprise is critical.

Equally important is the formation of the structure of assets and liabilities, which will improve the liquidity of the enterprise, and, accordingly, to minimize the risk of insolvency.

In the structure of liabilities is necessary to reduce the share of the most urgent and current liabilities. To cover a large amount of non-current assets, which are necessary for the efficient functioning and further development, **Ilyich iron and steel works** should greatly increase the proportion of fixed liabilities. The proposed structure will ensure the stability of the company in the long term.

Measures should be taken to minimize or neutralize financial risks in the future. These include avoidance, diversification, limitation, domestic and foreign insurance. Each risk requires individual solutions depending on the objective and subjective circumstances [4].

References

[1] Klapkiv M S 2002 Insurance of financial risks Ekonomichna dumka Ternopil, Ukraine
[2] Kostets'kyj V V 2012 Problems of insurance protection enterprise from financial risks Innovatsijna ekonomika **37** 226-30 (in Ukrainian)
[3] Metinvest Official Website (Ilyich iron and steel works) **E-source:** https://ilyichsteel.metinvestholding.com/en (accessed 01/04/2020)
[4] Hmyria V, Kucherenko V 2020 Qualimetry of financial risks in the system of economic security of an enterprise Management and Entrepreneurship: Trends of Development **1**(11) 8-22 **E-source:** https://doi.org/https://doi.org/10.26661/2522-1566/2020-1/11-01

Tools for "green" technology implementation in small and medium enterprises of foreign countries

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Abstract

The ways of improvement of processes of introduction, adaptation and dissemination of "green" technologies in small and medium enterprises of foreign countries are determined. It has been proven that in order to effectively support innovative "green" technologies for small and medium-sized enterprises in developing countries, governments and other stakeholders should consider the following key areas of support: accelerating business development; innovative financing; development of the market for "green" technologies; technology development; regulatory framework.

Keywords: "green" technologies, small and medium-sized enterprises, tools, innovative financing

1 Body text

To ensure effective support for innovative green technologies for small and medium-sized enterprises (SMEs) in developing countries, governments and other stakeholders should consider the following main areas of support: accelerating business development; innovative financing; development of green technology markets; technology development; regulatory framework. In each of these five areas, a variety of tools can be used to promote green technologies in SMEs.

Accelerating the development of entrepreneurship is implemented in the form of programs that provide training and capacity building for managers and business owners, ranging from general financial and management skills to purposeful support of technical aspects of business. These programs are often provided by consulting firms, business incubators or technical experts.

An example of such programs is the Climate Technology Program, infoDev, which is a global World Bank program that supports small and medium-sized enterprises as well as new entrepreneurs developing innovative products and new business models in the field of climate technology [3].

National or multilateral public-private partnerships may also be noted to link investors with technological opportunities in developing countries. For example, the PFAN Private Finance Advisory Network [4].

Attention should be paid to UN technology transfer initiatives. First of all, technology support for clean technologies is donor-funded, but country-led. The Climate Technology Center and Network (CTCN) is an operational tool of the UN Technical Assistance Mechanism, which provides technical assistance to developing countries to support their plans for the development of low carbon technologies [5].

Information platforms are designed to facilitate knowledge sharing both in technical resources and in the implementation of business projects. An example is the international Cleantech network [6] organized by the Copenhagen Cleantech Cluster; Climate and Development Knowledge Network (CDKN).

Innovative financing involves tools designed to provide SMEs with several forms of early financing and venture capital that are not available from traditional sources of finance. It includes start-up capital, venture capital, loans and loans.

Governments and investors can support the private sector by providing loans to SMEs on preferential terms. Such support takes into account that in most countries there are significant barriers for SMEs in the green technology sector. This has been confirmed by surveys in India and Kenya, where access to finance has been identified as a major barrier for SMEs in the clean technology sector, especially in Kenya, where 70% of bioenergy firms have identified it as a major barrier, compared to 46% of solar power firms in India [7].

Innovative financing can also stimulate demand. The most important tool here is technological consumer credit. The main purpose of demand instruments is to reduce commercial uncertainty for clean technology companies, thereby reducing investment risk.

Another tool is loan guarantees [1]. The Central American Renewable Energy and Cleaner Production Facility (CAREC) provides interim financing for small grids related to renewable energy technology (TVE) projects with a mortgage guarantee from the United States Agency for International Development (USAID), the Development Credit Authority (DCA).

Government Venture and Equity Guarantees: China's Shenzhen Capital Group is one of China's most successful venture capital groups, creating state funding structures for the first time by investing in a host of new technologies, including clean technologies [2].

In renewable energy, the most popular tool for boosting market demand for grid technology in developed countries

is tax tariffs, which support approximately 75% of global installed solar power and 45% of wind power.

Manufacturer standards, product labeling, and product testing and certification are potentially powerful tools to stimulate demand for clean technologies and raise consumer awareness. However, such instruments are largely limited to consumer goods, such as household appliances, which are of marginal importance to small and medium-sized enterprises in developing countries, since these goods are more likely to be imported than produced locally. However, government standards, for example, to improve energy efficiency in buildings, are an important means of stimulating the demand for clean technologies that can be provided or installed by SMEs.

Technology development mechanisms are intended to assist SMEs in the technical aspects of developing an innovative product. These may include tax credits for research and development activities, research grants for research, public funding contests, public investment in R&D, public and private technology cooperation agreements, demonstration projects, and applied research networks. For example, direct subsidies in India have been recognized as the most popular form of government support for firms (32%) [7].

While government-backed R&D instruments can be a powerful catalyst for the development of clean technologies and the local potential of SMEs, they also carry structural risks that need to be considered and anticipated. First of all, public R&D funding can cause inefficient allocation of resources as a non-market means of selecting technologies and business models, and / or lead to excessive subsidies that leave technologies out of the market.

Another important area of technology development is intellectual property rights (IPRs). To support the strategic importance of patenting in the "knowledge economy", many developing countries have implemented patent policies, often with the support and funding of the World Intellectual Property Organization (WIPO). For example, Rwanda has a comprehensive IP policy as a means of supporting scientific and technological potential and technology transfer [8].

2 Conclusion

The toolkit that governments and other stakeholders can use in each of five areas to promote "green" technology in SMEs is considered: accelerating business development; innovative financing; development of the market for "green" technologies; technology development; regulatory framework.

Such direction as accelerating the development of entrepreneurship is implemented in the form of programs that provide direct training and capacity building for managers and business owners.

Innovative financing involves tools that provide SMEs with various types of early financing and venture capital that are not available from traditional sources of financing.

Technology development mechanisms are intended to assist SMEs in the technical aspects of innovative product development.

It is considered the regulatory framework, which is aimed at strengthening the overall conducive environment for the implementation of "green" technologies in small and medium-sized enterprises.

References

[1] OECD Publishing 2019 Start-up Latin America Promoting Innovation in the Region **E-source:** https://read.oecd-ilibrary.org/industry-and-services/start-up-latin-america_97892-6420230en#page1 (Accessed 2 June 2019)

[2] Rene Van Berkel 2019 Regional Study to Guide Policy Interventions for Enhancing the Development and Transfer of Publicly-Funded Environmentally Sound Technologies in Asia and Pacific Region **E-source:** http://www.unescap.org/ (Accessed 8 August 2019)

[3] Robinson D 2018 Renewable energy investments in developing countries: These are the five leaders NS Business **E-source:** https://www.compelo.com/renewable-energy-investments-in-developing-countries/ (Accessed 7 December 2018)

[4] The Private Financing Advisory Network 2019 CTI PFAN Pilot Programme for Financing Adaptation-related Climate Change Projects **E-source:** http://pfan.net/ (Accessed 3 October 2019)

[5] The website of Climate Technology Centre and Network 2019 UN Environment Programme **E-source:** https://www.ctc-n.org/ (Accessed 21 September 2019)

[6] The website of The International Cleantech Network (ICN) 2019 Energy and Environment industries **E-source:** http://internationalcleantechnetwork.com/ (Accessed 13 July 2019)

[7] United Nations Economic and Social Commission for Asia and the Pacific 2019 Financing an Inclusive and Green Future: A Supportive Financial System and Green Growth for Achieving the Millennium Development Goals in Asia and the Pacific **E-source:** www.unescap.org/publications/detail.asp?id=1393 (Accessed 1 October 2019)

[8] United Nations Environment Programme 2019 UNEP Report *"Towards* a Green Economy: A Path to Sustainable Development and Poverty Eradication. A synthesis report for the authorities **E-source:** www.unep.org/greeneconomy (Accessed 15 March 2019)

The level of financial inclusion of the Poltava region

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Abstract

Analysis of the current level of financial inclusion of the Poltava region showed that the current level of financial inclusion of the Poltava region is low. Survey of the respondents showed that there is a large disproportionate level of financial inclusion among urban and rural population. The rural population is limited in financial services. There is also still a significant low level of confidence in financial institutions. All this slows down the processes of full involvement of the population in financial inclusion and creates a shadow sector.

Keywords: financial inclusion, financial literacy, financial well-being, financial goals, region

1 Introduction

Financial inclusion of the region is a means of making full use of the financial services industry's tools, which ultimately contributes to the long-term economic growth of the region, as it stimulates innovation, mobilizes savings and supports investment. Scientific and technological progress has made the provision of financial services a simpler, safer and more cost-effective process for ordinary citizens.

At the same time, embracing technology in all sectors of the financial market contributes to solving financial inclusion problems for all types of low-income developing economies, including Ukraine. All this makes relevant research concerning the definition of effective ways of development of financial inclusion of Poltava region.

2 Body text

In recent decades, financial inclusion, along with financial stability, financial integrity and protection of the rights of consumers of financial services, has been one of the main goals of both the state and regional regulation of the financial sector in many countries of the world. Involvement of a wide range of economic entities, especially individuals, in the active financial life, contributes to the increase of the financial institutions resource base, and thus their positive impact on the economic development of the region and the well-being of the population, optimization of the money supply structure, enhancement of transparency of financial flows, which creates conditions for shrinking the shadow economy [1].

The idea of financial inclusion of the region is based on the elimination of barriers that impede or prevent the use of financial services by certain categories of the population. According to the latest financial services research, it is plausible that many of the region's population do not use them. This is especially true of innovative methods of providing financial services, such as internet banking or other financial services. The introduction of financial inclusion of the region implies the involvement of as many people of the region as possible in the financial services market. It is about all segments of the population of the region, individuals and legal entities. Increasing the level of financial inclusion of the region contributes to the prosperity of the banking sector and sustainable economic growth in the country as a whole and in the region [2].

Today, financial inclusion of the region is considered one of the drivers of stimulating the economic development of the country and its regions and reducing social inequality in society. It provides equal access for citizens and businesses of the region to the use of affordable financial services and products; meet their needs; are accessible to all segments of the population of the region, regardless of age, income, education, place of residence or type of activity; made available to the financial sector at an appropriate level by all parties involved. Thus, financial inclusion of the region is a way of overcoming poverty, and inclusive growth is a way to the common welfare of the region's population.

In order to determine the level of financial inclusion of the Poltava region, we conducted an online survey using the form developed by Google. 247 respondents took part in the study. Respondents were asked to answer six questions that characterize their level of financial awareness. Among all respondents, 141 were identified as female and 106 were male.

When asked "Do you know what financial inclusion is?" we received the following data for only 15% of women and 7% of men gave a positive answer to this question.

When asked "Do you plan your own daily and / or regular expenses?", We received the following data - 50% of women and 47% of men gave a positive answer to this question. It is worth noting that residents of Poltava region plan their own daily expenses, which is already a very positive manifestation of the level of financial inclusion.

When asked "Do you use any electronic payment methods yourself?" We have received the following data that among all surveyed respondents only 43% of women and 35% of men of Poltava region use electronic means of payment.

To the question "Do you use any financial products in the region?", We received the following data, so 57% of women and 40% of men gave a positive answer.

When asked "Do you know what financial well-being is?", We received the following data on 53% of women and only 28% of men with an idea of financial well-being.

According to the results of the analysis, it can be noted that more than 40% of the respondents have a low level of financial inclusion. It is worth noting that almost 60% of respondents in the Poltava region came from rural areas.

As in most regions of Ukraine in the Poltava region, the main reasons for not actively developing the financial services market include the inability to use the service due to its physical inaccessibility for residents of certain territories.

The main reason economic: to build the infrastructure to provide traditional banking services is expensive. Therefore, banks focus on focusing on the most active and most solvent demand, estimating the return on their investment.

However, for the development of financial inclusion, banking institutions need to remember that a large proportion of the regions of Ukraine have a significant proportion of rural residents in the permanent adult population.

Our surveys, more than 38% of the adult rural population lives in the Poltava region, most of which are not involved in financial inclusion at all. However, this does not mean that residents of less populated or less economically active areas do not need access to financial services. It can be provided either directly by the financial institution or by remote access to financial services from a computer or mobile phone. Therefore, this provides a serious basis for the development of new financial technologies (FinTech).

Another reason for the low level of financial inclusion of the population of Poltava region is the lack of financial literacy of some groups of users of financial services. As a result, the consumer cannot make a rational and responsible decision regarding the placement and use of his own and borrowed funds:

a) because of the risks arising from the unconscious investing of own resources in a non-bank financial institution instead of the traditional bank deposit;

b) misunderstanding of risks in obtaining a foreign currency loan in the absence of income in the same currency.

Usually in rural areas the whole base of financial institutions is concentrated only by 2 national brands - JSC Ukrposhta and Coop Ukraine (before rebranding - Ukoopspilka). Recently UkrPoshta has also expanded its access to financial services, and Coop Ukraine is trying to make financial services available (payment for internet, mobile recharge, payment for goods using a card, receiving transfers, payment for utilities, etc.).

But there are also a number of problems for urban populations. Typically, the average consumer who wants to get financial services from a non-bank financial institution is at risk of financial pyramids. The overall financial literacy index of Ukraine, calculated according to the OECD methodology, is 11.6 (out of 21). This index is based on points for financial knowledge, attitude and behavior. Only 43% of the adult population in Ukraine correctly answered at least five of the seven knowledge test questions (considered the minimum target) and confirms the correctness of the data we received when polling Poltava respondents against 56% in all participating countries in the OECD poll. This poll showed the following:

1. Ukrainians are well aware of what inflation is and how to calculate discounts in stores.
2. The level of knowledge of simple percentages is lower than in other countries (55% in Ukraine against the average of 65% for other OECD countries).
3. A low level of understanding that the promise of a high income is likely to mean high risks makes Ukrainians vulnerable to fraudulent schemes and speculative investing.
4. Only 21% of respondents were able to correctly choose from the short list of proposed options the amount of state-guaranteed bank deposit compensation (UAH 200,000).

But, it should be noted that Ukrainians show great interest in financial literacy and its support. They want children to learn how to manage their money.

3 Conclusion

The research has shown that the need to involve more people in the formal financial system cannot be overestimated. Financial inclusion of the region increases social stability, material well-being, directs savings in investments, which, after all, positively affects the level of profitability of each person in the Poltava region.

References

[1] Yegoricheva S B 2018 Finansova inklyuziya v ramkah sistemi protidiyi legalizaciyi zlochinnih dohodiv ta finansuvannyu terorizmu [Financial inclusion within the framework of combating criminal proceeds and terrorist financing] Finansovij prostir - Financial space **4**(32) 80-7 (in Ukranian)

[2] Marushak A V, Latkovskij P P 2020 Finansova inklyuziya yak napryam rozvitku finansovogo sektoru Ukrayini [Financial inclusion as a direction of development of financial sector of Ukraine] Mizhnarodna naukovo-praktichna konferenciya «Die wichtigsten vektoren für die entwicklung der wissenschaft im jahr 2020», LUX **E-source:** https://ojs.ukrlogos.in.ua/index. php/logos/index (in Luxembourg)

Technological bases of creation of interactive electronic training courses

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Abstract

The article discusses the modern processes of managing interactive electronic training courses in the education system.

Keywords: interactive, electronic book, electronic market

Today it is necessary to reform the educational process in the education system, develop new teaching methods based on information technologies, and widely introduce them. At the same time, the introduction of interactive electronic training courses into the educational process is becoming one of the modern requirements.

It should be noted that when creating interactive electronic training courses intended for the educational process, it is necessary to take into account programmers and system tools. Below we list the features that should be available in educational computer programs:

For the user:

1. General provisions the organization of the educational process at different levels from acquaintance to full assimilation;
2. The ability to demonstrate training materials depending on the purpose of the training.

For the programmer:

1. General provisions bringing a certain sequence in the program;
2. Make a list of concepts that are difficult to understand;
3. Construction of a graphic model of the relationship between the concepts of mutual determination.

The problem of three directions arises when implementing the education system: - Technician: provide a computer and technical devices, process communication channels.

- Organizational: provision of highly qualified managers, teachers, specialists.
- Methodology: visual weapons, lecture text, multimedia, animation, provision of test data. There are a number of advantages and benefits of using in education, including: - Training time is optional, the student can study, study in his spare time.
- It is not necessary to conduct classes in the classroom.
- Teaches students to study independently.
- Requires highly trained teachers.
- Students can get practical and quality knowledge.
- The ability of students to independently think and make decisions is developing.
- Students develop skills in using technical devices, computers, the Internet, and email systems.
- Funds for education are cheaper. New conditions are emerging for acquiring knowledge of talented youth, especially from low-income families.
- Education has no boundaries, that is, students can study in other places, from the region, city.

There are specific elements of the educational process, such as an instructor (teacher), students, communications, training materials, devices.

At the same time: - An instructor, a teacher is a special specialist who teaches. He prepares an appropriate training course, advises students and students, answers their questions, and controls students' knowledge.

- Training material - an appropriate training course, study guide, Internet, electronic library.
- A student is a person who improves his knowledge through independent education, receives the necessary information, independently deals with it, addresses questions, performs assigned tasks, and checks his knowledge.
- Communication is a means of communication, a bridge connecting a student's appeal with an instructor. It can also act as a liaison between student.

To this end, it is cheaper to search for the necessary information from an e-book or copy it into text editing and collect information not only for such purposes, but also provide an opportunity to bring the data to the state of the book.

Currently, many companies have been set up selling interactive e-learning courses for distance learning. Their main goal is to organize an electronic market in a certain form and get the necessary profit in it.

When creating such tutorials, several programming languages are currently used. In particular, Macromedia uses programming languages, JSP and other programming technologies such as Flash, Microsoft FrontPage, Microsoft PowerPoint, HTML, JavaScript, CSS, PHP, etc.

Such programming languages make it possible to view documents of a certain volume via the Internet. With their help, you can organize various links to text, images, to a web page. Of course, the JavaScript program has more features than an HTML program when creating such programs. Using it, you can place active elements on a web page. When creating interactive e-learning courses, you can use only an HTML program.

Using this language, you can compose the basic part of interactive electronic training courses, text of questions, answer options, etc. The HTML programming language is one of the only languages that allow you to view documents on web pages.

When choosing a JavaScript programming language, its main features are as follows:

- the JavaScript program is very convenient for working with HTML documents;
- active and passive parts of the program are located in one document. JavaScript is a program that interprets

the loading of a particular program in a web browser. At the same time, the speed and loading of the configured program increases, and special programs are not needed to download it, other service tools will be placed in the browser itself.

- JavaScript software has the ability to work in all web browsers, such as Java software, but compared to JavaScript, JavaScript is easy and convenient.

Thus, the created information and teaching aids are widely used in the distance learning system, such as the traditional form of student learning. Developed training materials increase the level of independent work for full-time students and at the same time do not carry much work for the teacher. Currently, the creation of electronic teaching aids that meet certain requirements and the basics of creating the interactive electronic training courses listed above is important in the distance learning process.

References

[1] Taylakov N I 2004 Model and forms of distance learning courses Public education **2**
[2] Tailakov N I 2002 Prospects for the introduction of distance learning in the system of lifelong education of the republic International scientific and practical conference "The use of the Internet in the educational process." Tez. Dokl. Moscow - Tashkent
[3] Usmonov M 2008 Development of training courses in a multimedia environment Materials of the interzonal scientific-theoretical conference Zhizzakh

Role of information systems on tourism development in Uzbekistan

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Abstract

The article discusses some issues related to the development of pilgrim tourism in Uzbekistan. Information and communication technologies play a special role in the development of tourism.

Keywords: tourism, technology, travel services, advertising.

New tourist destinations are created in the country thanks to the accelerated development of pilgrimage tourism, a more complete and efficient use of tourism potential through innovative, information and communication technologies and the development of traditional cultural and historical tourism.

Issues related to the development of pilgrim tourism in Uzbekistan as a strategic sector of the national economy create favorable economic, legal and organizational conditions for the accelerated development of tourism.

National and regional programs for the development of domestic, inbound and outbound tourism are developed and coordinated for their certification, computerization, development of mobile applications, the formation of a database, the formation of unified national registries for tourist destinations and tourist sites.

In Uzbekistan, a lot of work is being done to further develop tourism in the country, increase the attractiveness of the country and increase the international rating using modern computer technologies.

When it comes to visiting tourism, it is wrong to think only about tourists from Muslim countries. Thousands of people traveling from Israel to Southeast Asia use the airports of Uzbekistan as a transit point. Japan, South Korea and China also show great interest in visiting many Buddhist monuments in the Surkhandarya region.

Uzbekistan has ample opportunities and conditions for the development of pilgrimage tourism. For example, in Malaysia you have to wait 35-42 years to complete the hajj. Uzbekistan can serve as a transit point for them. There are places of great pilgrimage in our country, such as Bukhara and Termez. Pilgrims from Malaysia and Indonesia can spend a week in Uzbekistan on their way to Mecca. This in turn increases and develops budget revenues. [1].

In the holy places of Uzbekistan, efforts are being made to attract tourists from Muslim countries, especially from Malaysia and Indonesia. In this regard, we can clearly see the work of the state committee of the Republic of Uzbekistan on the development of tourism.

Outbound tourism retraining guides, publication of a new edition of booklets. Creating travel applications on the Android platform, making banners, handouts, booklets, slides using modern communication technologies.

The development of the etiquette of visiting holy places.

Suggestions and comments on facilitating airport and visa services and developing relations with foreign partners and embassies [2].

On December 28, 2017, the President of the Republic of Uzbekistan issued a decree "On the appointment of additional working days and relocations during the celebration of official dates in 2018". According to the document, Uzbekistan will celebrate New Year, Navruz and Independence Day, as well as additional holidays in Eid al-Fitr and Eid al-Adha. In addition to the holidays, our compatriots will have the opportunity to spend time with their family and visit places to celebrate the holiday.

Tourism, regardless of the international or local level, is impossible to imagine without modern information technologies. Modern tourists cannot relax without modern information technologies.

"Audio Guide Khiva" developed by Uzbek programmers allows you to listen to the sights of the city in audio format and use a QR code (English Quick Response Code - code for immediate execution). The program, created in 2017, has a GPS system [3].

Travel business is a mobile business. Its representatives must constantly be in contact with customers, be able to remotely coordinate any situation, be able to answer any questions and comments as quickly as possible, be prepared for the latest moments and trips. Information technology abroad is an integral part of a number of major tourism and socio-cultural projects. Information systems play a special role in the development of long-term tourism development planning projects in the region [4].

Mobile technology plays a very important role in sales. Today, travelers can get the necessary barcode information from their mobile phone to pay for an air flight, check in and out. Information flow is a service that provides communication between manufacturers of tourism services. They act not only in the form of information flows, but also in the form of services and payments.

Tourism today is a source of information for business, which includes the largest airlines in the world, hotel chains and operators of tourist facilities. Personal computers and the Internet, their availability and reliability contribute to the penetration into all spheres of society, including tourism, of new information technologies [5].

Many years ago, online orders were a small stream, and now they have turned into a powerful stream, which accounts for a quarter of all revenue. An example is CheckMyTrip. Through this portal, local and foreign tourists will be able to get acquainted with the ancient cities and tourist destinations of Uzbekistan. The portal works in Russian, English, Malay, German, French, Spanish, Chinese and Korean.

At the same time, in order to further enrich the portal,

various materials are collected from various regions of Uzbekistan in the direction of tourism. It is also worth noting that the portal, along with reading interesting materials, provides an opportunity to learn about attractions, entertainment venues, museums and historical monuments.

Today, more than 730 enterprises providing tourism services in Uzbekistan have their own pages on the Internet, but not all of them have real economic success. If we talk about travel portals, the most popular area in the online travel business today is advertising travel services, which will give the client as much information as possible to make a decision. In the future, ways to influence the client may be further improved [6].

Currently, the competitiveness in the tourism segment is directly related to the creation of the site. The company's website performs a number of important functions. This is one of the main advertising channels of a travel company, the most effective mechanism for promoting a travel product or service. Company sites provide basic information that is easy to read. Creating blogs on sites based on the memories and desires of consumers [7].

Many travel companies offer on their sites the opportunity to relax, for example, Greece is not only a resort and beach country, but also a country that provides ski and medical relaxation. The combination of textual information with the media is a specific representative of the tourist space and a specific consumer of tourist services. The company's website is a means of information and communication with the target audience.

In conclusion, we note that due to a lack of experience, travel companies do not take into account the requirements of some consumers. Information on many sites is only 32% of the total number of tourists interested. It can be concluded that many users do not find enough information for search and travel companies, and the companies themselves lose potential customers. To do this, it is worth increasing the number of mobile applications that promote the tourism of visits to Android and IOS systems.

References

[1] https: //www.xabar.uz/uz/community/ tourism development in our country
[2] https://sputniknews-uz.com/tourism /20171103/6737153.html
[3] https://ictnews.uz/04/06/2018/ict-tourismkhiva/
[4] https: //soglom.uz/nigoh/internal tourism- and travel- and pilgrimage
[5] Gritsenko Y Status and prospects of using the Internet in the tourism business of Russia/ Yuriy Gritsenko, Advertising Director of the 100 Roads server [Electronic resource]
[6] Shakhovalov N N Internet technologies in tourism [Electronic resource].
[7] Gulyaev V G 1999 New information technologies in tourism M.: "Publishing House PRIOR" 144 p. 10

Development of family entrepreneurship as a factor of increasing population employment

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Abstract

This article focuses on the influence of innovative factors on the development of family entrepreneurship, as well as employment.

Keywords: innovation, entrepreneurship, leasing, products, innovation

The development of entrepreneurship in Uzbekistan is considered as the main driving force for reform in the socio-economic transformations of the country. Aware of this, support for entrepreneurship will remain the government's cross-cutting priority in economic reform and structural transformation.Over the past two years, a lot of work has been done in Uzbekistan to improve the business environment, increase business activity, improve the mechanisms for protecting the interests of entrepreneurs, permit procedures have been radically abolished, the types of licensed activities, forms of statistical and tax reporting have been reduced, the organization of inspections has been revised, which contributed to the achievement of positive results in assessments of international organizations, such as Uzbekistan's ranking on the quality of the business climate in the World of Bank (Doing Business).

Despite the results achieved, a number of problematic issues remain in stimulating the development of domestic entrepreneurship. Firstly, the modern requirements of the world market, globalization processes and the competitive environment require increasing competitiveness in both small business and private entrepreneurship by introducing innovations for the production of new products [2].

However, the level of production of innovative products by domestic entrepreneurs remains at a low level, which indicates the slow pace of their quality development. According to the results of the study, only 6% of entrepreneurs began to produce completely new products, 25% - significantly updated, and 69% did not launch production of new or updated products. A more negative trend is the lack of interest of entrepreneurs in the development of its production.

This situation is due to the monopolization of the economy and the low efficiency of state support in the form of benefits and various preferences. The majority of entrepreneurs (33.3%) indicated a lack of access for small businesses to order large enterprises, a lack of own funds and difficulties in obtaining loans to implement new ideas, as well as a fear of risk.

Given the above, as well as the fact that large enterprises carry out technological updates and new products, companies with a foreign share of ownership need to seriously work out the issue of stimulating the development of small enterprises and entrepreneurs by developing industrial cooperation with large enterprises in the processing industries, which will create the basis for accelerate industrialization in industrially lagging territories and accelerate the reproduction of new jobs.

There are big problems in providing information support for family business: a lack of available scientific and technical literature, lack of communication with scientists and specialists of the necessary profile, and weak opportunities for using Internet services.

In order to strengthen state support for family business, the author proposed a number of recommendations in the report:

- development of priority areas for the development of family business, broken down in cities and rural areas;
- the creation of specialized targeted programs in the banking sector for lending to a family business;
- provision of property support for family business entities through financial leasing (updating machinery and equipment of family business enterprises);
- promoting the innovative focus of family business in order to produce and process new and competitive products - comprehensive assistance of the state to expand the investment potential of remittances of labor migrants;
- promoting the development of electronic commerce, improving market information support in order to expand the export of products of family enterprises and increasing the number of international consumers of domestic goods;
- introducing into practice the statistical accounting of the activities of family enterprises according to the range of indicators adopted in the statistical reports on small business;
- strengthening the legal status and order of activities of family business in traditionally craft activities;
- the creation of specialized services for research in the field of family business, the promotion of modern technologies and innovations in family business;
- expanding the network of marketing and consulting firms capable of providing real assistance to family entrepreneurship in all regions;
- development of a network of an automated system for processing and transmitting information in the state language to ensure access for entrepreneurs to the information they need about technologies and methods of manufacturing products of the corresponding profile;
- improving the efficiency of business centers, business incubators in the regions, attracting educational institutions of an economic profile to conduct courses on organizing a family business, and trainings with the participation of the most successful family entrepreneurs. Organization of

internships in order to exchange experience of family business representatives.

Uzbekistan took 11th place among the countries of the world in terms of the "Registration of Enterprises" due to a radical improvement in the procedure for state registration and registration of business entities, ahead of such developed countries as the USA, Japan, France, Germany, Italy, Spain, Denmark and others. On April 1, 2017, an innovative online system for registering business entities began to operate in our country, which took only 30 minutes against the previous two business days.

The issues of simplifying tax administration and reducing the tax burden on business entities are in the center of constant attention of the leadership of our country. Thus, in the Decree of the President of the Republic of Uzbekistan "On measures to radically improve tax administration, increase the collection of taxes and other obligatory payments" in 2017, the widespread introduction of modern information and communication technologies in the tax administration process, a complete transition to contactless electronic services for taxpayers, primarily business entities [1].

Uzbekistan entered the first hundred countries in such areas as

№	Name of types of direction	Place
1	Company registration	11
2	Power Connections	27
3	Enforcing Contracts	39
4	Lending	55
5	Protecting minority investors	62
6	Property Registration	73
7	Taxation	

Doing Business 2018: Reforming to Create Jobs is the 15th annual edition of the World Bank Group, which evaluates business regulations. New Zealand is leading the world in terms of ease of business environment. The top five also included Singapore, Denmark, the Republic of Korea and Hong Kong (China).

Our country is among the top ten reformer countries in creating the most favorable conditions for the introduction of business. At the same time, the ongoing reforms allowed Uzbekistan to become a leader among the countries of Europe and Central Asia in improving the business environment and simplifying the conditions for introducing a business.

The development and implementation of the proposed measures can become the basis for the development of a new concept for the development of entrepreneurship, taking into account the characteristics of the regions of the republic for the long term [2].

References

[1] Decree of February 7, 2017 by the President of the Republic of Uzbekistan Sh.M. Mirziyoyev under number PF -4947 "Development Strategy of the Republic of Uzbekistan for 2017-2021"

[2] Honkeldiev G Sh 2017 Innovative economy and innovative development path Science Magazine Ferghana State University **4**(42)

Formation of effective marketing activity of OAO "Zolotonosha oil-processing plant" in conditions of market competition

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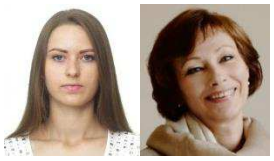

Abstract

The article deals with the peculiarities of formation of effective marketing activity of OAO "Zolotonosha oil-processing plant" under conditions of market competition.

Keywords: marketing, marketing activity, marketing complex, research, analysis, market

1 Introduction

The dairy industry occupies an important place in the economy of any State because it provides the population with essential foodstuffs.

Marketing plays an important role in the activities of any enterprise. In the context of increasing competition in domestic markets for goods and services, economic agents are aware of the need for active marketing activities. It is therefore relevant to improve the efficiency both of each individual marketing activity and of the marketing activity of the enterprise as a whole.

2 Main part

A marketing complex is a set of marketing tools and methods used by an enterprise to achieve its market objectives. This set is often referred to as 4P ("four P") - by the first letters of English words: product, price, place, promotion. Thus, the ability to correctly combine the elements of marketing is the key to the success of a firm in solving marketing problems.

TM "Zlatokray" can get a wide range of goods to cover the needs of consumers. In terms of latitude and saturation we see that the enterprise has a sufficient list of goods. The sustainability measure indicates that the vast majority of business products are in steady demand among consumers, but there are also products that are not in demand.

Price policies are essential elements of an enterprise. It is the level of the prices of goods that determines the commercial performance of an enterprise, and the price policy chosen by the enterprise has a long and decisive influence on its performance in the market.

The cost of raw materials for each commodity group is different, as each group has a certain basic composition.

The production costs of an enterprise are formed from the following expenses:

- Heating, lighting, water costs
- Maintenance costs of office premises
- Cost of maintenance of production process
- Administrative costs

Comparing the prices of TM "Zlatokray" and its main competitors, it can be concluded that the prices for the products of our TM are lower. There is a big difference between the prices only in the group of cheeses, where the difference can reach the mark of 13 hrn, but in the other groups the deviation is small. Prices higher than those of competitors are found in the group of hard and melted cheeses. Thus, the prices of TM "Zlatokray" are mainly lower, which allows to keep competitive position, combining affordable price and high quality.

At the enterprise "Zolotonosha oil-processing plant" the main tasks and duties on realization of marketing policy are assigned to the sales department, which, by the nature of its activities, should ensure the realization of the strategic and tactical tasks envisaged.

An important element in each enterprise is the skilful and rational distribution of the responsibilities of the participants at each level. The channels of distribution at OAO "Zolotonosha oil-processing plant" and the number of products is sold at different levels (Figure 1).

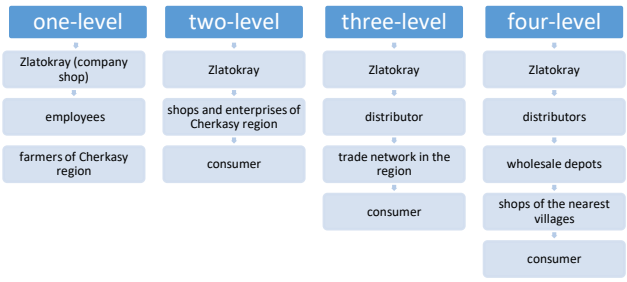

Figure 1 Product distribution channels

Products of this enterprise are sold in all cities and regions of Ukraine. For efficient marketing of produced products, the enterprise cooperates with various distributors who deliver the goods to the right places.

"Zlatokray" exports its products abroad, which is another

distribution channel. 80% of imports and 15% of basic products are sold through this channel. The main importer of TM "Zlatokray" products is the Russian Federation.

TM "Zlatocay" has its own corporate style, which distinguishes it among other competitor products. The packaging of all "Zlatokray" products differs, but at the same time has a common concept. It emphasizes the naturalness of the products and raw materials it is made of, associating it with the village.

Marketing of advertising: advertisements; radio advertising; window decoration; staff uniform.

Image is very important for every enterprise, therefore Zlatokray takes a responsible attitude to the quality of its production and sets the average level of prices in order to be elected among competitors.

3 Conclusions

The main means of influence of the enterprise on the market is the complex of marketing. It includes product, price, distribution methods and product promotion.

Marketing complex is one of the main concepts of modern marketing system.

The complex of marketing includes everything a firm can do to influence the demand of its product. Multiple opportunities can be grouped into four main groups: product, price, methods of distribution and incentives.

References

[1] Aksyonova K A 2005 Advertising and promotional activities Moskow 248 p
[2] Bagiev G L 2012 Foundation of enterprise marketing L 315 p
[3] Bliznyuk S V 2008 Marketing in Ukraine: problems of formation and development 2-nd pbl. M. «Politekhnika» 400 p

Personal management's complex-economic research in modern business

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Keywords: personal, continuous process, organizations, business

In the conditions of a market economy, developing business is crucially important. Therefore, an economic development of every country depends on the efficiency of doing business properly. The efficient, purposeful management of the staff depends mainly on the efficiency of the enterprises and, so, the improvement of the welfare of the population, the overall growth of the country's economy.

One of the reasons why businesses can be doing inefficiently is the low level of staff training, that is why they are unable to cope and solve the tasks and problems they face at a high professional level. To solve these problems, an effective human resource management system has to be built. Changing the pace of external conditions for the operation of entrepreneurial organizations is essentially beyond the pace of transformation of consciousness and the level of professionalism and competence of the leaders of the vast majority of enterprises. These shortcomings can be solved by upgrading the management system in enterprises, as well as introducing innovative management of management, which takes into account the historical experience of management development, both professionally and technologically, and the level of developed market economies.

Personal management is a continuous process that involves making a decision in order to change the motivation of the staff, because of getting the maximum result in the development of the enterprise. In the modern conditions, the main goal of the relationship with the staff is to form a person who is characterized by high responsibility, stable mental state and high qualifications, who is directed to the effective work of the organization. The study of behavioral, motivational, and other factors that shape the work of personal in an enterprise, deepen knowledge of management methods, and form the main basis for development is a prerequisite for managing efficiency.

The research objectives and tasks are to study the characteristics of personal management in organizations and to create technology, mechanisms and procedures for the effective implementation of personal management functions.

Features of the formation of communication policy in the food industry

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Abstract

The article considers the features of a marketing communication policy development at modern enterprises of the food industry and ways to improve it.

Keywords: marketing, communications, politics, food industry, enterprises, strategy

1 Introduction

Marketing communications today play an important role as a powerful tool for transferring information from the manufacturer to target markets, and are also an important means of competition. Marketing communications have a particularly big impact on the market activity of food industry enterprises, oriented towards satisfying the ever-changing consumer demand for food. It is important to note that in the food market there is a fairly high level of competition compared to other industries. Therefore, the effective use of marketing communications is the basis for the formation of a sustainable positive image of enterprises in the industry. The task of improving communication policy is very important, since recently the creation of new brands and trademarks has become characteristic in the activity of food enterprises. Consequently, domestic enterprises need to improve their activities in the field of marketing communications in order to maintain their competitive position in the market.

2 Main part

The food industry of Ukraine is thousands of large, medium and small enterprises of various ownership forms, the production volumes of which make up almost 20% of the total industrial output [1]. In 2018, this industry ranked first in terms of sales among all industries [2].

As of 2019, the Ukrainian food industry brings together 22 different sectors specializing in the production of flour, cereals, sugar, alcohol products, tobacco, confectionery, bakery goods, pasta, canned fish and vegetables, and other types of food products [3]. The industry is also closely linked to agriculture, which is the main supplier of raw materials. Recently, the food market has become increasingly competitive and dynamic in development. Aggressive advertising of competitors has a huge impact on the buyer. There was a need to search and use new approaches towards the consumer and modern methods of promoting food products on the market. Therefore, the communication policy plays an important role in ensuring effective market activity for food industry enterprises, and should help strengthen the market position of enterprises through high-quality and effective communications with consumers.

It should be noted that the communication policy in the food industry has its own characteristics, which are largely determined by the specificity of consumer demand and factors influencing its formation (price, population income level, existing consumer preferences, social habits, family traditions, consumption culture, and depth of products assortment, limited storage life and consumption of products, etc.).

For enterprises of this industry, an important tool for success is a product quality indicator, not only as a factor of their competitiveness, but also a factor affecting the safety and health of consumers.

But in marketing communications, in addition to the quality, the important aspects are successful sales and promotion of products on the market, therefore, enterprises need the whole marketing mix to work, and not just its individual components.

The complex of marketing communications should include: advertising, public relations, sales promotion, personal sales, direct marketing [2]. The effectiveness of these tools directly depends on the type of market. It is no secret that many firms monitor suppliers before making a large purchase of durable goods. Therefore, it is important to pay attention to branding, PR and personal sales, and only then to advertising and sales promotion.

The main problem of the Ukrainian food market growth is the lack of quality advertising and serious product promotion.

Often, food companies choose advertising as their primary means of marketing communications. This is due to the fact that such enterprises have a sufficient number of potential buyers and especially consumers of their products, to whom it is easiest of all to convey information through advertising. Advertising, as a way of disseminating

information, allows the use of a wide range of means of communication: from national television to local newspapers.

The main distribution channels for advertising in the food industry in Ukraine are: leaflets; negotiations with customers; manufacturers inspection; contracts with suppliers; information in non-specialized newspapers; contacts with sales representatives of other manufacturing companies; advertising in transport.

It should be noted that Ukrainian food industry enterprises are rather slowly developing marketing communications, since they do not have a clear system for planning and monitoring communication policy. Therefore, one of the main tasks of each enterprise is to balance all means of communication policy in order to achieve the best result at the lowest cost.

It is necessary to take into account that the important elements forming the marketing communications system of an enterprise should be:

- the general strategy of the enterprise in the market;
- marketing communications strategy;
- communication policy of the enterprise;
- measures to implement the marketing communications system.

Regarding the last element, it should be noted that it happens with the help of the formation of a complex of marketing communications at the enterprise.

In order to increase the efficiency of the food industry development in Ukraine, it is necessary:

- to take measures to expand sales markets for domestic products;
- to provide food industry enterprises with highly qualified specialists, in particular, in the field of marketing and marketing communications;
- to comply with international quality standards;
- to improve technical equipment for raw materials at enterprises, which leads to the cost decrease of raw materials and, accordingly, to the decrease of products price;
- to analyze foreign food markets and taking measures to improve the competitiveness of domestic goods.

3 Conclusions

Food industry enterprises can use various combinations of marketing communications depending on the enterprise activity and its financial capabilities. The main criterion for the selection of elements, tools and methods of marketing communications is the analysis of consumer behavior, that is, the ratio of the potential or real consumer to the products of the selected enterprise. That is why, it is reasonable for Ukrainian food industry enterprises to increase their sales by improving a complex of marketing communications.

References

[1] Hack D 1960 Food industry of Ukraine K
[2] Goodz R B 2011 Improving the communication policy of an industrial enterprise RB Goodz, M.I. Stall **E-source:** http://www.kpi.kharkov.ua/archive/Naukova_periodika/vestnik/Tehnichny%20progress%20 and% 20efficiency% 20virobnitsva / 2011/26 / Gydz.pdf.
[3] State Statistics Service of Ukraine **E-source:** http://www.ukrstat.gov.ua/

Improvement of the system of motivation and stimulation of personnel in tourism enterprises

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Abstract

The article discusses the system of stimulation and motivation of personnel in tourism enterprises. Namely, tangible and intangible stimulation, organizational, moral, stimulation of free time are revised. Lack of motivation has been identified as on one of the difficulties in that sphere. Recommendations are offered to improve the motivation system at tourism industry enterprises – unusual types of rewards.

Keywords: Stimulation of personnel, motivation systems, tourism enterprises, labour resources

1 Introduction

The object of the research is the entrepreneurial activity of tourism enterprises. The subject of the research is the system of stimulation and motivation of personnel in tourism enterprises. The aim of the research is to identify motivation regulators and to suggest methods of their application in the area of tourism entrepreneurship. During the research both theoretical and empirical methods of analysis were used.

It is impossible to properly stimulate workers without taking into account their labour motivations. The purpose of motivation is to activate the workers, to encourage them to work effectively to achieve the goals [3].

Modern theories of motivation, based on the results of psychological research, prove that the true reasons for a person to give all forces to work are extremely complex and diverse. According to some scholars, a person's action is determined by his needs (Abraham Maslow 's theory of the hierarchy of needs). Other positions assume that human behavior is also a function of human perception and expectations. The level of motivation of employees of tourist organizations is desirable for their quality and organized work, both with clients and within the enterprise, because their work directly affects the efficiency of the organization.

2 Motivation regulators

Table M. Woodcock and D. Francis (Table 1.), helps to use motivation ideas more deeply to stimulate effective work behavior. This table shows why the "main motivators" will not have the desired effect unless decided with the "motivation regulators," i.e., by not meeting the needs of the lower levels, there is usually nothing to think about inclusion in the active state of the higher ones [1].

TABLE 1 Motivation regulators

1.Working environment	2. Remuneration	3. Feeling of safety
Convenient workplace Dining room Purity Good physical. working conditions	Good salary, fair remuneration by results of work The social benefits (housing, medical care, the paid food, etc.)	Feeling of the accessory, necessity for firm to the company. Good relations in collective
Main motivators		
4. Personal growth	5. Feeling of participation	6. Interest and challenge
Opportunities for training Possibility of career Growth of responsibility and influence Possibility of creativity, self-expression	Feeling of usefulness of the work Knowledge of affairs, plans, prospects of the Interest and accounting of workers by the management of personal opinions Joint decision-making	Interesting work The becoming complicated work demanding growth of skill The increasing responsibility Competitive effect Statement of the difficult interesting labor purposes

Labor stimulation is part of the motivational process at tourist enterprises. The material incentive of employees is realized through: the system of remuneration, vouchers for food and transportation, life and medical insurance, excursion trips, system of bonuses (one-time payments) discounts for services provided by the organization, programs related to training of personnel. Intangible stimulation is based on human moral values. It is divided into moral stimulation, free-time stimulation and institutional stimulation. Moral stimulation is the stimulation of labor, which regulates the behavior of an employee through public recognition. It includes: presentation of awards, diplomas, public incentives, placement of photos on the board of honor. Free-time incentives are incentives that are to regulate an employee's behavior when his or her employment changes. It includes: the right to choose the time of vacation, additional holidays

and increase of vacation for active and creative work, part-time with high productivity. Such types of incentives are distinguished by free time: general (for all), reference (for employees who have achieved certain results), competitive (for the best workers). Organizational stimulation is the stimulation of work, based on a sense of satisfaction with work in the organization. It implies the presence of creative elements in work, opportunity in promotion, creative travel. The incentive of personnel at tourist enterprises is aimed primarily at improving the quality of customer service, career development of employees, as well as the purpose of the organization use such incentives as: cash bonuses, valuable gifts, free trips, courses on advanced training, etc. [5].

Mainly tourism firms are limited to the following motivational and stimulating activities: training of employees through the use of study, promotional tours. Employees engaged in ticket sales are sent on study tours two or three times a year; awarding; the possibility to purchase tour products with a significant discount, and usually this rule applies not only to the employee himself, but also to his whole family and relatives; public recognition of the employee's merits is intended to stimulate the work not only of this subject, but also of the whole team of the travel company.

Among the difficulties of organizations of the tourist sphere, in case of insufficient motivation of employees can be considered: turnover of staff; insufficient conditions for self-realization of employees (unfavorable microclimate and moral and psychological atmosphere in the collective, conflict, poorly interested personnel); low discipline (late work, frequent skewing, etc.) [4]

In connection with the above, recommendations are proposed to improve the motivation system in tourist industry enterprises (atypical types of remuneration): additional rest time (at high season, when many tourists arrive, the staff cannot physically work without an additional break); subscription to expensive magazines, payment of membership in clubs or associations (at the employee 's choice); gifts to employees based on their interests; undertake activities aimed at improving the social and psychological climate in the collective (incentives); payment of tickets to visit sports halls, swimming pool; prganization of delivery of hot lunches to the office; material support of the enterprise in difficult and joyful moments of the employee 's life.

3 Conclusions

Studies have found that the satisfaction of employees with the material conditions of work (wages, allowances, etc.) does not always lead to an increase in productivity, that is, wages are one of the last places on the list of priority needs of employees. Therefore, the heads of enterprises attach great importance to the motivation of work. Thus, the manager must understand the motives of the labor behavior and the nature of the motivation, what can influence the efficiency of the staff. Motivation is linked to the incentive process, which can be seen as an effective impact on staff.

References

[1] Samygin S I, Stoyarenko L D 1997 Personnel Management Rostov n/A: Phoenix p 164
[2] Wissema H 2011 Management in the departments of firms M.: Infra-M p 532
[3] Utkin E A 1998 Course of management M.: Zertsalo p 11
[4] Mikhnenko P A 2014 Management Theory Moscow: Sinnergia p 369
[5] Odegov Yu G 2014 Human Resources Management /Yu.G. Odegov, G.G. Rudenko M.: Jurayt p 532

The processes of population migration

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Abstract

The trends of international labor migration are investigated. The reasons for the emergence and existence of international labor migration have been analyzed and systematized. At the international and national levels, contemporary migration processes and their impact on the social and economic development of the country are explored. The positive and negative effects of migration are outlined.

Keywords: migration, migration processes, labour migration

1 Introduction

Over the years, at different historical stages, in Ukraine, the vectors of migration flows and the motives that shape them have changed. With regard to migration, the interpretation of this term can be found in many sources, namely migration as the displacement of a large group of people associated with a change of permanent residence, voluntary or involuntary decision, and the ability of migrants to return home. Migration in Ukraine is cyclical. It cannot be said that these people leave Ukraine forever. They go to work, they come back, after some time they go again.

2 Overview

International labor migration is one of the most difficult elements in international economic relations, because, unlike the movement of goods and capital, this process involves living beings. Labor migration is the relocation of working-age population from one state to another for more than a year, caused by economic and other reasons [1].

Emphasis is placed on labor migration, since its causes and consequences directly affect the level of security of socio-economic development of the country. The reason for the phenomenon of labor migration is the reason for the migration of migrants from one territory to another, so the massive displacement of labor migrants is a direct threat to the stable development of society.

Changes in the migration policy of the nearest neighbors will have a very rapid impact on migration processes in Ukraine, so a thorough study of their experience is urgently needed. But the experience of migration management cannot simply be taken from one context and transferred to another. Its successful adaptation requires a careful selection of elements that meet the specific historical and socio-economic conditions of each country.

3 Decision

The main figures about the emigration of Ukrainians over the past 20 years are presented at https://nv.ua/ukraine/events/emigraciya-ukraincev-interesnye-fakty-i-cifry-statistika-oon-novosti-ukrainy-50067302.html.

- The total number of Ukrainians living outside their home country. In 1990: 6.892 million - In 2019: 4.964 million;
- Percentage of migrants from the total population of Ukraine. In 1990: 13.4% - In 2020: 11.3%;
- The number of Ukrainian refugees in the countries of the world. In 1995: 5.2 thousand - In 2020: 9.4 thousand;
- The proportion of refugees from the total number of migrants from Ukraine. In 1995: 0.1% - In 2020: 0.2%;
- The number of women among Ukrainian migrants. In 1990: 57.2% - In 2020: 57%;
- The average age of Ukrainians living outside the country. In 1990: 43.2 years - In 2020: 49.1 years;
- The share of Ukrainian migrants in the age group 0−19 years. In 1990: 13.9% - In 2020: 6.3%;
- The share of Ukrainian migrants in the age group of 20−64 years. In 1990: 69.4% - In 2020: 73.2%;
- The share of Ukrainian migrants in the age group of 65+ years. In 1990: 16.6% - In 2020: 20.5%.

Yes, migration processes have been significantly influenced by the war-related situation in Ukraine. This factor led to the desire of a significant number of Ukrainian citizens to leave their country and go abroad, as well as not to participate in life-threatening hostilities. The worsening economic situation has led to increased poverty, unemployment and increased labor migration. Security and development have shown a close connection and interdependence both in the country and in relation to potential migrants to Ukraine. During the years of armed conflict, twice as many foreigners arrived in Ukraine than before the war. The tendency towards unattractiveness of Ukraine for external voluntary migration is increasing, while the number of refugees from the countries whose citizens seek asylum is increasing. Migrant surveys and surveys show that there is an increase in the share of women in the overall migration flow, there is a different geographical direction of

female migration (Italy, Portugal, Poland) as opposed to male (Russia, Belarus, Poland, Czech Republic), female migrants have a higher average age compared to men (37.9 years versus 36.2 years), and they are also more educated (most have higher education) [2]. There are also differences in the distribution of work between men and women: 45% of men work in construction (3% of women), 17% - in industrial production (only 9% of women) and 9% - in the transport industry (1% of women). On the other hand, 33% of women provide home-based services (1% of men) and 21% - in the hospitality industry (5% of men). Younger women work more in the hospitality industry (47%) and older women work in households (53%) [3].

But the biggest harm to the country is the migration of young people. Countries such as Poland, the Czech Republic, Slovakia and others are actively inviting students to study at their universities, creating favorable conditions (free training, language centers, assistance in document processing, etc.). According to UNESCO, in the period from 2000 to 2012 alone, the number of Ukrainian students abroad has quadrupled and amounted to 37 thousand people. It has grown especially rapidly in countries where traditional labor migration flows are directed. A. Slobodyan and E. Studniy emphasize that "over 46,000 Ukrainian citizens studied abroad abroad in 2013-2014. Among the most desirable countries for learning were Poland, Germany, Russia, Canada, Czech Republic, Italy, USA, Spain, France, Australia, UK "[4].

4 Conclusion

The unfavorable demographic and economic situation in Ukraine will not contribute to the reduction of emigration, but on the contrary will only increase immigration. The situation in the world, in particular in industrialized countries, is as follows: as a result of the declining birth rate and the aging of the population, imbalances in the labor market are created and they feel the need to attract foreign labor. This helps to increase the number of migrant workers from Ukraine.

Therefore, the most important goal of state regulation of internal migration in Ukraine should be to ensure a balanced development, elimination of regional economic asymmetry. This means that the standard of living and living conditions in individual regions should not differ sharply from each other, in order to prevent the process of sharp overflow and concentration of population from one region to another, and not create a dangerous level of social tension in the most favorable regions. The rational allocation of the population at the expense of its internal redistribution smoothes regional contradictions, eliminates internal socio-economic tensions.

References

[1] Humeniuk Yu P 2013 International labor migration: methodological and organizational aspects: monograph / Yu. P. Humeniuk / Ternopil: TNEU 619 p
[2] Migration as a factor in Ukraine's development: A study of the financial income associated with migration and their impact on development in Ukraine **E-source:** http://iom.org.ua/sites/default/files/
[3] Shimanska K V 2017 Gender structure of Ukrainian emigration: current tendencies, transformations and socio-economic consequences Scientific Bulletin of Uzhgorod National University. Series: International Economic Relations and the World Economy **1** 184–8
[4] Slobodyan O Ukrainian students abroad: how much and why? / O. Slobodyan, E. Studny // CEDOS **E-source:** http://cedos.org.ua/en/osvita/english-studenty-za-kordonom-skilky-ta-chomu/

Features of business processes of tourism enterprises

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Abstract

The basic problems concerning the management of business processes of tourist enterprises are investigated. The problem of creating a set of business processes that take place within the organization, and the efficiency of their construction, which further development of the enterprise depends. The combination of the concepts of "business" and "process" to formulate the concept of business process, as well as what elements it consists of.

Keywords: business process, tourist enterprise, tourist services market, tourism

1 Introduction

The functioning of any enterprise, including the tourist, can be represented as a set of business processes that take place within the organization, and on the efficiency of building which depends on the further development of the enterprise.

2 Overview

Aggressiveness of the business environment of tourism enterprises requires continuous improvement of the management process, and therefore there is a need to find innovative and progressive management paradigms that will ensure the enterprise competitiveness in the process of functioning in the target market. The basic prerequisites for efficient activity of tourism enterprises are harmonized and rational management of business processes, which is able to adapt quickly and timely to changing market conditions.

Consistency between the priorities of the tourism enterprise and the goals of the overall set of business processes is a prerequisite for effective and prospective development of the enterprise. The process of managing a tourism enterprise should be based on the adoption of sound and meaningful management decisions, which will allow to rationalize and review the relevance of management techniques actively used by the enterprise.

The combination of business and process has led to the emergence of the term business process. However, a more detailed translation does mean a process of activity (business, commercial) that causes this issue to be debated.

The efficiency of managing the business processes of a tourism enterprise depends on their rational organization and ensuring the optimal level of productivity. Orientation of the enterprise to maintain a high level of implementation of business processes allows to increase competitiveness and to secure competitive positions in the market of tourist services.

The business process consists of aggregate-related elements (Figure 1).

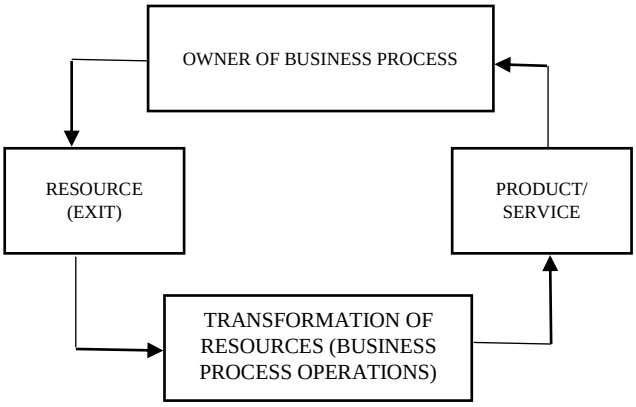

Figure 1 Elements of business process

The business process owner is usually a senior manager. Its main tasks are to formulate the goals of the process and to align them with the strategic goals of the enterprise. In order to fully ensure the initial results and achieve the goals, the owner has an extremely high responsibility, which involves monitoring, controlling and adjusting the efficiency of the business processes and efficiency.

The main purpose of the tourist enterprise as a tour operator and travel agent is to meet the needs of consumers in the services of tourist, recreational, sightseeing (cognitive) nature, so, in our opinion, the business process of a tourist enterprise is an interdependent set of specific operations (works) that transform inputs to the tourist offer to meet the tourist demand.

3 Decision

Due to the political and economic changes that are taking place in Ukraine, our country's business and cultural ties with the world have expanded significantly. This helps to increase contacts between enterprises, increase the number of foreign and domestic tourists arriving in certain regions of Ukraine. There is a need to accommodate guests in comfortable hotels

with the appropriate level of service. Despite the fact that the services sector is growing in our country, the development and functioning of the tourist business is complicated by a number of problems. One of the reasons for this contradiction is the lack of reliable and reliable information on the state of the tourist business market and the lack of proper service. As a result, competition in the tourist business market is diminished, which further aggravates the status of tourist organizations and delays Ukraine's entry into the world tourist market. The development of tourism in Ukraine is characterized by the adaptation of the reformed enterprises in this sphere to the market environment, the complex solution of urgent problems of improving the efficiency and competitiveness of the tourist services market, which began to gradually approach the world standards. In the conditions of market economy development, further development of tourism business requires increasing the competitiveness of tourism enterprises in the domestic and world tourism market. However, it is impossible to develop proposals that are unique to all tourism businesses that would ensure guaranteed success. Recommendations for improving and developing the tourism business are most appropriate for each specific market (international, domestic, regional, local).

4 Conclusion

Modern events in the country and in the world will weaken the world economy and create problems for the development of tour operators and travel agencies. Ukraine's economy is suffering heavy losses, the crisis and certain tour operators and tour agents will not survive, and will leave the market. At the present time, it is only up to the tourism entrepreneurs to keep track of the developments, as they have no influence on the situation, and now they understand the fact that they will not be able to influence potential tourists and make them travel after the pandemic. Even if the quarantine is completed in a month, the tourism industry will start working before June.

References

[1] Nicolau J, Santa-Maria M 2013 The effect of innovation on hotel market value International Journal of Hospitality Management **32** 71-9 http://dx.doi.org/10.1016/j. ijhm.2012.04.005

Problem aspects of the tourist activity in the Poltava region

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Abstract

Tourism in Ukraine is a key sector of the economy whose development should ensure openness of the domestic economy, strengthening of democracy and the course of European integration of the country. The strategic goal of tourism development in Ukraine is to create a competitive domestic and international tourism product in the domestic and world markets, expand domestic and increase inbound tourism. The article analyzes the main indicators of tourism in Ukraine and Poltava region and identified promising areas of improvement of organizational and legal aspects of tourism policy in Poltava region.

Keywords: tourism, tourism policy, inbound tourism, outbound tourism, legal regulation

1 Introduction

The vector of development of our country is clearly aimed at integration into the world economy. The tourism sector is increasingly beginning to play a prominent role in the socio-economic development of Ukraine, while still remaining in the lowest position in the ranking of the world tourism market. The reasons for this situation are the imperfection of the legal framework, which should ensure the implementation by the state of its tourism policy, the complex and ambiguous tax policy and the lack of infrastructure that is necessary to meet the needs of the population of this kind.

In the current conditions of active aggravation of competition, globalization and regionalization of economic ties, the tourism industry already has little to have serious tourism potential for successful activity with high financial performance. Nowadays requires providers of tourist services of high competitiveness, regardless of external and internal operating conditions of the subject. The development of the tourism industry will facilitate the flow of foreign currency into the country, assist in the development of less developed regions and regions, and allow the use of natural resources that had not been used by other sectors of the economy before.

2 Overview

Tourism is one of the most promising areas of socio-economic development of our country as a whole and at the level of cities and regions. Because tourism industry constitutes 11% of gross domestic product in the world. Ukraine has extraordinary potential in terms of resort resources: natural thermal waters, hydro-resources, therapeutic muds, coniferous mixed forests and seashores, but at the present stage, the UNWTO World Tourism Organization estimates Ukraine's share in tourist flows in Europe at 4% and around 1% - in pan-European revenues from tourism activities [1].

During 2018-2019, positive changes began to take place in Ukraine, which were reflected and improved tourist activity. According to this, in 2018-19, our country had the fastest growth rate in the sub-region, rising by 10 places and ranking 78th in the world. In particular, Ukraine, as the country stabilizes and rebuilds, has dramatically improved its business environment (from 124 to 103), security (from 127 to 107), international openness (from 78 to 55) and overall infrastructure (from 79 to 73).

In 2018 there was an increase in the number of tourist activities observed in Dnipropetrovsk, Donetsk, Lviv, Poltava, Kharkiv and Cherkasy regions. However, the largest number of subjects of tourist activity is concentrated in Kyiv, Dnipropetrovsk, Kharkiv and Odesa regions. Increasing the popularity of a territory, increasing the volume of tourist flows to the area is primarily related to its natural and recreational resources, historical and cultural sites, the level of infrastructure development [2]. It is the availability and effectiveness of tourist and recreational resources is a major factor in ensuring the development of tourism in Poltava region.

Natural tourism resources are an extremely rich component of the tourism and recreational potential of the Poltava region, which is involved in the creation of a tourist product. These include: cultural and historical tourism resources (archeology, history, architecture, town planning, arts, ethnography); material and tourist resources (establishments of accommodation and rehabilitation); sanatorium and resort sphere; ethno-tourism resources; sacred tourist resources; cultural and leisure tourist resources [3].

However, despite such wide opportunities in tourism, the number of tourists served by tour operators and travel agents is not significant enough in the Poltava region. The number of subjects of tourist activity in the Poltava region is insignificant, in comparison with other regions of Ukraine (17 legal entities and 75 FOP), but in 2018 there was a significant increase in the number of tourist activity (15 legal entities and 140 FOP), which carry out their activity as individuals entrepreneurs without registration of a legal entity. The Poltava region, having a huge tourist resource,

does not use it to its full extent, and, accordingly, the revenues from tourist activity in comparison with other regions are absolutely insignificant [4, 1].

However, it is fair to point out that the legal mechanisms of state regulation of the tourism sector are being activated in Ukraine, namely: new laws are being introduced, necessary changes are being made to the existing legal acts, and the provisions of national legislation in the field of tourism are being brought into line with international standards.

3 Decision

Poltava region endowed with vast potential opportunities in terms of tourism and recreation industry. Excursion, resort, recreational activity, providing of educational activity and scientific support of constant development of tourism and resort activity, attraction of investments in development of tourist infrastructure, ensuring effective promotion of regional tourist product in the international and domestic tourist markets, creation of objects of rest and additional working places - these are the main tasks that need to be addressed and reflected in the regulatory documents, as at the stage of formation tourism development policy in the Poltava region, and during the implementation of this policy [5].

The positive effect of the implementation of projects in this area should be reflected in changes in: streamlining the use of tourist resources; adaptation of natural areas, cultural heritage sites for tourist visits, providing them with appropriate infrastructure and information content; increasing the volume of tourist services provided; facilitating the creation of new tourist routes and innovative animation programs for local tourist services; development of health resort area; adoption of the Law of Ukraine "On the declaration of natural territories of the city of Myrhorod of the Poltava region as a resort of state importance".

4 Conclusion

Due to this we can make a conclusion that the fundamentals of sustainable development in the tourism sector should be appropriate legislative support, with funds of state and local governments, infrastructure, personnel, administration, information support and ensure the safe development of tourism by stimulating interest in preserving and restoration of historical and cultural heritage in Ukraine in general and in particular in the Poltava region.

References

[1] UNWTO World Tourism Barometr **E-source:** http://mkt.unwto.org/barometer
[2] Karmazina O O 2019 Tourism in Ukraine in 2018. Statistical collection. State Statistics Service of Ukraine. Kyiv **E-source:** http://www.ukrstat.gov.ua/druk/publicat/kat_u/2019/zb/05/zb_td_2018.pdf
[3] Makhovka V M 2017 Perspectives of development of tourist and recreational potential of Poltava region Economy and region **1** 31-8 **E-source:** http://nbuv.gov.ua/UJRN/econrig_2017_1_7.
[4] Karmazina O O 2018 Tourism in Ukraine in 2017. Statistical collection. State Statistics Service of Ukraine Kyiv **E-source:** http://www.ukrstat.gov.ua/druk/publicat/kat_u/2018/zb/05/zb_td_2017.pdf
[5] Official site of the Main Department of Statistics in Poltava Oblast **E-source:** http://www.pl.ukrstat.gov.ua

Ecological entrepreneurship in tourism

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Abstract

The tourism industry is evolving every year, opening up new destinations. Tourism has a positive impact on the economy of the country, stimulates the development of infrastructure, ensures the growth of incomes and increase the level of welfare of the nation. The development of rural tourism allows to increase the share of the employed population, but the increase in the number of tourists is directly proportional to the increase in the pollution of the territories. To reduce the environmental footprint of tourism activity, businesses in the industry need to focus on environmental entrepreneurship, in rural areas it is much easier to do so than in cities and metropolitan areas.

Keywords: ecological entrepreneurship, tourism, ecology, rural tourism

1 Introduction

The development of tourism activities implies an increase in indicators of tourist flows, which are not only consumers of tourist services, but also users of local infrastructure that meets their needs: food, accommodation, transportation, etc. Tourism is an economically viable activity for the territories and the country as a whole, but it has negative environmental consequences.

In recent years, tourism has been developing rapidly all over the world, opening new tourist destinations, creating new tourist and sightseeing routes. With the development of tourism, the number of businesses in this area is increasing. In Ukraine, there is an increase in indicators of the tourism industry, so the number of tourists served by tour operators and travel agents in 2016 was 2549606 people, in 2017 - 2806426 people, in 2018 - 4557447 people. Thus, the indicator of tourist flows in Ukraine from 2016 to 2018 increased by 78.75%.

The number of collective accommodation units in Ukraine increased by 10.88% from 2016 to 2018, amounting to 4719 units [1].

According to Eurostat Statistics-Explained, Europeans travel around Europe and stay at accommodation for an average of 7 nights. It should be noted that during the holidays, people will leave behind in times more rubbish than on normal weekdays.

Eurostat Statistics-Explained also reports that EU residents made 259 million tourist trips in 2017, with at least one overnight stay at the point. For 49% of these trips, air travel was chosen as the main means of transportation, followed by cars (private or rented) - 35%.

Bus travel is 5%, train and water transport are less popular during tourist trips [2].

Environmental impacts of tourism activities:

- air pollution due to transport emissions;
- excessive water consumption (long stay in the shower, large number of swimming pools, frequent washing of bed linen and towels);
- pollution of reservoirs with garbage and sewage;
- pollution of the environment with plastic, disposable tableware, etc.;
- not responsible for electricity consumption, etc.

In recent years, eco-hotels have begun to emerge and develop in the world, promoting not only the saving of resources but also the use of local agricultural produce. Eco-tourism in tourism helps hotels to refocus and provide accommodation in a new format. Environmental entrepreneurship also activates and stimulates the development of green, eco-friendly and rural tourism.

Tourism includes a variety of festivals that attract not only locals but also tourists. In Ukraine, the Sorochinsky Fair is held in August every year, with approximately 71,000 visitors in 2019. About 80% of all visitors are consumers of food services provided at the fair. All entrepreneurs who cater to the fair use disposable plastic tableware. One person has about 12 g. So, about 56800 people will leave behind 12 g of plastic, which in the sum is 681, 6 kg.

Thus, tourism has a positive impact on the economy but leaves an ecological footprint, the consequences of which have a significant negative impact on the environment.

2 Overview

This work discusses the advantages, disadvantages and conclusions on the following issues:

- Tourism development and increase of tourist flows
- The negative impact of tourism on the environment
- Ecological entrepreneurship to reorient tourism businesses
- Promotion of eco-tourism product

3 Decision

To reduce the environmental impact of tourism, tourism businesses need to minimize the use of natural resources, especially those that are non-renewable. Accommodations may recommend that their guests use water sparingly, and

encourage towels and bedding to be replaced less frequently. For washing, dishwashing and cleaning, it is necessary to replace the harsh chemicals with the environmental counterparts that are now widely available to consumers.

Tour operators and travel agents can develop "green" tours and routes for mass tourism, while adding relevant thematic units on their sites. Planning for green tours and routes involves reducing the role of transport, minimizing waste, promoting environmental trails, consuming locally produced agricultural products.

As for festivals, it is necessary to replace plastic disposable tableware with bio-cookware, which is decomposed and transformed into compost, edible dishes from bran, flour, agar-agar, pita etc. can be a great alternative. Utensils at festivals will not only effectively influence the environment but also the festival's rating.

Ecological entrepreneurship should be used as a "chip" of tourism entrepreneurship, as today the role of environmental consciousness is increasing, advertising such a direction will be very relevant especially if it demonstrates the benefits of travel that does not harm the environment.

4 Conclusion

Green tourism is an integral part of sustainable development. The reorientation of hotels and businesses in the tourism industry towards environmental awareness is a significant step in the face of sustainable development. Given that tourism is developing and is making a significant environmental footprint on the environment, it is necessary to take the side of eco-entrepreneurship to prevent the negative effects. Massive environmental entrepreneurship in tourism will allow ecology to cope with the increase in tourist flow rates.

References

[1] State Statistic Servise of Ukraine **E-source:** http://www.ukrstat.gov.ua/
[2] Eurostat Statistics-Explained **E-source:** https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tourism_statistics_-_intra-EU_tourism_flows#Europeans_stay_1_week_on_average_when_visiting_other_EU_countries
[3] Marsden T, Smith E 2005 Ecological entrepreneurship: sustainable development in local communities through quality food production and local branding Geoforum **36**(4) 440-51

State governance of land relations

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Abstract

The necessity of institutional regulation of circulation of agricultural land in Ukraine under modern conditions is reveals. The basic principles of improving government regulation of circulation of agricultural land in Ukraine are proposed.

Keywords: the lands' circulation, government regulation, institution, valuation

1 Introduction

The work of individual scientists and scientific schools of higher educational institutions doesn't give the system deep scientific research in land and agrarian sector that also forms institutional trap of further evolution in the land and agrarian relations in Ukraine. Economics, agricultural science and system of land use significantly behind the needs by the real economy.

2 Overview

Land, as a means of production and labor subject, should ideally have free access, and be in the hands of the manufacturer who uses it most effectively. But land is not capital in a pure sense, it is the basis on society; natural resource and not belong to the business, to the country and the people. Land markets are restricted by state boundaries and outside the communities, in most local. International agribusiness requires the free land market by the way of latifundism.

The East Germany cooperatives, economy of Belarus, successors of the Collective Agricultural Enterprise in Ukraine that have survived the economic and administrative pressure and farmers who wasn't tempted by division of property holdings and who saved integral property complexes, are working successfully [1]. Even Ukraine's agroholdings mostly rely on integral property complexes and organizational basis of former collective farms and state farms, organizing activities of industrial clusters.

For the last 30 years, the prices for agricultural land in Europehave tripled, and range from 5 to 25 thousand euros per hectare, while under construction, land prices have increased 16 times. The average tax on arable land in Europe is 200 euros and renting prices is 400 euro for 1 hectare. In the US the rental payments for1 hectare per year is 3-4% of the value of land, or 350 US dollars, in Ukraine the rent is 10-15% of the value of land [2] and 2.5 thousand UAH for 1 hectare a year.

The land market exists in the world, but it controlled and localized with absolute benefits for local people - peasants, farmers and domestic agricultural producers. The turnover of lands of agricultural purpose should work for the society of Ukraine, and not on the profits of international corporations.

3 Decision

The land granted with a general power of attorney are contracts of emphyteusis. You need to create regulatory mechanisms of a civilized circulation of land defining the moratorium on the free sale of agricultural land outside the settlements, as the emergency provision of the Land code of Ukraine, which corresponds to article 13 of the Constitution of Ukraine, and guarantees the right of land ownership to the Ukrainian people.

Ukraine needs a New Land and Agrarian codes that change the land and agrarian legislation in the public interest.

Some aspects of the formation of land circulation require specific development and improvement, especially:

- To limit the right of land lease with a maximum term of 20 years acting in the interests of the landlords;
- Also limit the transfer of agricultural land under contracts of emphyteusis;
- To stop the right of free privatization of land ;
- To determine the gradual formation of lands' circulation of agricultural purpose;
- In the first phase (1-5 years) should carry out the land acquisition of private property by the State Fund of lands, and local governments.
- In the second phase (5-10 years) should allow redemption of units to individuals, as a redemption share in the jointly-shared ownership, shares in jointly-joint ownership (forming neighbor's prevailing right of the farmers);
- In the third stage, after 10 years, it is necessary to define regulatory special status to the subject of the law on land market, the local farmers and farmers working in their favor.

4 Conclusion

Without waiting for systemic changes in legislation, it is necessary to make legal decisions and to improve substantially the land and agrarian relations, passing on of

agricultural land outside the settlements for community property that will further the redistribution of land exclusively for the benefit of local farmers, farmers and agribusinesses. Specified will provide the right to lease state and communal lands and within rural councils and communities solely to local producers, current and registered on the territory of the local government (community).

There is a need for the government to develop and build the infrastructure for the circulation of land by creating a State Fund lands and the State land Bank.

References

[1] Mihaylova L, Volchenko N, Zinchuk T, Kvasha S 2013 Evroekonomichna Integratsiya Ukrayini Tsentr navchalnoyi literaturi: Kiyiv

[2] Dankevich A E 2007 Ekonomika APK **3** 138–42

Peculiarities of the hotel business formation in the condition of globalization

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Abstract

The article discusses the peculiarities of the formation and strategies of the development of the hotel and restaurant business and tourism in the condition of globalization.

Keywords: hotel business, globalization, tourism

1 Introduction

Nowadays, it's very noticeable the dependence of the economic development of the country on the degree and scale of the use of innovations. Thanks to globalization, the appearance of new technologies, management methods, there is a growing need to attract foreign and domestic investments in the hotel business for the expansion of the range of hotel services. The innovation of hotel facilities is inseparably linked to investment development, that is, there is a continuous formation and the use of the investment resources for the achievement by enterprises of the operational and strategic purposes of their economic activities. The development of the innovation and investment activities of the hotel enterprises promotes the strengthening of the economy of Ukraine, the growth of its authority in the world market of tourist services, the growth of well-being of citizens, the preservation of historical and cultural heritage, the rise of spiritual potential of society.

2 Main body

The analysis of the world's experience in investing innovation shows that the main part of innovations is created in business sectors around the world, for which technological innovation is frequently updated. In these spheres the fundamental and applied research is actively organized financed and commercialized, develops large projects integrating the results of innovative search of small knowledge-intensive companies, the global scanning of new ideas and markets and the organize of the production process [1, p. 122].

In Ukraine, the hospitality industry is not properly developed. The level of the hotel service for tourists at the hotels does not conform the world level, so they need a significant updating of the provided services . Innovation is crucial to ensure efficient hotel operation. With increased demand for accommodation services for different categories of the tourists, there is an increasing need to study the organization of innovative processes at the enterprise and also the implementation of investment projects in hotels of different categories, formation and use of investment resources.

In the condition of globalization, research of the innovation and investment activities of hotel enterprises in Ukraine makes it possible to highlight both the obstacles to their functioning and the measures necessary to ensure the effective development of innovation and investment activities of accommodation facilities.

Scholars investigating the problem of innovation in hospitality note that innovations in services can be defined as a new service concepts, new channels of communication with clients, new distribution systems and technology solutions which often change the supply of services in the market, they update enterprise functions and require structurally new organizational, technological and human capabilities [2].

In the hospitality industry, it is important to consider innovation more broadly than only technological innovations, and take into account that it can appear primarily as a set of relationships between the constituent elements of the tourism system (hotels, restaurants, entertainment, transport and information) [3, c. 312].

3 Conclusions

Thus, the main stages of the development of innovative processes in the sphere of hotel industry we propose to consider the following: the improving training of hotel staff, expanding the supply of additional services, the application of new marketing methods in promotion of hotel product, the use of new innovative forms of hotel business organization, the creation of favorable conditions for attracting domestic and foreign investments in the hotel industry, the implementation of good management practices and international business practices in hotel enterprises. The hotel industry includes an industry with a high level of competition in the hotel services market, so hotel management is forced to look for new methods and means of producing services through innovation, and to create an activity strategy that has helped attract and retain the client.

References

[1] Izhevsky V V 2010 The economic essence of innovation and innovation activity of enterprises Scientific Bulletin Nat.logging. of Ukraine 20(3) 121–7
[2] Mikhailchenko G I 2012 Innovative development of tourism: a monograph K.: Kiev. nat. trading econ. Univ. 608 p.
[3] Tkachenko T I, Melnichenko S V, Boyko M G, et.al. 2010 Strategic development of tourism business: monograph / for the total. ed. A. A. Mazaraki K.: Kiev. nat. trading econ. Univ. 596 p

The impact of tourism development on the development of Uzbekistan

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Abstract

This article is about the first steps towards developing tourism in Uzbekistan, simplifying the visa system and developing the industrial infrastructure of the hotel business. The concept of tourism development is aimed at increasing the share of tourism in the country's GDP from 2.3% to 5%.

Keywords: tourism infrastructure, tourism development, tourists

At the present stage of development, there are several types of tourism companies, such as: tourist operators and travel agencies, regardless of the social structure of the country or tourism center. In addition, tourist transporters, hotels and other accommodation facilities, catering, attractions and entertainment, as well as banking institutions, insurance services and more.

The purpose of the cultural and entertainment activities is, firstly, to acquaint foreign tourists with our national culture and traditions, and secondly, to assist them in a meaningful time spent in our country. During these events, we have the opportunity to demonstrate that we are a hospitable people. For example, we witnessed a large number of tourists taking part in mass cultural events, such as the Landscape Design Festival or the electronic music festival in Tashkent, and we were convinced that such events should be taken into account.

Certainly, we will critically analyze our work in terms of what we should pay more attention to during such events and draw the necessary conclusions. The electronic music festival, held on June 8-9 this year, attracted a great deal of interest not only from tourists but also from the population, especially young people. In addition, these measures will help to meet the challenges we face in implementing the President's five major youth initiatives [1].

Despite the fact that the festival was first organized, it was held at a high level. Well-known singers from neighboring countries were invited to this event. Musicians from Italy, France, Georgia, Russia, and Ukraine participated in the festival called "East". We have made good use of social networking opportunities to inform as much of our activities as possible. In addition, there is a national PR center under the Committee for Tourism Development [2]. It regularly publishes information on projects implemented in Uzbekistan, cultural and entertainment events. We are very happy that a famous Sayilgoh Street in Tashkent has been re-opened and the people of Tashkent, as well as the guests of our capital, have become a favorite of foreigners.

There, we regularly publish information about activities that our organization is planning to undertake. At the same time, the opportunities of the PR-advertising department at the PR center are being used effectively. In addition, we are also making a significant contribution to informing all stakeholders about the activities of other agencies and organizations.

We should be proud of our national cuisine, and there are even some gourmands who make a special trip to our country to enjoy Uzbek cuisine. State Committee for Tourism Development of the Republic of Uzbekistan, Department of Tourism Development and Association for the Promotion of Private Tour Operator organized training seminars and training courses for the training, retraining and improvement of gastronomic tourism at home. , conducted master classes.

There is also a training center under the State Committee for Tourism Development, and we are effectively using the training center. In addition, these measures have been specified by government decisions. Training in general catering establishments is carried out step by step. Special attention is also paid to training of officers.

However, if we declare our country open to world tourists, we must prioritize high quality services, not only in the area of catering, but also from many other areas of tourism service infrastructure.

The average stay of foreign tourists in Uzbekistan has increased (from 2.3 in 2017 to 3 days in 2019), as well as employment rates have increased (from 62% in 2017 to 89.7% in 2018), which has a positive impact on employment in tourism infrastructure [3].

The organization of family guest houses is also an interesting direction in terms of fulfilling the commitments set before us by the President's “Every Family - Entrepreneur” program. For this purpose banks have the opportunity to use soft loans.

The event, organized by the Association of Chefs of Uzbekistan on Sayiloch Street in Tashkent on 9-11 August, is called "Gastronomic Market". Because this trend is growing rapidly around the world, and we have many national traditions to be proud of in this regard, which will certainly attract the attention of gourmands in the world.

In addition, it will also promote the tourist brand "Uzbekistan" to the world. At the event, we aim to increase the flow of tourists who can visit our country by promoting our national cuisine. The campaign has been launched not only in our country but also abroad.

However, we must pay attention to the fact that at such public events people should be able to demonstrate a high level of culture. Of course, foreign guests will observe the behavior of the host country, the culture of the problem, the courtesy, the courtesy, the hospitality, and will make a general conclusion about the people of the country. Therefore, it places a great responsibility on the people of our country. Now we can meet many foreign tourists not

only in big cities, but also in remote villages. We must effectively use the capabilities of our site and social networking pages.

The hotel and other accommodation facilities are certified by the Certification Center under the Tourism Committee. Validity of this document is one year. The standardization of our hotels is controlled by the Center for Standardization.

There are currently 240 hotels, hotels and hotels in Tashkent. Many of them are well organized, and considering the development of tourism in our country over the past two years, they are also struggling and doing much for their reputation. Most of our three-, four-, and five-star hotels are on the list of internationally recognized hotel booking online services, and there are currently no serious objections to their services. However, it cannot be ruled out that there are some complaints regarding the quality of the services.

As for hotels and other accommodation facilities, we have developed and approved the relevant standards for the classification of hotels in Uzbekistan in cooperation with the Uzbek Agency for Standardization, Metrology and Certification. They clearly outline the requirements for the size of the room, the supplies and equipment available, and other signs.

Studies show that 70% of tourists from the CIS prefer to stay in Samarkand for 2-4 days, most of whom come to Uzbekistan with families as well as groups.

It is well known that the history of our country is located on the Great Silk Road, and before us there were hotels, caravanserais. Today, in our historic cities such as Samarkand, Bukhara and Khiva, our businessmen continue to carry on these old traditions and serve private hotels built or equipped in the old style, and they are welcomed by foreign tourists.

Creating such hotels is also envisaged in the rapidly developing Tashkent city. The active development of the tourism industry will require young professionals who will promote the tourism brand of Uzbekistan and improve the quality of service. In this regard, the opening of the International Tourism University "Silk Road" in Samarkand was inevitable.

Currently, visa-free regime is established in 65 countries. New categories of visas are being introduced for certain categories of foreign nationals, including investment, student, academic, visiting and medical visas. An electronic system for registration and issuance of entry visas is established and successfully operated, and its services are available in 77 countries.

In conclusion, we can say that as a result of the done work Uzbekistan will be a favorite tourist destination for tourists from near and far abroad. In addition, the number of tourist lovers and pilgrims visiting our sanctuaries grows every year. This will be an important factor determining the economic potential of the country.

References

[1] Decree of the President of the Republic of Uzbekistan About additional measures for accelerated development of tourism in the Republic of Uzbekistan
[2] On priority measures for the development of tourism in 2018-2019 The decree of the President of the Republic of Uzbekistan
[3] Gosudarstvenny Committee of the Republic of Uzbekistan in tourism **E-source:** www.uzbekista.travel

Theoretical and instrumental principles of the impact of migration on sustainable development of the country

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Abstract

There is a growing intellectual interest in issues associated with migration. the literature on migration is continuously growing due to this trend. However, theorization of instrumental principles of migration and its impact on sustainable development of the country is not strong enough compared to other branches of international transactions. This may be due to the fact of the complexity and diversity of the area covered by migration. The paper focuses mainly on the overview of migration, presentation of instrumental principles of migration, this paper also showcases the impacts of these instrumental principles on the sustainable development of the country and therefore offers suggestions and recommendations.

Keywords: migration, theories and instrumental principles, development, country

1 Introduction

International migration as a practice has a long history with some turning points. Disintegration of the middle age societies and accompanied changes such as renaissance, commercial revolution, colonization, agricultural revolutions, industrial revolution, emergence of free market societies, modern education, and technological advancement are some prominent factors which have contributed to the growth of international migration. In the recent past, globalization has further enhanced migration, mainly through revolutionary changes in information technology. Economic blocks like the European Union have opened the gates of international migration in their member countries. The initial financial cost of migration has been drastically reduced due to low transport costs, cheap accommodation facilities, online travel arrangements, and availability of reliable destinations with low cost insurance packages (massey, 1994). Similarly, international conventions on migrants, peaceful environment in many parts of the world, encouragement of skilled and professional labour migration, and modern low cost communication facilities have become major incentives for international migration. Natural disasters and man-made disasters such as wars, conflicts and deteriorating political environments at present further contribute towards migration. The paper's intention is to highlight the impacts of theoretical and instrumental principles of migration and a recent trending instrumental principle of migration in most migrants destination countries is a principle that attract and retain high skilled migrants and this principle has proved to be effective and one of the economic booster because it fills the gap in terms of labour shortage in recipient countries and leads to economic development in home countries of migrants through remittance, Foreign direct investment, bilateral trade agreement between host and home countries, skills and technology transfer and cultural diversity.

2 Overview

This paper addresses the following issues:

1. The main attributes of theoretical and instrumental principles of migration.
2. Theoretical and instrumental principles of migration on the sustainable development of a nation.
3. Theoretical and instrument principles of migration on the socioeconomic development of Rwandans and Ukrainians.

3 Decision

After intensively analysing and verifying all the above hypothesis through secondary data collection and primary data collection through questionnaire surveys and interviews all hypothesis are considered because theoretical and instrumental principles are proved to having a tremendous impact on regulating , controlling , managing as well as attracting a desired number of migrants in most countries which therefore leads to sustainable development in host and home countries through bridging the gap in needed occupation lists, technology and skills transfer, remittances where for example the statistical numbers show that $ 466 billion were sent by migrants to their home countries in terms of remittances 2017 and $ 618 billion to high-income countries (bank, 2017) and countries such as: Canada, USA, Australia, Germany witness the impact of theoretical and instrumental principles of migration that primarily cater labour migrants to have played a significant role in attracting low and skilled migrants who not only filled the gap in labour shortages but also contributed greatly on the above mentioned countries and Rwanda witnessed the contribution of its migrants through remittances and

2016 report show that Rwanda collected $ 252 million in terms of remittances (statistics, 2016) and Ukraine received an approximate of $ 11 billion in terms of remittances in 2018 (bank, 2018)and this amount increased dramatically due to the introduction of free visa regime to EU for Ukrainians as well as the relaxation of work permit to Ukrainians which boosted up the EU member states 'economies as well as the Ukrainian economy and also extremely reduced the number of people living below the poverty line in Ukraine from 1.30 (bank, 2018) and the free movement of labour especially seasonal Ukrainian workers in The EU is one of the key factors to make this poverty headcount ratio possible. All these above mentioned reasons prove how well established theoretical and instrumental principles of migration alleviate people's standard of living as well as boosting up economies in host and home countries of workers' migrants.

4 Conclusion

In a nutshell, if labour migration is effectively coordinated, properly managed and strongly regulated through a well-established and defined theoretical and instrumental principles of migration can be of a profound benefit for both host and home country by reducing the disparity between labour shortage and a labour surplus, it can also lead to domestic business development through both foreign direct investment and remittances that therefore lead to a sustainable development.

References

[1] Bank W 2017 Report of immigrants 'remittances in low, middle and high income countries **l**
[2] Bank W 2018 Poverty headcount ratio Ukraine **l**
[3] Bank W 2018 Report on Ukrainian remittance **l**
[4] Massey D S 1994 Theories of international migration JSTOR **19** 433-66
[5] Statistics R n. i. o. 2016 Report of Rwandan diaspora contribution **l**

Virtual tourism as one of the directions of development of the world tourism in modern conditions

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Abstract

Tourism is one of the leading and most dynamic sectors of the economy because of its rapid growth rates, it is recognized as an economic phenomenon of the century. In the context of the pandemic of the COVID-19 virus, which has swept the whole world at closed borders, travel agencies are forced to look for new forms of developing their business. At the present stage, innovative technologies have become the most important factor in the development and element of the enterprise's competitiveness, since it is they that allow to reduce the cost of the product, increase profits, stimulate new needs, create a favorable image of the manufacturer of new products, and also lead to the development and capture of new markets, including external. Modern types of travel have undergone many changes and gained new forms, in particular, among Internet users in the world, and more so in terms of quarantine events, virtual tourism is gaining popularity.

Keywords: tourism, virtual tourism, information technology

1 Introduction

Tourism is one of the leading and most dynamic sectors of the economy and is recognized as the economic phenomenon of the century for its rapid growth. However, in the context of a global pandemic, border closures, travel agencies are forced to seek new forms of competition. At the present stage, the most important factor in the development and element of competitiveness of the enterprise are innovative technologies, because they allow you to reduce the cost of the product, increase profits, stimulate new needs, create a favorable image of the manufacturer of new products, as well as lead to the development and capture of new markets in external. Modern types of travel have undergone many changes and have taken on new forms, in particular virtual tourism is gaining popularity around the world.

2 Overview

This paper describes the advantages, disadvantages and conclusions on the following issues:

- The essence of virtual tourism;
- Benefits of virtual tourism versus traditional travel

3 Decision

Virtuality is the most essential characteristic of modern social reality, and information technology can effectively replace a person's direct communication with natural, historical, architectural and other spiritual and real objects of reality, especially in the current epidemic and isolation of most of the world's population. It should be noted that the pandemic of the COVID-19 virus is one of the factors that cause the development of virtual tourism. The tourism industry is ideally suited for the implementation of modern information technologies. The rapid development of the Internet - from text messaging right through to a powerful multimedia tool - has become a source of many new opportunities in the tourism industry.

Virtual tours are online or offline presentations that allow potential clients to view any object. Depending on the type of tour, it can be wide-format or circular (360°), as well as panoramas of objects of any size (exhibits of museums and art galleries, rooms and other premises of hotels, streets and buildings of cities, alleyways of parks, views from a height aerial view, etc.) that move arbitrarily.

Virtual tourism is a paradoxical phenomenon, because its essence does not correspond to the conventional interpretation of tourism, although it takes into account its characteristic features (leisure travel, educational purpose, one of the forms of recreation). Different from traditional tourism are its features such as: passive form of rest; which does not require departure outside the main residence; does not envisage real use of land and water tourist resources; duration - up to 24 hours. In modern conditions, virtual tourism can be classified and developed as an innovative type of tourism.

4 Conclusion

Therefore, virtual tourism is a very promising area of information technology development in the field of tourism. Virtual tourism enables every person to fulfill their long-held dream, to visit a place that they wanted to see for a long time, but could not for some reason. Virtual tourism is such an alternative that does not require any money and extra costs, all you need is a computer and a desire to visit a specific place. Since life is out of place, all technology related to virtual tourism is also being improved, this allows each of us to see a particular object in the so-called new format. That is why virtual technologies in tourism have huge prospects for distribution and are able to positively influence the development of tourism business in modern conditions.

The digital marketing structure of SMEs in tourism as an element of sustainable development of regional economy

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Abstract

The article examines the influence of marketing digitalization on the market of tourism services. The level of digitalization of small and medium-sized enterprises in the field of tourism in the Baltic countries is analyzed. Digitalization development trends and their influence on the tourism market are studied. The future changes in the tourism business are analyzed.

Keywords: Digital marketing, Tourism business, Small and medium –sized enterprises, economy

1 Introduction

The goal of the research was the analysis the level of digitalization of small and medium-sized enterprises in the field of tourism in the Baltic countries, as well as changes which entail digitalisation to this organisation and regional economy. The issue of research. Changes that have to come to the tourism industry required a different approach to marketing and appropriate actions from the government. The research methodology includes the analysis of theoretical information; comparison of different authors and primary sources; analysis of information obtained from the survey. The methods of logical and statistical analysis are used. To assess these issues, the author takes a cross – country approach and considers changes of SME's in tourism industry within the framework of digital marketing

2 Research object and methods

The unwillingness of many tourism-related SMEs to switch to digitalization is determined by the high cost of digital technologies, the difficulty of understanding such technologies, they also fear of hidden costs and have the lack of confidence in Internet technologies due to data insecurity. It is a mistake to assume that if tourism-related SMEs sell their services through the Internet, it can be called tourism and the marketing structure is digital. Digital tourism is the adaptability and flexibility of business processes and operations with the use of a new generation of ICT, allowing personalizing a product or service.

In the survey conducted in the Baltic countries, it was revealed that SMEs, operating in the field of tourism have mastered basic internet technologies such as internet website and the promotion of services through social networks, but only a small percentage organizes and tries to move to the next level. The differences between SMEs are characterized by low and medium level of digitalization. Within the framework of the survey, SMEs were asked about the technologies that they currently use at their enterprises and how it influences on their marketing strategy. The results showed that SMEs operating in the tourist industry already included many basic technologies related to electronic business in their activity, such as promotion on social networks, having a newsletter, and their own website, using Internet banking. ICT associated with average and higher levels of digitalization was not so common. Managers noted that they didn't have sufficient knowledge and resources to change their marketing strategy in favor of digitalization. Unsurprisingly, that SMEs characterized by an average level of digitalization, were interested in implementing new digital technologies because they have a clear vision of the role of digitalization in their business.

3 Results

The results showed that SMEs operating in the tourist industry already included many basic technologies related to electronic business in their activity, such as promotion on social networks, having a newsletter, and their own website, using Internet banking. ICT associated with average and higher levels of digitalization was not so common. Managers noted that they didn't have sufficient knowledge and resources to change their marketing strategy in favor of digitalization. Unsurprisingly, that SMEs characterized by an average level of digitalization, were interested in implementing new digital technologies because they have a clear vision of the role of digitalization in their business. Today, a basic set of digitalization can't achieve competitiveness on the market. If previously, it is was enough for companies to have their own website, a page on social network and software, then at the moment this can't attract the consumer. But despite the global economy's desire for digitalization, many tourism –based SMEs don't even use half of low digitalization. Not everyone has an account on social networks, especially with regard to the direction associated with the carriage of passengers (tourists). Few people use cloud storage of data, believing that it to be unsafe. Of the three Baltic countries, Estonia leads on all indicators by a small margin.

4 Conclusions

1. Tourism –related SMEs should become a part of the regional policy of the state. If the state doesn't support the digitalization of tourism, not everyone has the resources to do it independently; tourists will simply use the services of other enterprises, more active on the Internet. But the profit of these enterprises will not go to

the budget of the country.

2. Tourism in Latvia, as in other countries is no longer a self-sufficient sector and is only partially connected to other sectors of economy. That is why it is so important to approach a digital marketing strategy with all responsibility and the government should be in this ally. The state needs a unified digital marketing structure.
3. To make tourism sustainable, there must be good, effective infrastructure, fast, accessible Internet. Travel companies that are working on a change in their marketing concept must constantly monitor the digital channels of methods of promotion and marketing of goods and services, analyze data, using intelligent technologies that allow entire cities to respond to each new visitor in real time, helping new visitors easily respond to various scenarios, such as flight delays or hotel reservations.
4. Intelligent technologies offer opportunities to attract tourists. A tourist should interact with the city, give and receive feedback. Such interaction can only be organized through digitalization. A smart city is a living organism that helps to distribute the tourist flow, measure energy consumption and traffic density, offer a solution. The information should come online, segmenting tourists by type of tourism (business, recreational, etc.), age, interests.

References

[1] Tony Joseph 2019 Emerging Technology Trends **E-source:** https://www.fingent.com/blog/emerging-technology-trends-in-travel-tourism-industry. Access: 16.01.2020.
[2] Peceny U S, Urbančič J, Mokorel S, Kuralt Kuralt V, Ilijaš T 2019 Tourism 4.0: Challenges in Marketing a Paradigm Shift **E-source:** https://www.intechopen.com/online-first/tourism-4-0-challenges-in-marketing-a-paradigm-shift. Access: 16.01.2020
[3] Travel industry **E-source:** https://www.reportlinker.com/market-report/Travel-Services/509046/Travel? Access: 16.01.2020
[4] Graham Charlton 2020 Digital Trends in the Travel Industry **E-source:** https://www.salecycle.com/blog/featured/digital-trends-travel-industry-12-fascinating-stats/ Access: 12.02.2020
[5] State of Marketing report 2020 Marketing statistic **E-source:** https://www.hubspot.com/marketing-statistics Access: 01.01.2020
[6] Gestrin M V, Staudt J 2018 The digital Economy **E-source:** http://www.oecd.org/investment/investment-policy/The-digital-economy-multinational-enterprises-and-international-investment-policy.pdf Access: 16.01.2020
[7] European Commission 2019 Statistics explained in tourism **E-source:** https://ec.europa.eu/growth/tools-databases/vto/eurostat-statistics Access: 01.01.2020
[8] European Commission 2019 Digital Single Market **E-source:** https://ec.europa.eu/commission/sites/beta-political/files/a_digital_single_market_benefit_all_europeans_en_20190319_1230.pdf Access: 16.01.2020
[9] European Commission 2019 Smart Cities **E-source:** https://ec.europa.eu/digital-single-market/en/smart-cities Access: 16.01.2020
[10] Colin Blackman, Simon Forge 2019 5G Deployment **E-source:** https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA(2019)631060_EN.pdf Access: 11.01.2020
[11] European Commission 2019 Towards 5G **E-source:** https://ec.europa.eu/digital-single-market/en/towards-5g Access: 10.01.2020

Behavior of a tourism enterprise during a crisis

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Abstract

Currently, most enterprises have transferred the sale of their business product online. Meanwhile, tourism companies now, as a result of a global pandemic, cannot sell anything, but this is not a reason to stop their active position on the Internet.

Keywords: tourism enterprises, a crisis, attracting clients

1 Introduction

Many enterprises that, for several reasons, had not yet run an online business, were forced to time out, as a result of a global pandemic COVID-19. Despite it, many companies continue to work actively online: they transferred their sales 100% to the Internet. However, travel companies can no longer sell their product in both ways - offline and online, yet, they should not freeze their activities on the Internet. If the company completely stops its activity, then it will miss the opportunity to build up its client base.

2 Main part

For tourism enterprises, the current situation is extremely negative. It can be called a clear crisis, which is developing rapidly. An expected fall of between 20-30% could translate into a decline in international tourism receipts (exports) of between US$300-450 billion, almost one-third of generated in 2019. Taking into account past market trends, this would mean that between five and seven years' worth of growth will be lost to COVID-19. Putting this into context, UNWTO notes that in 2009, on the back of the global economic crisis, international tourist arrivals declined by 4%, while the SARS outbreak led to a decline of just 0.4% in 2003 [1].

However, neither in 2003 nor in 2009, the tourism business was faced with a global cessation of international flights and the closure of borders for the movement of tourists. An aggravating factor in the tourism crisis is it impossible to predict the end of the pandemic and the resumption of tourism. Despite it, travel companies should to maintain an emotional connection with the client. Travel downtime should be used by travel companies for online travel, review tours that were previously in demand by customers, passively familiarize potential customers with possible new tourism destinations, which can provide a growing customer base. Travel agencies that actively maintained their accounts in the pre-crisis period can now be a source of information about countries, historical sites and conduct on-line tourism - provide an opportunity to plunge a potential client into an atmosphere of relaxation, thereby maintaining their activity and popularity among clients. Accordingly, online tours can serve as a means of attracting potential customers. And it is precisely those tourism companies that continued to work with clients in a passive form during the crisis period that has high chances to get their active customers after the crisis due to established contact and trust.

The crisis for domestic tourism will last less. Tourism enterprises should pay special attention to this and use this knowledge to increase the flows of domestic tourism, as well as for timely preparation of the infrastructure of domestic tourism. Regardless of the cause of the crisis, a crisis is always new opportunities that should be taken advantage of in one or another type of activity.

3 Conclusions

The crisis is not only a loss, but also new opportunities that should be properly used. It is important for tourism enterprises to see these opportunities, to maintain existing positions, to retain customers, to seek new customers, and not to passively expect the crisis to end.

References

[1] International Tourist Arrivals Could Fall by 20-30% in 2020 **E-source:** https://www.unwto.org/news/international-tourism-arrivals-could-fall-in-2020

Priorities for development of tourism in Uzbekistan

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Abstract

This article assumes that tourism development is now a national issue. In order to stimulate entrepreneurial activity in the tourism sector, there are privileges and preferences, as well as tax and customs privileges.

Keywords: tourism services, hotels, tourist market, family guest houses

The Government of Uzbekistan pays great attention to the development of tourism. Simplifying the visa system and developing the hotel business were the first steps toward the development of the industry's infrastructure. The tourism industry has also given impetus to the development of related industries. In order to improve the tourism infrastructure on January 5, 2019 the Decree of the President of the Republic of Uzbekistan "On Additional Measures for Accelerated Tourism Development in the Republic of Uzbekistan" was signed. The document approved the Concept of Tourism Development of the Republic of Uzbekistan for 2019-2025.

The aim of the Concept is to increase the share of tourism in the country's GDP from 2.3% to 5%. It is also expected to increase tourism exports to $ 2.2 billion by 2025. Increasing the popularity of the tourist brand of Uzbekistan abroad and establishing partnerships with the tourist market of Uzbekistan are key factors in attracting tourists and developing the tourism market.

Within two years, the development of tourism in our country has led to the growth of all indicators by more than 2 times and has received the recognition of most international rating agencies.

Certainly, a number of decrees and resolutions of the President of the Republic of Uzbekistan on the development of tourism, an important branch of the economy, have been signed recently, and the work on their implementation is being carried out. It is noteworthy that no sector, industry, sector or industry has to sign a decree, regulations or regulations, but some of them are related to tourism. This is because the tourism industry is not only a separate destination limited to the reception and departure of tourists, but also a comprehensive process that is closely linked to many sectors of the economy.

Transportation, logistics, beautification, security, visa issues, services, catering, trade, household services, hotels, sanatoriums, resorts, medical, insurance services and many more.

Most of the tourists visiting Uzbekistan come to Tashkent and then to our other historic cities. This means that their first impressions of Uzbekistan start with Tashkent, which places a great responsibility on tourism officials in our capital.

According to statistics, this figure is up 121% year-on-year, up from $ 5 million last year. Nearly 300,000 tourists have already visited Uzbekistan, and there are already over 5 million visitors in Uzbekistan. More than 700,000 people came to tourist destinations. These positive dynamics indicate a growing interest in Uzbekistan as a new tourist destination.

The development of the tourism industry, in turn, requires the expansion of the tourism business infrastructure and the development of entrepreneurship in this area. It is worth mentioning the guest houses, as it is clear that the number of hotels and beds they have already built and ready to host is not enough even for Tashkent, given the growing number of tourists.

Therefore, in order to expedite the construction of hotels, the government offers various benefits. On August 18, 2018, the Cabinet of Ministers of the Republic of Uzbekistan adopted Resolution 631 "On the organization of activities of family guest houses". According to him, any family can arrange guest houses in their own home if there is enough room for guests to entertain guests. This practice is widely used in foreign countries.

Requirements include the availability of hot water, bathrooms, bathrooms, sewerage, and utilities, and an internet connection. The special requirement for the Internet system is that earlier registration of foreign citizens was carried out by the Department of Migration and Citizens Registration, now foreign visitor registration is done electronically.

The State Committee for Tourism Development is the supreme body for the organization of guest houses, whose tourism departments in Tashkent and the provinces are the Territorial Authorities of the Committee.

As for the legal aspects of establishing guest houses, you need to apply to the Department of Tourism in the relevant area with all relevant documents for state registration as a sole proprietor or family business, as well as a cadastre of individual housing.

At the same time, no payments are foreseen, and individual entrepreneurs are expected to pay a fixed tax, and family businesses make a single tax payment of 4% of total turnover.

The number of tourist organizations has also increased by 25% and amounted to 1,000, and this year there are 991 placement units with 218,000 rooms. By 2019 it is planned to increase their total number to 24,000.

The President has signed the Tourism Law [2]. The law defines the State Committee for Tourism Development as an authorized state body in the field of tourism. Tourist information centers will be established, which will provide information about and promote tourism facilities to individuals and legal entities.

According to the law, tourism activities and tourist activities, as well as other tourist activities are considered to be tourist activities. Tour operators and travel agents are licensed. Individuals, who are individual entrepreneurs, who provide eco-tourism services, do not need a license for tourist activities.

After guides (guides-translators), tour guides and guide-

guides receive a certificate issued by the Committee, the services can be provided independently without the establishment of a legal entity. In accordance with the law, the Committee develops the National Tourist Sign of Uzbekistan. The present Law comes into force three months from the date of its official publication.

References

[1] Decree of the President of the Republic of Uzbekistan About additional measures for accelerated development of tourism in the Republic of Uzbekistan
[2] The Law of the Republic of Uzbekis*tan "On Tourism"* ZRU p 549 18.07.2019
[3] Aliev M T 2010 Hotel Management. Textbook T.: TSPU 275 p
[4] Kutlimurotov F 2007 Tourism infrastructure. Tutorial TDIU 117 p

Methodology technique of destructive experience

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Abstract

The paper explores the approach of accumulating specialist experience which, develops the capability to detect and understand the circumstances, impacting the organization in a destructive manner. Detection of circumstances occurs on the basis of specially developed tools as part of a control system with an object that varies over time.

Keywords: state, instability, controllability, object, system, inoperability, algorithms

1 Introduction

The methodology ensures the provision of reliable diagnoses to properly assess the state of the organization [1]. Such evaluations are conducted on the basis of predefined control monitoring system, where the results are calculated in real time that eliminates the possibility of the control system to remain without the assessment of destructive forces for extended periods of time. Impact assessment is carried out with the help of effective tools that eliminate technological downtime induced during the search for solutions to get the organization out of an unstable position.

Based on the assumptions made, it has been determined that hastily prepared proposals aimed at overcoming new obstacles contradict, the regulations used by the time-tested procedures made for their neutralization.

As a result, special tools are required, where their absence manifest a problem in the research, as the underlying issue is reduced to the inability to maintain the control over the organization in the conditions of unrefined algorithms aimed at providing its (controllability) support.

2 Problem state

The elimination of the problem is carried out in the process of outlining a relevant issue, the peculiarity of which is to track changes aimed at improving the management system [2]. Hence, it implies the changes in processes influencing the management system, which can be worded in the following statement: "The process of change is a system aimed at providing a reasonable confirmation of the change in the system that is targeted at improving the overall performance of the organization."

The Object system consists of two subsystems, totaling nine zones, presented in Figure 1.

The first subsystem characterizing the objective part includes a completed organization test cycle under conditions of recognizing the influence of destructive forces [3].

Furthermore, the second subsystem, representing the subjective part, defines a measure of effectiveness in a superposition mode, more precisely, in a mode where the change conducted is impacting the organization's functionality [4].

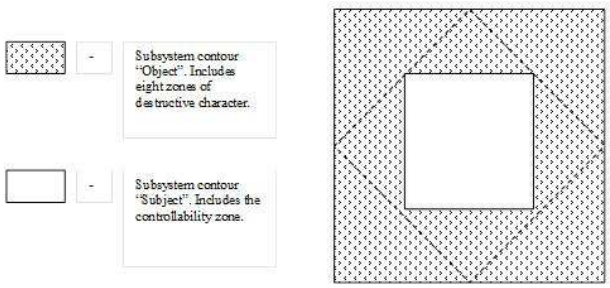

Figure 1 Representation of object change in the form of two complementary contours

As a result, the constructed representation is used to develop a fundamentally new description of the system-forming elements of the control system. The objective area characterizing the external factors of the system is considered through critical analysis to identify potential destructive forces. The subjective area, representing the internal contour of the system, is based upon the accumulated management experience, and characterizes the degree of controllability. An object representing a combination of two contour is defined as an object with changing structure, which transforms with the changes in the contents of the zones within the system.

A special procedure is required to facilitate the objective change, the development of which was the goal of this study. The implementation of the procedure allows for identification of causes that result in the organization to remain in an unstable state for extended periods of time. Such condition is chronic, hence, unnatural for the organization, as the external destructive forces occur along with the problems, such as conflict and deceit, that leave the true cause of illness uncovered.

In accordance with the formulated goal, the following tasks were determined:

1. evaluate the strategic position of the organization in real time;
2. preserve traditions when choosing an improved version of the objective change;
3. monitor the implementation of the medium-term development scenario of the organization;
4. develop a guide based on accumulated experience to

create an action plan for when the organization is under the destructive forces.

In the course of solving the set tasks, algorithms were developed that are fine-tuned to the method control used for detecting adverse events. An approach is suggested for monitoring the object change under the prerequisite that a reasonable conclusion suitable for the control system has been constructed to bring back the organization from its unstable state. Reflection skill has been formed that aims to understand the influence of circumstances of a destructive nature. Hence, the experience is accumulated which counters the errors caused by excessive complacency due to the deceptive perception of both the object itself and its surroundings.

3 Conclusions

The study found a new way to isolate the object of change by combining the tasks of management science and destructive analysis technology. In the first case, the "Subject" subsystem provides the opportunity to protect the organization from measures that lead to unnecessary interference in a sustainable process, which nurtures the ability to manage a healthy organization. In the second case, within the "Object" subsystem, normative for determining the state of an inactive organization is established as well as the ability to detect deviations from the set norms prior to their escalation.

This paper presents the object of change as separate organizational structure, hence, allowing you to create a system that functions in crisis situations. This is due to the experience accumulated from previously dealt with destructive forces. As a result, all experience gained is recorded in a specially developed methodology, which serves as a guide for crisis management and mitigation. Furthermore, the key force behind creation of such crisis management guide is due to the experience accumulation technique based upon prior destructive events. Such experience is gained in situations when a real object changes its structure and composition. In conclusion, the accumulated knowledge regarding the destructive forces not only allows for the timely detection of the uncontrollable state of the organization, but also prevents the possibility to "slip" for the object of the system, that has undergone changes in itself and its environment.

References

[1] Diakons R, Kopitov R 2020 Assessment methodology of the contribution of the university branch in the development of the region The 18th International Conference Open Learning and Distance Education 2020, January 30-31, 2020, ISMA, Riga, Latvia
[2] Mikrjukova Z 2019 Development of the Reconstruction Algorithms of the Organization The 17th International Conference Information Technologies and Management 2019, April 25-26, ISMA, Riga, Latvia, 226-7
[3] Amangeldiyev A 2019 Algorithm requirements for the examination of organizations The 17th International Conference Information Technologies and Management 2019, April 25-26, ISMA University, Riga, Latvia, Information Systems Management Institute, Riga, Latvia, p.217
[4] Akimov G 2019 The evaluation of strategic position of enterprise in diagnostic tasks algorithm The 17th International Conference Open Learning and Distance Education 2019, January 24-25, 2019, ISMA, Riga, Latvia

Maintenance of sustainable entrepreneurship: disclosing the meaning of the concept of "Entrepreneurship"

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Abstract

The paper considers the approach of a comprehensive assessment of the enterprise's state. This approach is built considering the methodological provisions, structured in the form of a hierarchy of values. The formed structure includes a set of related nodes and the task is formulated on this basis.

Keywords: strategy, requirements, basis, complex, tasks, position, value, novelty

1 Introduction

The proposed approach is aimed to eliminate the ambiguous interpretation of the concept of "Entrepreneurship" [1]. Thus, formed systems thinking advantages the development of provisions and implementation does not contradict the adopted strategy [2]. Violation of the provisions is captured during the assessment of the current state of the organization [3].

Considering the current issues, the study highlighted a contradiction, the essence was reduced to the fact that the tightening of the requirements for the behavior of the organisation's participants when implementing the strategy contradicts the reliability of the provisions adopted in the new conditions for the organisation to get out of a difficult situation [4, 5].

2 Problem state

As a result, there were basis for the formulation of the research problem: "It is impossible to agree on new requirements and new provisions in the absence of means to assess the current state of the organisation."

Highlighting the object of study, it was necessary to use a separate set of measures to describe an effective system of entrepreneurship.

In the course of the study occurs the understanding of the organization's defense subsystem operating resultant in the new conditions [6].

As a result, the purpose of the study is focused on the development of a procedure ensuring the formation of a conceptual scheme of related system concepts.

In accordance with the stated goal, the following tasks were formulated:

1. conduct a current analysis of violations in the context of a study of the entrepreneur's chance;
2. make the choice of process improvement option;
3. to implement the medium-term scenario of the restored order by means of acting control levers;
4. to develop a long term guidance.

This approach is intended to identify the subsystem for detecting large-scale circumstances affecting the entrepreneurship system. As they are identified, a comprehensive assessment of the enterprise's state for periods of various durations is carried out. This assessment serves as a common business platform for the collection, processing and analysis of business information.

As a result, a method of related systems concepts was found as part of a single scheme, thus, it becomes possible to assess the strategic position of an enterprise accordingly to a defined destination.

References

[5] Akoff R, Jemeri F 2008 O celeustremlennyh sistemah Moskva: Librokom 272 p.
[6] Isaev V V, Nemchin A M 2002 Obshhaja teorija social'no-jekonomicheskih sistem Sankt-Peterburg: ID «Biznes-pressa» 176 p
[7] Niv G 2007 Organizacija kak sistema: Principy postroenija ustojchivogo biznesa Jedvardsa Deminga Moskva: Al'pina Biznes Buks 370 p
[8] Porter M 2006 Konkurentnaja strategija: Metodika analiza otraslej i konkurentov Moskva: Al'pina Biznes Buks 454 p
[9] Mincberg G 2008 Trebujutsja upravlency, a ne vypuskniki MVA. Zhestkij vzgljad na mjagkuju praktiku upravlenija i sistemu podgotovki menedzherov Moskva: ZAO «Olimp-Biznes» 544 p
[10] Santirasegarama E 2019 Category wisdom: expert thinking development The 17th International Scientific Conference Information Technologies and Management, 2019, April 25-26, ISMA, Riga, Latvia

Maintenance of business design management system

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Abstract

The paper explores ways to restore the operability of the organization. Such methods are confined to the development of a special procedure on the basis of which the organization is improved. As a result, the skill of conducting effective changes throughout the life cycle of entrepreneurship is being practiced.

Keywords: changes, value, scenario, effectiveness, recovery, sustainability

1 Introduction

The proposed approach relates to the early and reasonable implementation of systemic changes. Such changes can lead the organization out of an unsustainable state. As a result, the time to eliminate downtime associated with loss of performance is reduced.

Taking into account current features, it was determined that the unique ability to link the interacting elements contradicts the instructions confirming its value.

The revealed contradiction made it possible to highlight the following research problem: "It is impossible to implement a medium-term scenario in the absence of mechanisms to transfer the system to a new state".

2 Approach

Knowledge of the problem characterizes the object of study, which represents a measure of the expert's readiness to comply with the standards of behavior before and after the system changes. For this purpose, it is necessary to find management levers allowing timely impact on recovery of the organization's activity.

During the recovery process, the objective of the study is being worked out, which is focused on the development of a procedure to assess the effectiveness of the changes made to the system, limited in time and resources. In line with the objective set, the following objectives have been set:

1. to perform a routine analysis of the symptoms of effective intervention;;
2. organize the choice of the option to preserve the organization's unique ability;
3. develop indications for the implementation of the medium-term implementation scenario
4. form a guidance for action on long-term effectiveness measurement.

3 Conclusions

In this approach, those who wish to acquire the skill of restoring the lost sustainability of an organization throughout its life cycle.

While solving the above mentioned tasks, a way of assessing entrepreneurship for periods of time of different duration has been found. In this way, the prospective measures of the scenario implementation are defined.

Features of authentic organizations

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Abstract

Research is devoted to accompany authentic organizations. The basis of such organizations is authenticity, which is associated with time, place and event, that allows to create unique characteristics of the organization. It is about financial characteristics providing issuance of non-financial recommendations, and by this to ensure its originality, not allowing stand out opportunities to reproduce a copy of the implemented strategy.

Keywords: strategy, complacency, vigilance, damage, reappraisal, algorithm, effectiveness

1 Introduction

The proposed approach is based on the addition of design skills to entrepreneurial business skills [1, 2]. During this addition, forming thought which allowing to its owner to create and reconstruct unique strategies [3]. Holders of this uniqueness have not only strategic superiority over other organizations due to their focus on implementing the strategy in the direction "from inside to out", but they also provide support for a hard-to-copy strategy, the implementation of which stimulates changes, taking into account the restrictions set out in the history of the organization [4, 5].

Herewith the formation of authentic organizations comes into conflict with their identity.

The real contradiction is due to the fact that the results achieved because excessive self-confidence and lead to a loss of vigilance. Such prerequisites cause not only significant damage to the organization, but they also cause manifestation of extremes in the implementation of strategies.

The research problem is lack of means to determine the status of an authentic organization. Organization managers should have at their disposal objective mechanisms that make it possible to conduct a self-analysis of the configuration of significant factors of the organization. As a result, at a certain moment, factors are reassessed, and knowledge is acquired that will help prevent extremes and inconsistencies [6].

Thereby the object of research means of assessing the current state of the organization.

In the course of such an assessment, a full-scale scan of the full activity and monitoring of individual actions takes place, which allows to separate new key operations from those that are used for a long time.

2 Research objectives setting

The aim of the research is to develop a procedure that allows for the effective design of unique organizations. It should be noted that the essence of such a design is determined by the idea, which is formed in the form of a new phenomenon, established in accordance with the principles of building the entire social system immersed in a specific environment.

The main objectives of the research are:

- Analyze technologies of design of modern organizations;
- Classify factors of creation of authentic organizations;
- Develop objective means of forming the image of an authentic organization;
- Build an algorithm for supporting an authentic organization based on complementing Osterwald's approach with Olet's technique [7, 8];
- The use of algorithm should be debugged in conditions of counteractions to sanctions coming from external environment
- Test the algorithm in accordance with the requirements presented in the disclosure of the so-called "Icarus paradox" [9];

The solution of these problems occurs during the evaluation of the effectiveness of the tested algorithm [10].

3 Research results

The developed approach allows testing the action of the procedure on the example of the organization's reaction to unauthorized interventions.

References

[11] Mincberg G 2004 Struktura v kulake: sozdanie jeffektivnoj organizacii Sankt-Peterburg: Piter 512 s
[12] Shhedrovicknj G P 1995 Izbrannye trudy Moskva: Shk.Kul't.Polit. 800 s
[13] Kammings S 2010 Rekonstrukcija strategii Har'kov: Gumanitarnyj Centr 560 s
[14] Lalu F 2016 Otkryvaja organizacii budushhego Moskva: Mann, Ivanov i Ferber 432 s
[15] Ramanudzham M, Take G 2017 Monetizacija innovacij. Kak uspeshnye kompanii sozdajut produkt vokrug ceny Moskva: OOO «Biblos» 256 s
[16] Robertson B 2018 Holakratija. Revoljucionnyj podhod v menedzhmente Moskva: Jeksmo 107 s
[17] Olet B 2015 Putevoditel' predprinimatelja. 24 konkretnyh shaga ot zapuska do stabil'nogo biznesa Moskva: Mann, Ivanov i Ferber 336 s
[18] Osterval'der A, Pin'e I 2012 Postroenie biznes-modelej: nastol'naja kniga stratega i novatora Moskva: Al'pina Pablisher 288 s
[19] Miller D Paradoks Ikara: Kak uspeshnye kompanii sami sposobstvujut sobstvennomu krahu
[20] Kokinz G 2008 Upravlenie rezul'tativnost'ju. Kak preodolet' razryv mezhdu ob''javlennoj strategiej i real'nymi processami. /Per. s angl. 2-oe izd. Moskva: Al'pina Biznes Buks 318 s

Adapted pricing mechanism

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Abstract

The paper discusses development of algorithms for managing the movement of capital. Such algorithms are configured to resolve conflicts that arise during the identification of inconsistencies in the interests of interested participants in the organization. Thus is formed the skill of pricing in terms of changes in the external environment.

Keywords: price, turnover, conflict, algorithm, performance, skill

1 Introduction

Non-standard means of setting the price make the price parameter the main one. When forming the revenue rate, this orientation switches the usual priorities from the parameter that characterizes the number of units sold to the price parameter. This ensures timely detection of violations of capital turnover conditions, which leads to the elimination of unexpected losses

During the study of these characteristics, it was found that the methods of selling goods / services contradict the forced assignment of redundancy in relation to the number of units sold, in case of an unexpected price reduction.

2 Approach

The proposed contradiction reduces the research problem to the impossibility of achieving an effective sales system in the absence of adaptation mechanisms in the conditions of changes in the movement of working capital

The object of research is characterized by working capital management algorithms over time in pricing conditions.

The subject of the study is adaptation mechanisms that are configured to resolve conflict situations detected during the capital turnover cycle.

The purpose of the study is to develop a procedure that ensures the adaptation of mechanisms for managing changes in the movement of working capital.

In accordance with the proposed goal, the following tasks were set:

1) Conducting an ongoing analysis of symptoms of typicity of sales.
2) Choosing the option for managing the movement of working capital in the conditions of deviations.
3) Implementation of the medium-term sales scenario in the absence of excessive trading activity.
4) Development of a guide to action to implement effective sales in a changing environment.

3 Conclusions

As the tasks are completed, the skill of pricing based on the principles of recent sales is developed. During its acquisition, a pricing algorithm was developed for the entire life cycle of the organization, as well as measures to overcome non-standard situations in the changing environment.

Drucker paradox in comprehension of systemic convictions of a concept

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Abstract

This paper explores the approach to ensuring the performance of the organization in all its functioning stages. The approach is based on the idea of consolidation of resources in determining the performance and effectiveness of the system in the context of goal management. Thus, an understanding of system categories is achieved and localization of issues leading to functionality impairment is carried out.

Keywords: norms, measures, discord, purpose, procedure, exit, sustainability

1 Introduction

The proposed approach allows us to find a correspondence between the established norms and the measures used. Establishment of such correlation determines the reliability of the issued diagnoses, regarding the detection of violations in the organization's operations. Identified transgressions are recorded at their initial stages.

After consideration of current issues within the studied paradox, a contradiction has been outlined, where the essence is narrowed down to the fact that various means of norms establishment and initiation of consumption measures result in the discord in regards to the concepts of "efficiency" and "effectiveness".

Thus, basing upon the aforementioned contradiction the formulation of the research problem can be outlined in the following way: "It is impossible to draw conclusions about the system's operability in the absence of means for harmonizing the concepts of "efficiency" and "effectiveness"."

2 Approach

As a result, it was necessary to use goal management as a single parameter, to isolate the object of study, in order to ensure the consistency of evaluation means in determining the performance and effectiveness at all stages of the organization's life cycle. Hence, it is necessary to develop algorithms for the organization to exit from complex situations associated with deviations from the goal.

As the agreement is reached, understanding of system concepts is achieved through their elaboration at the level of norms and measures.

To summarize, the aim of the study is focused on the development of a procedure that is geared towards creating a conceptual framework in line with system concepts. In accordance with the goal, the following tasks were formulated:

1) determine the core elements of the conceptual framework;
2) identify the limitations of the conceptual framework;
3) highlight the object of study;
4) modify the conceptual design of the study;
5) convert a conceptual diagram into a decision tree form.

This approach is intended for those who are interested in localizing the areas of the organization that suffered from loss in working capacity.

3 Conclusions

The developed localization measures, help us analyze the situation with the performance loss by determining the precise areas of discord and complication. Development of exit strategies from difficult situations positively impact the duration of the exit time, out of an unstable state, which in turn also increases the cost savings and the life cycle of the organization as a whole.

Research of mechanisms to overcome obstacles

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Abstract

The study considers the means of effective impact on unreasonable interventions in the management process. Such means give the opportunity to the management team for eliminate the consequences of negative influences throughout the entire life cycle of the enterprise. By that formed the skill of improving the organization from the position of ensuring its manageability.

Keywords: defects, diagnosis, safety, decisions, impacts, handling, sustainability

1 Introduction

The developed tools are related to the fundamental diagnostics of the search for defects. This search tuned for sustainable functioning of the organization due to training for management. Due to this, there is a reduction in time. Neutralization of losses in the initial stages of development of the organization. Taking into account the identified relevant features it's determined that full-scale organization security means are contrary to requirements, fixated on manufacturability.

2 Main part

The content of the problem is based on contradiction and is the wording of the following content: "It is impossible to reach the end of the distance in the absence of mechanisms making informed decisions."

As a result, the object of research is the means of evaluating the management team, allowing it to overcome obstacles throughout the life cycle of the organization through its improvement.

The subject of the study is the management mechanisms, timely impact the use of unprepared technology.

In the process of exposure, the aim of the study is supported, aimed at developing a procedure that ensures the assessment of defects at control points.

According to the goal, the following tasks were identified:

1) Performing a current analysis of signs of ineffective impact on identified obstacles.
2) The choice of overcoming obstacles by abandoning the theory of "Zero Defects".
3) Realization of improvements in the composition medium-term scenario of the neutralization of violations during advanced management training.
4) Development of a guide to action on the measurement of maintaining controllability at control points by creating a unique security system.

3 Results

In the framework of this study, a means of assessing the overcoming of obstacles that differ in time and place of their occurrence on the organization's full life path is proposed.

In the course of solving the set tasks, measures were developed for implementing the scenario by introducing the organization's security system, built due to mechanisms for improving the manageability process.

The role of financial stability of enterprises in the context of the impending global economic crisis

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Abstract

In theses, the role of the financial stability of the enterprise in the context of the impending global crisis is investigated.

Keywords: financial stability, enterprise, crisis, efficiency, competitiveness

1 Introduction

At the present stage of development of national economies and the scale of globalization there are more and more destructive external factors that affect the decisions as the whole States, and on the subjects of thrift, which operate at the micro level. These factors affect the structure of the national economy and on the financial sustainability of enterprises as a whole.

In the process of integration it is important to respond quickly to new market demands and the transience of situations, to ensure competitiveness in the industry. Financial condition of the company plays a key role for the stable development of the subject of thrift and its work in the future. It is necessary to conduct systematic and qualitative analysis of a company for making necessary managerial decisions and increase their economic efficiency.

2 Main part

In the system of scientific research of financial stability of the enterprise is characterized as an indicator of a stable situation in which revenues exceed expenses, there is money for free disposal and efficient use, and ensures a smooth production process and sales of products [1]. It is worth noting that among the variety of concepts for the characteristic of activity of the enterprise, for example, "solvency", "margin" or "solvency" is investigated in the article, the concept is much broader and includes a General assessment of the financial results of the company.

In the process of integration of the national economy on the activities of economic subjects of began to influence both old and new factors with varying degrees of intensity. First of all, consider the impact of the GDP growth rate. In Ukraine, he gradually grew up, gave positive forecasts and expectations of the business in the future. The rate of inflation began to decline, the incomes grew and unemployment decreased. In the process of such positive changes, companies were able to expand activities and strengthen financial stability.

Market factors also had positive dynamics of development and political tensions start to subside. A trade war between the US and China have an opportunity for Ukrainian producers to replace their goods on the world market from foreign competitors. As a result, the heavy industries have improved financial performance and increased activity. The disagreement between Russia and Saudi Arabia about keeping oil prices in a falling market led to a huge saving of financial resources due to low prices of petroleum products to support manufacturing and related activities.

But the totality of positive factors, economists and analysts characterizable situation as the first signs of the forthcoming economic recession on a global level. The findings were made in terms of development of economies with a large influence, particularly the EU and the United States and historical experience. Accelerated the process of approaching crisis an epidemic COVID-19. Because of its fast prevalence and the high percentage of mortality for older people, announced the epidemic has led to the shutdown of companies and a large pressure on the social policies of all countries.

Economic losses are very large. The financial condition of many companies has deteriorated to critical indicators. Many of them ceased operations. The same businesses that name sufficient financial strength needs to reconsider its fiscal policy and to switch to balance activities and increase financial reserves to overcome future financial and economic shocks for conservation activities and positions in the market. It is understood that due to all the crises the market is purified, passed into a new phase of development and opened new areas of activity.

3 Conclusion

The role of financial stability is very important in the modern fluctuations of the .markets and more devastating world crises. Achievement of the required level of strength, the company provides a successful operation at this stage activities and the ability to handle unexpected and challenging situations, both at the national and global level. Those businesses that chose and formed the right policy activities, may in the future enter the market as experienced players and more rationally and with greater force to conquer new positions on the market that can also be seen based on the history of development of different enterprises and companies that have already been in such conditions.

Reference

[1] Poddier'ohin A M, Naumova L Yu 2011 Finansova stijkist' pidpryiemstv v ekonomitsi Ukrainy [the Financial stability of enterprises in the economy of Ukraine], KNEU, Kyiv, Ukraine

The features of the competitive advantages formation in the agricultural enterprises

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Abstract

In the paper we investigate the integrated approach, which allows to identify the key external factors and internal symptoms affecting for assessing and reviewing agricultural enterprises competitiveness. To assess the competitive advantages of agricultural enterprises, it is proposed a methodical approach, which is based on the evaluation of the enterprise's strategy, measuring the effectiveness of its activity in the conditions of changing the innovation and investment potential.

Keywords: new conditions, innovation, policy, planning system, efficiency

1 Introduction

At the beginning of the 21st century both developed and developing countries faced new global challenges related to increased global competition. In the context of the strengthening of global climate, political and technological challenges, the issues of strengthening the competitive position of food producers have remained extremely critical.

This is primarily due to the exponential increase of the population. The world's population, which numbered 7.7 billion in 2019, continues to grow to 9.7 by 2050, and will increase to about 11 billion by the end of the century Population growth will lead to increased food demand and a huge increase in food production, which could have devastating environmental consequences.

At the same time, the strengthening of integration processes in global trade and the emergence of new technologies for the manufacturing greatly complicates the competitive conditions for the business activity of all legal and institutional forms and types of economic activity. Together all this has led to strong competition amongst food producers, both nationally and globally.

Against such a background, one of the primary focuses agribusiness development is a number of issues, which include the improving the competitiveness of agrobusinesses as a key driver food security, social stability and poverty reduction in the country.

2 Mainpart

Considering the fact that there is no unambiguous position had been expressed by the economists and specialists in the determination of the combination of factors and conditions that identify the competitiveness of the enterprise in a market environment, there is no unambiguous definition of the concept of competitive advantages. This has been clearly illustrated in a huge literature over many years, such as M. Porter, B. Karlof, A. G. Shpikulyak, Yu. P. Voskoboinik, A. V. Ovsyannikova [1, 2].

According to A. G. Shpikulyak, Yu. P. Voskoboinik and A. V. Ovsyannikov, agriculture is characterized by institutional competitiveness features associated with the "institution of ownership", which leads to the development of various organizational and legal forms. This explains the disparate approaches to the process of competitive advantage creation [3, p. 5].

Competitiveness is achieved by combining the advantages of some economic agents with the advantages of others in the national and global market conditions. There is a need for creating the set of elements and parameters that are strategically important for economic performance and competitive advantage to become competitive on the international market. We have a number of proved competitive advantages that should be used in the in any activity or product output compared to competing enterprises.

A host of factors, in addition to technology, affect the competitive advantage of enterprises. to identify the key external factors and internal symptoms affecting for assessing and reviewing agricultural enterprises competitiveness by analyzing the basic approaches of leading scientists, such as:

- agri-enterprise strategy (a system of techniques and tools in management, which allows to achieve the mission of the enterprise, a system for controlling the formation and distribution of resources, a way to introduce innovations, compete, conquer new markets, a systematic methodology for researching the future);
- the effectiveness of the system and methods of enterprise management (high-quality strategic and operational management, the professional level of managers and specialists);
- innovation and investment potential (development and introduction of a new product, a new production method, the creation of a new market for goods or services, the development of a new source of supply of raw materials, the reorganization of the management structure, the implementation of measures to improve the life of the population and environmental protection, the availability of financial, property and intellectual values, their structure and sources of income)
- the level of organization of production (provision of the enterprise with fixed assets and working capital, compliance with the main principles of organization of production, level of maintenance of production, etc.);
- planning system (planning the main activities of the

enterprise, resource support, expenses and finances at the enterprise, enterprise development planning, operational calendar planning, determining the best methods and ways to achieve the goals of the enterprise with the efficient use of all types of resources);

- a system of economic, socio-psychological incentives (forms and systems of remuneration, bonuses, participation in profits, tuition, preferential nutrition, additional pay for seniority, content of work, the opportunity for taking initiatives, moral encouragement, social recognition, etc.);
- intellectual and labor potential (organization of personnel policy, provision of high-quality labor resources in the quantity necessary for the enterprise, carrying out measures for planning and forming the personnel of the enterprise, staff stability, personal ambitions, the possibility of professional development);
- the corporate culture (enterprise orientation on people, cultural structure, common values and beliefs).

It is necessary to take into account the peculiarities of the industry to which the enterprise belongs when developing management decisions to achieve competitive advantages.

The agro-food complex is almost the most competitive industry, where agricultural producers (small and medium-sized enterprises) are not able to influence market prices (unlike agro-holdings). The main threats to the enterprise's activities in this area are: increasingly ineffectual State regulation of the economy in the absence of developed market regulatory mechanisms;, and the consolidation of monopolistic power on the part of the developed processing and manufacturing holdings, the constraints and challenges posed by the deteriorating macro-environment, problems securing the requisite equipment and vehicles, land abandonment, undergrazing and lack of capital to maintain or improve farm structures, fragmentary land reform, farm restructuring, input supply, improvement of production and productivity, and pricing.

3 Conclusions

Thus, competitive advantages for agricultural businesses should be formed by increasing the efficiency of the use of available limited resources, finding a way to diversify products with effective State regulation. The main pillars of the improving competitiveness in agri-food complex are:: pursuing a fair and effective agricultural policy as a partnership between agriculture and society, and between state and its farmers, which include the supporting farmers and improving agricultural productivity, ensuring a stable supply of affordable food; horizontal integration with enterprises and individual peasant subsidiary farms to establish processing and marketing cooperatives, o deal with difficult market situations such as a sudden drop in demand due to a health scare, or a fall in prices as a result of a temporary oversupply on the market, promoting sustainable and organic farming and innovation, to support jobs and growth in rural areas and to move financial assistance towards the productive use of land. It entails a major technical overhaul and the addition of cutting-edge technologies to enhance effectiveness in the use of existing funds.

The feasibility of some possible forms of special competitive advantage in various service sectors of agribusiness could be further explored.

References

[1] Karlof B 1991 Delovaya strategiya: kontseptsiya, soderzhaniye, simvoly [Business strategy: concept, content, symbols] Moscow, Economy
[2] Porter M 2005 Konkurentnoye preimushchestvo. Kak dostich' vysokogo rezul'tata i obespechit' yego ustoychivost [Competitive Advantage. How to achieve high results and ensure its sustainability] Moscow, Albina Business Books
[3] Shpikuliak A 2017 Formation of competitiveness in agrarian economy / AG Shpikulyak, Yu. P. Voskoboynik, OV Ovsyannikov Agroincom **9-10** 4–8
[4] Kondratenko O, Pershen N 2019 The Formation of Competitive Advantages of Agricultural Enterprises in Modern Economic Conditions Bulletin of Economic Science of Ukraine **1**(36) **E-source:** https://cyberleninka.ru/article/n/formuvannya-konkurentnih-perevag-agrarne-pidpriemstv-v-suchasnih-umovah-gospodaryuvannya

Investigation of key factors in the strategy formation in the context of integration

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Abstract

An approach to determining the performance of the organization at all stages of the implementation of its strategy is offered. In addition, conditions for the formation of the stable functioning of an enterprise are provided with consideration of the managerial actions leading to prosperity, survival and death of the organization.

Keywords: strategy, integration, management, market, organizational development

1 Background

The present study focuses on evidence-based selection of the best ways to develop the organization in a changing setting of the external market [1]. A bet on validity allows not only to strengthen the organization's position, but also to find leverage on pricing tools [2]. Possessing unique levers of control, the organization ensures the implementation of the strategy over the entire distance towards achieving particular strategic goals [3].

During the implementation of the strategy, the requirements for integration into the market contradict the methodological provisions of the organization of entry. It is a question of alignment of external requirements with internal standards of development of skills in solving complex organizational issues. Such coordination is carried out on the basis of performance measurement tools [4].

The subject of the problem is disclosed in the following wording: "It is impossible to develop a strategy in the absence of means of evaluating its effectiveness". Another research problem is the lack of means of determining the status of the authentic organization.

Knowledge of the problem allows you to highlight the object of study, a set of instruments that allow to form a system for managing strategy implementation for the entire period of its effectuation [4].

2 Problem Statement

The aim of the study is to justify the mechanism for managing the formation and realization of strategy in the integrated environment.

In accordance with the goal, the following objectives were formulated:

- to identify the best ways of development of the organization in the changing external market environment and identify the key factors influencing this process;
- to present the system of strategic management of a business organization as well as the content and purpose of a development strategy, and to determine the main factors affecting its choice;
- to establish a system of the tools necessary for strategic management of the organization during integration;
- to justify the formation mechanism of management and implementation of the strategy.

The solution of these problems occurs through the use of system-structural and abstract-logical research methods, which allow to study information and scientific sources along with the experience of leading enterprises, make theoretical generalizations and draw the appropriate conclusions.

3 Research findings

The approach which was developed, that is introduction of a management mechanism for the implementation of the organization's development strategy in the context of integration, allows to increase the efficiency of activities in the competitive market using a combination of competitive advantages and timely response to opportunities and threats of the external environment.

Any enterprises have two fundamental options for a development strategy, internal and external development. Internal development requires intensive growth based on the introduction of innovative technologies and enterprise management approaches that can ensure that they achieve better results in their field of activity compared to competitors. And external development, provides for the development of the enterprise through integration and diversification. At the same time, the size of the enterprise does not particularly affect the process of developing a development strategy and tools that are used for this. The specifics of the strategies will be shaped by the fact that small-sized enterprises operate in limited market niches, narrowing the range of possible strategic decisions. A set of possible strategies comes down to concentrating efforts, maintaining competitive advantages, building up efforts or eliminating them and reorienting to other market niches. In

this case, the main goal of vertical integration is to increase efficiency, and horizontal - the expansion of market power.

As studies have shown, the use of this mechanism ensures the identification of reserves in all areas of activity. In such way, favorable conditions for warning about possible problems are created that stimulate managers to implement solutions to improve coordination of their actions and increase working efficiency.

References

[1] Cummings S 2010 ReCreating Strategy Kharkiv: Humanitarian Center 560 p
[2] Paderin I D Pricing methods at an industrial enterprise in a transition economy **E-source:** http://dspace.nbuv.gov.ua/bitstream/handle/123456789/4242/st_29_18.pdf?sequence=1
[3] Mintzberg H, Ahlstrand B, Lampel J 2019 Strategy Safari: A Guided Tour Through The Wilds of Strategic Management Moscow: Alpina Publisher 367 p
[4] 2005 Instruments for implementing the strategy / Ed. prof. Yu.N. Lapygina Vladimir: Vladimir Book Printing House 281 p

Discovering the problem of the WOS effect

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Abstract

The paper investigates the shortcomings of the class of systems related to the class of "Well-organized systems". (WOS) They are disclosed in the process of designing the means to restore the system's operability in new conditions. Such means cause the necessity in protecting the structure of the organization, from large-scale circumstances. Their revealing is based on revealing of the states which cause loss of sustainability.

Keywords: dynamics, compliance, condition, instability, measures, exit

1 Introduction

The approach of dynamic monitoring of influence factors and symptoms compliance is considered. Dynamic compliance monitoring, performed in the type of "repeated exercise", helps to develop the skill to remain vigilant. This results in the identification of mismatches detected early in the exercise, warning the organization about the possibility of getting into an unstable condition.

The selected moments have shown that if the operation of temporary localization of the place of violation of the organization's functioning is not taken onto account, there is a contradiction connected with the measures of recovery of the organization from the unstable state [1]. Usually, the causes of violations are declared on the basis of the results of the investigation by means of exit.

2 Main part

The revealed contradiction has allowed to express a problem of research in one formulation: "It is impossible to establish reliability of the event which characterizes loss of sustainable functioning, in the absence of means of dynamic coordination of factors of the external influence, synchronizing in time with symptoms of internal return influence».

Presence of a problem to allocate searched object which is reduced to the isolated complex, allows to describe restoration of working capacity of system in case of occurrence of the deviations caused by damage caused to the organisation.

As a result, the hidden side of the research subject is revealed. It is a organisations' structure protection subsystem, which operates in new conditions [2].

Thus, the objective of the study is to develop a procedure to ensure synchronization over time of exposure factors and symptoms of influence.

The formulated objective made it possible to set the following tasks:

1) To carry out the current analysis of violations of the organisation's presence in an unstable state
2) Implement the choice of sustainability option in a short term.
3) Ensure implementation of the medium-term scenario in the strategic space.
4) Develop guidance for action in the long term perspective.

3 Results and perspective

The solving of these tasks will require the development of a subsystem to restore lost resilience. The basis of such subsystem will consist of algorithms, which development will allow to find control system output actions from inoperable state [3]. As a result at the disposal of the organization there will be means, allowing to open the system and bring it to the level of response to new large-scale situations.

References

[1] Kossiakoff A, Swee N, Seymo, S, Bier S 2011 Systems Engineering Principles and Practice John Willey & Sons, Inc

[2] Kelsina D, Kopitov R 2010 Loyalty predisposed algorithms of chain management system Reliability and Statistics in Transportation and Communication 2019, October 16-16, TSI Transport and communication institute, Riga, Latvia 48-9

[3] Kelsina D 2019 Algorithms of the company's loyal maintenance 6th SWS International Scientific Conference on Social Sciences 2019, August 26 - September 1, 2019, Albena Bulgaria, Section Business & Management 365-72

Control based self-adapting algorithms

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Abstract

The approach of creation of the dynamic control complex of the consequences of the negative impact detected deviations has been explored. Such influences have been determined in the course of the disruption of the functioning of the control system.

Keywords: operational capability, metasystem, current state, goal formation, position

1 Introduction

The proposals for the improvement of the system through detection of the changes come into conflict with the reluctance of their implementation that is caused by negative experience in the implementation of previous proposals [1].

2 Problem state

The problem of the research has been reduced to the impossibility of effective introduction of changes to the system in the absence of the means to determine its performance.

The object of the research is a complex that allows selecting the certain conditions on the basis of which the requirements for diagnostics of the tools that allow determining the organization's performance before and after the detection of large-scale events have been formed [1, 2].

The objective of the research is the development of a procedure for determination of the organization's performance before and after the improvement of the system.

In accordance with the objective, the following tasks have been set:

1) To conduct a routine analysis related to the resistance to the introduction of changes against the background of the disclosure of the consequences of their timely introduction;
2) To select the option that allows overcoming the resistance by assessing the damage caused to the system due to unwillingness to introduce and implement the changes;
3) To implement a scenario in the medium term focused on the quality maintenance through the rejection of the immediate benefit;
4) To disclose the introduced improvements at the operational level in the context of resolution of the identified problems.

3 Results

In the course of resolution of the problems, two systems have been formed. The first subsystem is designed for tracking the negative consequences of the functioning of the organization upon introducing significant changes. The second subsystem provides tracking of the changes occurring in the external environment [3].

References

[1] Kossiakoff A, Swee N, Seymor S, Bier S 2011 Systems Engineering Principles and Practice John Willey & Sons, Inc
[2] Kazina I, Kopitov R 2019 Self-Adapting Algorithms of the Assessment of the Operational Capability of the Organization 6th International Scientific Conference on Social Sciences and Arts SGEM 2019, Bulgaria, 24 August - 2 September, 2019, Conference Proceeding Book 733-40
[3] Trompenaars F, Coebergh P H 2014 100+ Management Models. How *to understand and apply the world's most powerful business tool* Oxford: Infinite Ideas Limited 577 p

Usage of the hidden feature of the DIKW model for determining the object of functioning

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Abstract

This thesis addresses the approach of restoring the operations of an organisation before and after eliminating the consequences of its withdrawal from an unstable condition. The approach is based on a synthesis of two systemic subsystems within the system of a functioning object. The operating capability of an object is determined in reliance upon a set of means obtained in the course of converting the ideal DIKW model for adjustment to the two oriented circuit scheme. The premise for such conversion was the new feature of the DIKW model.

Keywords: methodology, circumstance, lever, restoration, life activity, chance

1 Introduction

The proposed methodology allows determining the active object of functioning. Working with such objects represents the natural state of an organisation, when destructive forces such as disjoint and disinformation, while being under external influences, do not pose any threat to the organisation. This is achieved thanks to effective operating levers, which, if implemented in a timely manner, allow preventing the spread of disturbance across the organisation that would otherwise require many years of restoration [1].

Considering the emphasized moments, it is concluded that the new conditions of the organisation's life activities contradict the standing norms of goal setting.

The identified contradiction brought about the understanding of the problem of the study, essentially formulated as follows: "It is impossible to ensure seamless functioning of an organisation in the absence of any means of survival that would be effective in the setting of influence of large-scale circumstances".

2 Methodology

This led to the appearance of key grounds for allocating the object of the study aimed at finding a chance to save an organisation that is currently in a critical condition. Fulfilment of the chance is tested within a subsystem of targeted influence aimed at the elimination of consequences of the identified circumstance. In such situations, the active circumstance not just causes disjoint within an organisation, but also disables its reaction to numerous, regular and imperceptible repetitions, accumulation of which can bring about the demise of this organisation. This causes the need for a subsystem allowing to identify the symptoms typical for an organisation that is affected by a large-scale circumstance over a lengthy period of time. This subsystem forms a basis for an organisation to rectify its critical situation that could otherwise lead to its destruction. In terms of systemic elements, this refers to the objective part of the object of functioning oriented towards maintaining the constancy of a set goal. Figure 1 shows the circuit of a subsystem obtained by means of transforming the DIKW model.

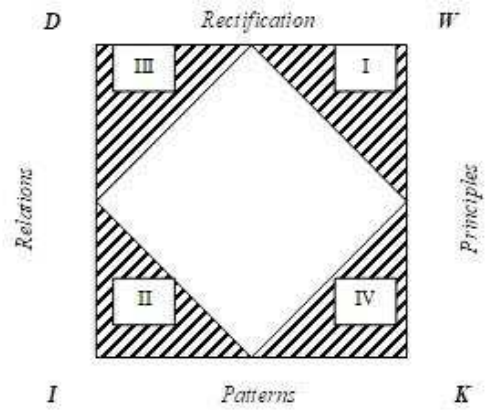

Figure 1 Layout of presentation of a goal-oriented DIKW model as a closed circuit

This circuit is obtained by means of introducing the positive feedback "Remediation" into the DIKW model [2]. The hatched areas represent the zones of potential loss of functioning.

The drawback of the presented model scheme is its circularity and isolation from the external environment. The thing is, the subject within such schemes acts as the object at the same time. In other words, withdrawal from the idealisation of the DIKW model has allowed to relocate the functions of setting the rules of functioning of the object from the standpoint of studying its behaviour through the efforts of the organisation. Within the boundaries of such system describing the object f functioning, it is impossible to ensure timely reaction to external circumstances. This is due to the fact that the circuit of the system does not receive information from the external environment. Essentially, the subject circuit must be introduced into the DIKW scheme. This problem was solved using the methodology described in the book [3]. The methodology mentions four elements that belong to the functional component class of the first level of the goal system. Such elements describing the life activity of an organisation were introduced by the authors of the DIKW model [4], but were never used in practice. Association of the four keys, specifically, "good", "truth", "beauty" and "abundance" provides an opportunity to obtain a means of tracing powers of authority that affect the goal orientation of a system, which eventually shapes the idea of the subject area of the management system within the

context of the active object of functioning. Figure 2 depicts the external circuit of influence of the subjective part of the object of functioning.

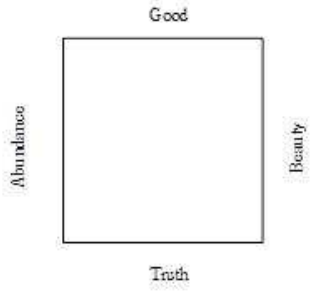

Figure 2 Detailed specification of the DIKW from the standpoint of the circuit described in terms of life activity of the object of functioning

The second circuit is a subsystem for supporting the life activity of an organisation that allows identifying large-scale circumstances.

Figure 3 depicts the influence of the external circuit on the object of the system initially described in terms of the subject circuit.

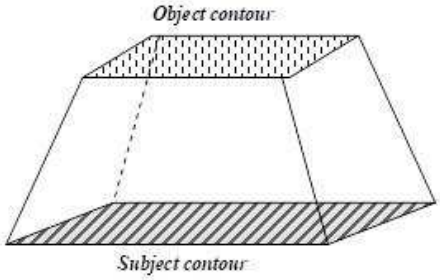

Figure 3 Detailed specification of the DIKW from the standpoint of the circuit described in terms of life activity of the object of functioning

The size of the subject subsystem is less than the area of the subject zone because the restrictions that determine the vitality of an organisation are stricter.

Projection of the external circuit onto the subject area allowed shaping an idea of the object of functioning [5]. Its description is provided in the course of disclosure of the goal of the study summarised as the development of a set of procedures allowing an organisation to deal with a complicated situation. Four objectives were set to achieve the desired goal:

1) assess the current position of the organisation within the boundaries of the strategic field of the object of functioning;
2) determine the symptoms of failure to react to the manifestations of influence of large-scale circumstances and substantiate the way of remedying the current situation;
3) adjust the strategic plan of development of the organisation within the setting of restoring normal functioning;
4) systematise faults from the standpoint of identifying the main circumstance using the means of prospective prevention of the loss of performance ability.

3 Results

Achieving the objectives listed above led to the development of a method for shifting from the ideal-oriented model to the systems that describes an object of functioning that changes over time. Such system is obtained by means of combining two circuits. Fig. 4 shows the strategic field of the system, which includes the area of sustainable functioning, as well as eight performance loss areas (see Figure 4).

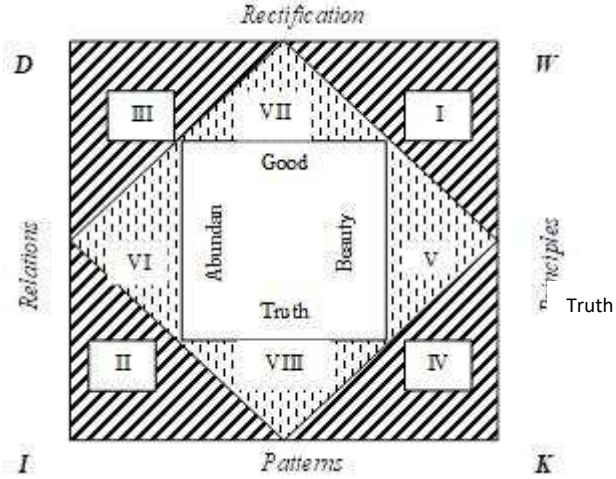

Figure 4 Strategic field of the object of functioning within the DIKW model

4 Conclusions

This resulted in the development of an algorithm for the calculation of coordinates of the strategic position of an organisation from the allocated zones of the object of functioning. Apart from that, the study has identified a method for structuring and assessment of the goals of a system from the aspect of the active object of functioning. Thus, developers of the management system acquire a means of shaping a separately organised complex for the assessment of the strategic position of an organisation and development of measures for restoration thereof in case of influence of large-scale circumstances.

References

[1] Dyakon O, Dyakon R, Kopitov R 2014 Comprehension of Management Problems Forms Understanding of Business Tasks The 12th International Conference Information Technologies and Management 2014, April 16-17, 2014, ISMA, Riga, Latvia 186-7

[2] Kamforina O 2017 Classification of factors that affect loss of sustainability in organization The 15th International Conference Information Technologies and Management 2017, April 27-28, ISMA, Riga, Latvia 187-9

[3] 2009 *Теория систем и системный анализ в управлении организациями Справочник: учебное пособие* / под. ред. В.П.Волковой и А.А. Емельянова/ Москва: Финансы и статистика; ИНФРА-М 848 с

[4] Акофф Р, Эмери Ф 2008 *О целеустремленных системах* Москва: Либроком 272 с

[5] Kelsina D, Kopitov R 2019 Algorithms of the Company's Loyal Maintenance 6th International Scientific Conference on Social Sciences and Arts SGEM 2019, Bulgaria, 24 August - 2 September, 2019, Conference Proceeding Book 365-74

The conceptual provisions for developing of socially responsible supply chain management in companies

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Abstract

The article considers the key principles of formation of conceptual provision for developing of socially responsible supply chain management in companies

Keywords: social responsibility, supply chain, global supply chains, global value chains

Corporate social responsibility is understood to mean such type of a company's management and functioning when all its activities are permeated by social obligations (most often voluntary) to all internal and external counterparties: employees, partners, the government, civil society institutions. The most general definitions for CSR mean the responsibility for decision makers to those whom these decisions concern; this is a corporation's rational response to the conflicting expectations of all participants (stakeholders) aimed at the company's stable development; it is the implementation of voluntary social obligations to employees, partners, the government, civil society institutions and society as a whole within the corporate governance system.

The origins of the CSR concept, theoretical foundations of entrepreneurship, business activities, understanding of the entrepreneurship's mission based on the social responsibility principles are presented in the works by M. Allais, A. Berle, H. Bowen, M. Weber, P. Drucker, R. Cantillon, B. Karloff, D. Carnegie, Ph. Kotler, K. Marx, A. Smith, D. Ricardo, J. Schumpeter and other scientists

Various models of social responsibility actively emerged and had began implementation in the world business practice at the end of the XIX - beginning of the XX century. This occurred because of several reasons:

1) the aggravation of social and labour relations that previously were formed exclusively in the employers' interest;

2) the transformation of social, cultural, moral values, traditions, and customs, which for many centuries have determined the society development;

3) the formation of a large corporate sector and its positive image in the public minds;

4) the development of democracy in all aspects of society's life;

5) understanding the importance of human resources and their role in the modern economy.

Further formation of the foundations of the corporate social responsibility concept, its rapid development, serious discussions among the public regarding the nature and significance of the CSR phenomenon had a place in the 30-50s of the twentieth century. The 60s of the twentieth century became a developing period for the corporate social responsibility concept, deepening the CSR definition. In 70s of the twentieth century, the number of alternative views on the interpretation of the social responsibility phenomenon increased. More profound research was held in the 80-90s of the twentieth century, which caused the CSR thematic framework to expand and more alternative concepts to emerge.

At the end of the twentieth century, the processes of globalization, expansion of information technology, and greening the economy, were accelerating. Finally, in the 2000s, the socially responsible business finally became a non-alternative way of development. The idea of sustainable development had become popular in science and practice, and reporting systems taking into account environmental standards emerged. An integration of the social responsibility principles in the companies' strategic management occurred.

An important stage in the spread of the social responsibility concept was the emergence of the ISO-26000 standard "Guidelines on Social Responsibility" in 2010. In this standard, "social responsibility" is considered as the responsibility of the enterprise for the consequences of its decisions and activities on the society and the environment through transparent and ethical behaviour, which contributes to the sustainable development, health and well-being of the population; takes into account the stakeholders' expectations; complies with existing legislation and is consistent with the international rules of conduct; integrated into the entire enterprise's activities and is implemented in the practice of relationships" [1].

Since the beginning of the XXI century and until the present time, the CSR concept is being developed further. The conceptual aspects of social responsibility, various issues of social responsibility in labour relations, the environmental responsibility of enterprises, development of corporate culture based on social responsibility, as well as other fundamental issues in the field of social responsibility were studied by H. Bowen [2], W. Buffet [3], K. Davis [4], A. Carroll [5], W.B. Werther [6], C. Walton [7], et al.

The evolution that the corporate social responsibility concept passed can be represented from a timing perspective as follows:

- the economic responsibility concept - the social responsibility of business was understood as a company's economic responsibility for business operations and maintaining profitability;

- the basic business strategy concept provides that a

business cannot move forward if the society in that it operates does not function well;

- the concept of responsibilities - a company should fulfil the following responsibilities: economic (to earn sufficient profit on its own equity in order to satisfy shareholders, provide products to consumers, create new jobs and new material values for its business), legal (to comply with the law), ethical (to be moral, honest, fair, respect human rights, avoid harm or social oppression, prevent harm to other participants), philanthropic (to pay for activities useful or beneficial to the society);

- the "stakeholders" concept highlights the presence of a company's "corporate consciousness", which involves a constant understanding by the company's management of the company's responsibility in relations to the civil society;

- the corporate accountability concept – the companies are in a certain way responsible for the consequences of their actions and should become more accountable to the public;

- voluntary concept - the companies obligations to strive (on a voluntary) basis to achieve long-term goals that are useful to the society;

- the proactivity concept involves a "proactive" (strategic) approach to doing business, thus systematically expanding the company's management capabilities for sustainable development.

As a result of the evolution of the corporate social responsibility concept, many interpretations of this concept have arisen. In the scientific studies devoted to disclosing the nature and structure of social responsibility, we can find different definitions, such as: "social responsibility of business", "corporate social responsibility", "corporate citizenship", "corporate social activity", "business ethics", etc. The given definitions are related to different types of social responsibility, but the essence remains the same. In common understanding, the corporate social responsibility is defined as a business managing with consideration of needs of local communities, the own personnel, and the environment.

References

[1] International standart ISO/DIS 26000. Retrieved from: http://www.lsd.lt/typo_ new/ fileadmin/Failai/N172_ISO_DIS_26000__E_.pdf.

[2] Bowen, H. R. (1953). Social responsibilities of the businessman. NewYork: Harper& Row.

[3] Buffet W. (2008). Essays on Investment, Corporate Finance, and Company Management. M .: Alpina Business Books. 268 c. Retrieved from: http://muganfx.com/uploads/books/book_1271318186.pdf.

[4] Davis K. (1960). Can business afford to ignore social responsibilities? California Management Review. 2 (3): 70–76.

[5] Carroll A. B. (1979). A three-dimensional conceptual model of corporate performance. Academy of Management Review. Vol. 4(4). P. 500.

[6] Werther, W. B., & Chandler, D. (2005). Strategic corporate social responsibility as global brand insurance. Business Horizons,48(4), 317–324.

[7] Walton, C. C. (1982). Corporate social responsibility: The debate revisited. Journal of Economics and Business, 34(2), 173–187.