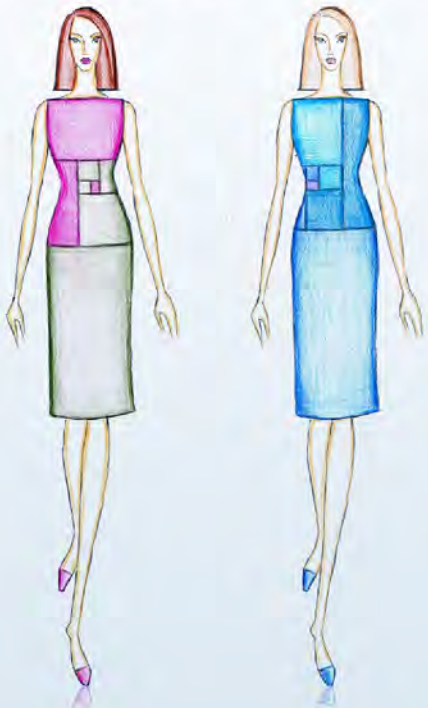
EMIT

economics management information technology

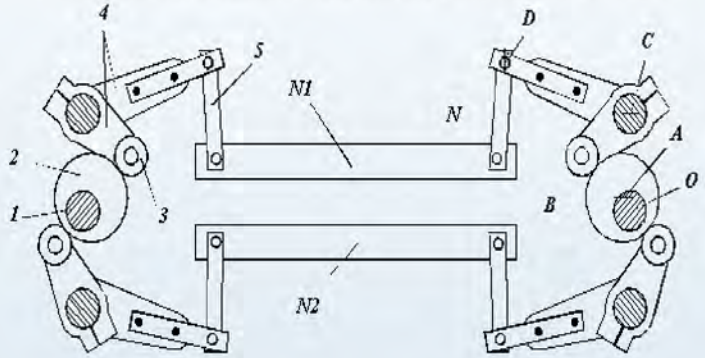
Volume 4/ Number 1 / 2015 ISSN 2217-9011 e-ISSN 2334-6531

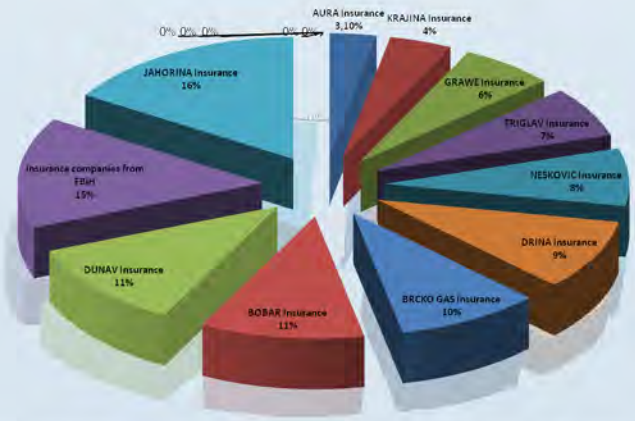
SUPPORT: Rex RAKITA EXPLORATION doo Bor
Affiliate of Freeport-McMoRan

Design of ladies' dresses using the Golden squares tiling in spiral form



Actuating of the knife boxes of the Jacquard machine GROSSE





Market representation of the insurance companies in the RS for 2011

www.emit.kcbor.net

ISSN 2217-9011
9 772217 901005

EDITOR IN CHIEF

Editorial board

ECONOMICS, MANAGEMENT, INFORMATION AND TECHNOLOGY E M I T

Content:

Address of the Editorial Board
19210 Bor,Trg oslobođenja 8, Serbia
phone: +381 30 422-386
email: emit@kcbor.net
http://emit.kcbor.net
Published by: (Civic Library Europe)
Građanska čitaonica Evropa
ISSN 2217-9011
e-ISSN 2334-6531

SHORT BIOGRAPHY OF GUEST EDITOR OF ZLATINA KAZLAHEVA

Zlatina Kazlacheva, PhD
Trakia University Faculty of Technics and Technologies,
Yambol, Bulgaria

Zlatina Kazlacheva (born 1968) got her PhD in Design from Technical University of Sofia, Bulgaria in 2008. Since 2009 she is an Associate Professor in Fashion Design and Pattern Making at Trakia University, Faculty of Technics and Technologies, Yambol, Bulgaria. Since 2012 Zlatina Kazlacheva is Vice Dean of International Relations and Science of the Faculty of Technics and Technologies.
Zlatina Kazlacheva has published over 90 papers and 8 books. She is a member of scientific committees of international conferences and editorial boards of scientific journals in Bulgaria and abroad. Research interests: Fashion Design (Design Theory, Application), Pattern Making (Development of Geometrical Constructional Models, CAD Design).

UDK: 371::004 371.694:004 COBISS.SR-ID 216026636 Review Article

REQUIREMENTS FOR THE PREPARATION OF E-LEARNING RESOURCES

Krasimira Georgieva[1], Vanya Stoykova[2]
[1]Trakia University of Stara Zagora,
[2]Faculty of Technics and Technologies of Yambol, Bulgaria

Abstract: *The integration of modern information technology in higher education lays the foundation for e-learning, which differs from traditional training in terms of content, organization and implementation.*
Electronic resources and services are the essential basis of nowadays information educational environment. For the successful design of interactive educational e-resources, it is necessary that university teaching staff possesses professional competences and capacities in this field as well as some experience in the implementation of various innovative methods and training tools. The electronic educational resources that teaching staff develops should meet certain requirements to help enhance their usability.
The current report analyzes and systematizes some technical and pedagogical requirements for the design and use of e-learning resources in various engineering disciplines.
Keywords: *e-learning resources, e-learning, innovative teaching methods, usability.*

ARTICLE INFO
Article history:
Recived 03. mar .2015 **Recived in revised form** 05. may. 2015 **Accepted** 16. may. 2015. **Available online** 03. jul. 2015.

1. INTRODUCTION

Today's digital generation students can find any information and training material they need at their fingertips - at a smart phone, laptop or tablet through "Google", "Wikipedia" or sharing resources with their colleagues in the social networks. Such sources often provide irrelevant, inaccurate and unverified information. According to Professor Brabazon, author of "The University of Google" [1], Internet users give the same credibility to any piece of information on the web. She says it was "great to see how the students have changed. But we can no longer assume that students arrive at university knowing what to read and knowing what standards are required of the material that they do read." Students prefer e-resources and it is difficult to take them to the libraries at the fixed working hours while the information is before them and they can use it anytime that's convenient for them.

The 4th screen generation, which will soon enter our universities, prefers reading on screens rather than on paper. Having this in mind, teachers should guide their students to reliable high-quality web-based e-resources, published in various e-learning systems (ELS), virtual libraries, educational portals and repositories.

In order to achieve the educational objectives, all educational electronic resources, published on the web, should meet certain requirements. The latter can be referred to the technical and pedagogical usability of web-based resources as viewed and studied in [2, 3, 4]. E-resources used in the training of engineering students must meet the same requirements, yet there are a few more specific features which have been introduced in the current report.

2. EXPOSITION

2.1. Electronic educational resources

"The electronic educational resources (e-resources) are among the most important components of the Information Educational Environment (IEE)" [5]. By definition, an "electronic resource" is any piece of encrypted work, which is used by a computer. It can be provided via remote access (computer networks, Internet) or direct access (through electronic media such as CDs, floppy disks, flash drives, etc. that are read by the relevant peripheral device of the computer system) [6, 7]. Nowadays the most widely used resources are the web-based resources which are published in university ELS, clouds, educational portals, social networks, on web sites for sharing learning resources (e.g. pomagalo.bg), etc. (should be arranged in reverse order to see the frequency of use).

Modern organization of the educational process requires an increase of the time for self-study and a reduction of the contact time with the teacher, therefore it is necessary that the students have before them learning resources which are of high quality and are fully applicable for the theoretical and practical training on the course. The importance of e-resources in the IEE for example, is greater than that that of paper manuals in traditional training because the contact of the student with the teacher (who plays the role of a mentor in this scenario) is minimized and the training takes place in a virtual learning environment through e-resources.

Learning objects and assets are a building block in the creation of educational content in the context of e-learning.

According to [5] "The main types of electronic educational resources" are the following: electronic textbooks; test systems; search engines, directory systems; various means for mathematical modeling and simulation; automation of professional activities; interfaces to remote access laboratories, virtual laboratory workshops; comprehensive training programs, etc. The number of digital web-based resources and activities integrated in university courses, ELS, subject blogs, virtual universities, etc. is constantly growing.

In Bulgaria, a positive step in this direction was taken with the help of few projects conducted by the Ministry of Education in the period 2010-2014, such as "System for training and career development of teachers in higher education institutions" and "Development of electronic forms of distance learning in higher education". These were aimed at the expansion of the university e-learning resources and training the teaching staff to create and implement them in the learning process.

In order to achieve their educational goals, e-resources must meet certain requirements, which can be viewed in the context of their usability. Usability is defined as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use." (International Organization for Standardization ISO 9241-11, 1998). In the process of developing a website, its usability is of a particular significance [8], furthermore, when this is a site with educational resources, the parameters of their usability bear additional specific characteristics and importance.

The main parameters of usability have been defined in standard ISO DIS 9241-11 Part 11: Guidance on Usability [9,10], as:

- Effectiveness - Accuracy and completeness with which users achieve specified goals. It is estimated by the number of mistakes made by users and the number of tasks completed correctly;

- Efficiency - resources expended in relation to the accuracy and completeness with which users achieve goals. It is measured by the errors made by users, the cognitive load, duration of training and the complexity of the activities involved;

- Satisfaction - Freedom from discomfort, and positive attitudes towards the use of the product. Special techniques during or after usability tests are applied for the estimation of this parameter. [8].

When reviewing the usability of a web site, the user interface is taken into consideration and therefore Nielsen's ten most general principles (heuristics) for the user interface design apply. [11,12]

Classical approaches for analysis of users and their tasks in the process of designing user interfaces are based on the international standard BS EN ISO 9241-11.

The usability of the learning environment is essential; it is achieved through an effective, productive, quality education. In view of the above-mentioned parameters of usability, technical and pedagogical requirements for e-resources can be formulated.

2.2. Technical requirements

Technical requirements for e-resources can be viewed in the context of the technical usability concept.

Various definitions of usability of web-based resources have been introduced. [2, 3, 13, 14], one of the most prominent researchers of usability, offers a definition that focuses on the technical usability. But when it comes to educational software, the use of his definition is limited and insufficient. Nokelainen in the article [15] expands this definition and includes pedagogical usability as well, as discussed in item 2.3. According to [2] technical usability aims to minimize the cognitive load so that more effort is put into the very process of learning. This allows students to more easily focus on the educational materials. In terms of technical usability, researchers claim that there are no significant differences between students' and teachers' opinions.

The main criteria for technical usability are indicated in [2] of the Web-based resources (WBLR) and are divided into three main groups:

• content design - this criterion shows how much WBLR content can be read and how efficient its access is;

• page design - this criterion describes how easy it is to use WBLR pages and related figures, multimedia elements, etc .;

• site design - this criterion specifies how easy it is to use the site menus, as well as to navigate through the WBLR links and screens.

For the engineering specialists' study of technical subjects, page design is of crucial importance. The specific content requires the presence of abundant illustrative material such as diagrams, charts and illustrations. The percentage of the figures and multimedia elements in educational materials and respectively, e-resources for the technical disciplines, is high.

Web usability is measured against five criteria: memorability, efficiency, errors, learnability, and satisfaction and is reviewed in [16].

The technical requirements for e-resources also include international standards and specifications such as SCORM, DUBLIN CORE, IMS QTI, etc. designed and applied for resources included in e-learning and published on various ESLs. The objective is to design learning content with an option for storage, packaging and reuse in the form of "learning objects" in a common technological structure and to retrieve data from various databanks for its use in different e-learning environments. Learning content standards determine the rules of how to describe, create, package and use e-resources as well as how to monitor the learning process. These standards help us to reach some of the key goals of the resources used for e-learning:

• accessibility – providing access to learning resources for educational purposes from a remote location so that they can be delivered to various other locations;

• versatility - description of the learning components in a certain area with a set of commands and their use in another area with another set of commands;

• stability, the learning resource' resistance to technological changes with no need to reconstruct, reconfigure and re-encode;

• reusability – putting together the same educational components in various applications and contexts.

In the training of engineering students there are no special requirements in terms of technical usability of e-resources as well as the standards and specifications used in the design, storage, packaging and structuring of the resources used for e-learning. As it has already been mentioned, page design is probably the only exception, since for engineering disciplines a bigger number of graphical objects (diagrams, charts, illustrations, 3D objects, etc.) is required, alongside audio and video files, high quality multimedia objects, including such with a high level of interactivity (e.g. virtual laboratories).

2.3. Pedagogical requirements

E-resources are created in accordance with the technical usability requirements as well as the existing standards and specifications. However, this is not enough, as these are resources created for learning. They should therefore meet certain pedagogical requirements as listed in [2, 3, 4]

Web-based resources (WBLRs) have been developed mainly by software engineers with a high level of technical knowledge, but with a limited knowledge of the specifics of methodology and training [17]. As a result, it is possible that graphic design and technical usability get overrated to the detriment of the pedagogical aspects. In the end e-resources will look attractive and appealing but will be difficult to use and inefficient in training [2,18].

E-resources content should correspond to the learning objectives of the respective subject, to be reliable, tested and scientifically proven at an academic level and to relate to the entry and exit connection points of the subjects studied in the particular technical specialty.

Despite the high level of technical usability, if e-resources do not meet the below mentioned pedagogical requirements students may still be disappointed and e-resources may not "reach" them. Similar is the case where the educational content provided is missing entry connections with the subjects studied; this may lead to reactions such as "I do not understand anything" and refusal to continue to the next teaching units included in the course. In some cases, the greater technical usability may have a negative effect since a high level of technical usability does not necessarily contribute to the achievement of an educational effect [19].

WBLRs pedagogical usability is a critical factor for the success of technology in education. WBLRs should not be used for their own sake. The concept of pedagogical usability is related to the learning process and the usefulness of educational software.

In order to handle the pedagogical aspects, it is necessary to extend the technical usability by including elements related to the learning process. Technical and pedagogical usability are closely related. The second one includes the following criteria and requirements for e-resources design respectively [2]:

- Intelligibility –should provide a well structured description of the course content. Educational content should be clear, concise, easily understandable. It is necessary that the learning content offered to the students should be structured by the teacher, in hierarchical structures corresponding to the curriculum of the course. It needs to be tailored to match the characteristics of digital generation students: they find "endless texts" boring and they are unable to focus for a longer period of time;

- Added value – should offer more training opportunities than traditional education for collaboration, feedback, interactivity and flexibility. E-resources offer much greater opportunities for feedback and students can get an immediate assessment of their work, through online self-study tests, etc. This is not possible with traditional education, while it is a very important requirement, a typical characteristic of digital students. They expect immediate feedback and evaluation of their work;

- Focus - this criterion is related to the usefulness and meaningfulness in terms of learning goals set by the teacher and the curriculum;

- Time - Web-based resources should allow the students to learn the course within a restricted but sufficient period of time. Preferably this period is shorter than when using traditional means such as books. The time required to absorb the educational content of the area of study is restricted due to the e-resources ability to provide the necessary information (including auxiliary materials from other disciplines) in one place with the relevant links / relations. We can only imagine how much time a student would need to go back and look for definitions from other disciplines in the traditional way. It takes a lot of books, textbooks, manuals and time, something dynamic digital students are short of. The specializing courses for engineering students are related to a number of disciplines from the general technical skills modules, such as Engineering Graphics, Mechanics, Materials Science, Machine Elements, Metrology and technical measurements, etc.

- Interactivity - WBLRs should provide interaction with easy access to the course and secure students' activity through setting tasks. Practical training is particularly important for students of technical specialties. For example engineering graphics training is done by providing a number of tasks for the learners to accomplish. E-resources developed in accordance with the interactivity criterion ensure the active participation of the learners, learning by doing - a typical feature of the digital generation's learning style;

- Multimedia - WBLRs should repeatedly provide information presentations through various multimedia elements such as text, graphics, sound, animation and video files. Tasks may include links to multimedia applications such as games and simulations. The latter are undoubtedly the means of training particularly favored by modern students whose learning style is visual-kinetic (as several studies have already confirmed [20, 21]) and have a direct connection to the next criterion. An increased number of illustrations and simulations, for example dynamic objects or processes and phenomena which are inaccessible and dangerous for the trainees, can play a crucial role in the training of engineering students. It is therefore that the materials developed for the engineering programs should meet this criterion within the educational goals stated;

- Motivation. The materials provided by WBLRs should contain motivating tasks and examples. They should demonstrate important aspects of the subject area studied in order to motivate the students for more in-depth and targeted study of the respective discipline;

- Differentiation - the resources proposed are tailored to the age, interests, abilities, language, prior knowledge, computer skills, etc. characteristics of students, learners with special educational needs included;

- Flexibility - flexibility means that WBLRs provide different difficulty levels and contain a variety of tasks tailored to the individual characteristics of students. E-resources must create conditions for personalized learning according to trainees' individual characteristics and learning pace;

- Autonomy- students can work independently using WBLRs and acquiring knowledge without the intervention of the teacher. Such a requirement is essential for distance learning, where no territorial restrictions apply. Due to financial, health and others reasons, today's students widely choose the aforementioned mode of learning.

In order to gain minimum practical knowledge and skills in the program, the engineering education today requires tuition using laboratory and practical exercises. This is one reason why it is difficult to fully implement electronic, distant and autonomous learning in technical training courses. Virtual laboratories do provide practical training for students to a certain extent; however, it is far than enough. Working in a virtual laboratory should complement the work in a real lab. A positive example in this respect can be seen at [22]. Students participate in real laboratory sessions in welding, hydraulic and electrical maintenance. These activities, once experienced face-to-face in a real environment, are then simulated by the students in virtual space during self-study, where they can work at any time, at own pace and from their own computer.

Many more examples and pieces of evidence can be produced in defense of bringing together for engineering students the advantages of e-learning and traditional training in a combined learning mode. In a survey conducted within the Faculty of Technics and Technologies, Trakia University of Stara Zagora, the surveyed students have placed in first place video, uploaded in the e-learning systems as their preferred training materials during their preparation, while on second place, based on the number of responses, they have placed the combination of video, uploaded in the e-learning systemsand consultations with a lecturer. This is an evidence, that the students also prefer and appreciate the benefits of the combination between the eLearning system and the traditional forms. [23]. The latter is evidence, that the students also prefer and appreciate the benefits of the combination between the eLearning system and the more traditional forms.

- Cooperation - this criterion means that students can work together to achieve a common goal, giving them the opportunity and skills to work in a team. Engineering students training is largely project-based and the opportunities that e-resources provide for team work are particularly important and useful for the training and future realization of engineers. Modern communication technologies and software, which engineering disciplines use nowadays, provide opportunities for a collaborative approach to project design and implementation;

- Variability- students can use a variety of learning resources in combination with WBLRs, according to their own learning styles and preferences.

For the implementation of the above-mentioned technical and pedagogical requirements for e-resources, the following material and immaterial conditions should be met:

- Material conditions/base at macro level (university) and micro level (teachers and students). Modern ICT facilities and superstructure (hardware and software) in universities (Bulgaria included) are generally sufficient for the design, publishing and use e-resources that meet the above listed pedagogical and technical requirements. The same applies to teachers and students who own and use for the needs of e-learning their personal PCs, laptops, smart phones, communication equipment and Internet connection.

- Immaterial conditions. Students and teachers' knowledge of ICT technology. Modern students, who grew up in a digital technology world, have no difficulty in using modern ICT and e-learning resources in the learning process. On many occasions they manage better than their teachers (digital immigrants), and state their demands and remarks (justified in many cases) to the e-resources provided.

Most of the teachers do not have the abilities to develop e-resources in accordance with all the technical requirements described in item 2.2. In most of the cases they manage well with the upload of tests and training materials through e-learning systems software or other application software. It is not justified, however, to require that all the teachers have the relevant knowledge of the development of multimedia textbooks, virtual laboratories, etc., through implementing all possibilities of modern ICT. They should work jointly with teams of

software engineers and develop e-resources projects, which focus on the pedagogical requirements and intended learning outcomes; they should be aware and take into account the possibilities of modern technology.

3. CONCLUSIONS

1. The developed e-resources should meet certain technical and pedagogical requirements to ensure their usability and to help achieve their educational goals.
2. The training of engineering students places high demands in terms of page design, multimedia, interactivity as well as certain restrictions in respect of autonomy.
3. The theoretical and practical training of engineering students is impossible to accomplish entirely through e-resources and distance learning. Due to the specifics of technical staff training, it is necessary to implement combined learning – i.e. enhanced practical training, project-based learning with active participation on behalf of the students and teacher monitoring.

REFERENCES:

[1] Brabazon, T. The University of Google, November 2007, ISBN: 978-0-7546-7097-1.
[2] Hadjerrouit, S. A Conceptual Framework for Using and Evaluating Web-Based Learning Resources in School Education, Journal of Information Technology Education, Volume 9, 2010 .
[3] Nielsen, J. Usability 101: Introduction to Usability, Avaliable on Web site:: http://www.useit.com/alertbox/20030825.html
[4] Nokelainen, P. An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students. Educational Technology & Society, 9 (2), 2006, pp. 178-197.
[5] Totkov G. 4the National Conference on Electronic Education, October 2008.
[6] http://www.lib.bg/isbd_er/vavedenie.htm
[7] http://www.loc.gov/acq/devpol/electronicresources.pdf.
[8] http://scolor.net/?p=16
[9] BDS EN ISO 9241
[10] http://www.usability.ru/sources/iso9241-11.htm
[11] Nielsen, J. 10 Usability Heuristics for User Interface Design, 2005, Avaliable on Web site: http://www.useit.com/papers/heuristic/heuristic_list.html
[12]. Maczuga, P., M. Plewczyński, N. Mileva et al. The methodology for learning through mobile devices in the field of e-business, ISBN: 978-83-936582-0-6, Avaliable on Web site: http://bg.mtraining.eu/upload/files/0/34/MTMfeB_BR_merged.pdf
[13] Nielsen, J. Usability engineering. Boston, MA: Academic Press, 1993.
[14] Nielsen, J. Designing Web usability: The practice of simplicity. Indianapolis: New Riders, 2000.
[15] Nokelainen P. An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students, Educational Technology & Society, 9(2), 2006, pp.178-197.
[16] http://www.useit.com/alertbox/20030825.html
[17] Nam , C. S., T. L Smith-Jackson. Web-based learning environment: A theory-based design process for development and evaluation. Journal of Information Technology Education, 6, 2007, pp. 23- 44, Avaliable on Web site: http://www.jite.org/documents/Vol6/JITEv6p023-043Nam145.pdf
[18] Brinck, T., D. Gergle, S. D. Wood. Usability for the web: designing Web sites that work, San Francisco, CA: Morgan Kaufman, 2002.

[19] Tselios, N., N. Avouris, V. Komis. The effective combination of hybrid usability methods in
evaluating educational applications of ICT: Issues and challenges. Education and Information Technologies,13, 2008, pp. 55-76.
[20] Angelova, N., L. Jordanova. Use of video materials for e-learning and networks for sharing learning resources, In: Proceedings of the Fifth National Conference on E-learning in higher education, Ruse, 2014, pp. 139-145
[21] Stoykova, V. Evaluation of the application of interactive presentation systems in higher education, ARTTE, Applied Researches in Technics, Technologies and Education, Journal of the Faculty of Technics and Technologies, Trakia University, 2014.
[22] http://www.witc.edu
[23] Stoykova , V. Implementation and research of elements of a framework for adaptation of higher education to the digital generation, PhD Thesis, Ruse, 2014.

UDK: 631.3 COBISS.SR-ID 216026892 Review Article

DETERMING LOSSES DUE TO DOWNTIME OF MACHINES IN AGRICULTURE

Krasimira Georgieva[1], Nevena Ivanova[2]
[1]Faculty of Technics and Technologies, Trakia University, Bulgaria,
[2]Graf Ignatiev 38, 8600 Yambol, Bulgaria

Abstract: *The contemporary agriculture has based on a modern, high performance, energetic collecting technique. Generally, this technique has characterized with new, better technical and economic indicators, greater structural complexity and application of new technologies, higher price of machinery. Timely provision of agricultural organizations with spare parts to maintain the working capacity of the machines in the modern world is becoming more and more important and it is an important factor for improvement efficiency of use of the technique.*
In connection with this, the issues of determination of the loss of machine downtime, the various forms and methods of production organization and the means of repairing have become ***more contemporary.*** *We take into account the level of reliability, operating conditions and development of repair- service basis.*
Key words: *operating losses of machinery, fund-working hours, the rate mode Mr K, reserve of machine-tractor aggregates (MTA).*

ARTICLE INFO
Article history:
Recived 01. mar. 2015. **Recived in revised form** 03. may. 2015 **Accepted** 05. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

The experience shows that machine downtime is $10 \div 15\%$ in row cultivation and $20 \div 40\%$ of the total working hours in collecting of production [5]. Therefore, without considering the losses from downtime of machines it is impossible to evaluate the effectiveness of the various forms and methods of organization of production; effectiveness of the activities related to the improvement of methods and tools for repairing service; the system of maintenance and development of repairing and service base.

There are attempts to solve the task [1, 3, 6] but in our opinion it is not specified exactly which interruptions of the technological process should be treated as downtime and when we should to take into account losses from them.

It is accepted the material production to be considered as an interaction of three main elements: labor tools, labor subject and human labor.

In order to determine downtime losses of machine-tractor aggregates (MTA), we conditionally accept that management quality and efficiency of technological operations in agriculture we will influence the labor tools (MTA) and the people work (subject), as well as their rational interaction.

Applied to the objects (MTA), the impact occurs in increasing the productivity and effectiveness of the technique and in improving its level of reliability. In terms of human labor, the object of attention is the improvement of workers' physical and professional-qualification training. For the realization of the production process, it is not enough just to have the basic elements of production but there is a requirement of technology and organization that need in appropriate way to join these elements into a harmonious functioning production process.

If we assume that in an agricultural cooperative the technological cards for growing field crops have developed, the improvement of the organization of sowing, tillage, harvesting

of crops will directed at improving the intensive and extensive use of MTA, to skillfully use the potential of people. This means: full utilization of the work time fund, raising the qualification skills and labor intensity according to regulations.

The technological operations quality has determined by the parameters of the object and the qualification of the subject. The quantity of performed work depends on the labor intensity, which should not exceed physiologically acceptable levels.

The use of MTA also has its limits defined by their technical and reliability characteristics. From the total working time, we should remove the time for: repairing and maintenance; adjusting the MTA to work; loading seeds, fertilizers, herbicides and insecticides, etc.

Thus, the optimal organization of the process we will have where:

a) The mechanic uses working time fund;

b) Everybody performs a job that corresponds to his qualifications and works with normal intensity;

c) The machine-tractor aggregates have used in accordance with their technical capabilities and within the nominal working times fund.

In practice, we can achieve such an organization by providing reserve of machines and work force, resulting in reliable and efficient operation of the system ergodic object-subject. In strictly scientific terms, such a stockpiling should develop after taking into account the reliability of the system.

The downtime of ergodic system is such a state in which it does not perform useful work, i.e. the downtime is non-productive loss of time.

The downtime by its nature is:

a) **Technical** – for maintenance and refueling;

b) **Technological –** for adjustment of the drill, filling with seeds, fertilizers, herbicides and other operations related to the agronomic requirements;

c) **Organizational** – for distribution of tasks, waiting for technical service, refueling or charging with technological material, the time to arrive to the field and others.

The losses from underutilization of the machines by time (S_q) do not depend on the interruptions of the process due to technical faults in the normal limits (they are inherent in the technique).

Labor inputs and resources in this case are a function of downtime, because in determining the required number of machines we start from the condition to ensure the continuity of the technological process. In this case, in order to avoid losses from downtime of MTA, by the normative value of the coefficient of readiness $Кгн$ we determine necessary number (main and reserve) machines.

The maximum number of necessary machinery $N\,n$ we have taken from the busiest period and the periods close to there is possibility to the part of the MTA to carry out some repair services; the energy vehicles (tractors) are diverted to other technological operations.

Actually the facts value of the coefficient of readiness $\boldsymbol{Кг}$ reflects downtime of real machines, therefore, the greater the difference between $\boldsymbol{Кгн}$ and $\boldsymbol{Кг}$ - the greater will be the shortage of machines during peak periods.

When the ratio of the actual number of MTA (N_F) and the required number $(N\,n)$ is less than „unit" there is a shortage, expressed by a factor Q.

Thus, the loss of not planning downtimes under certain conditions depends on three factors: the degree of saturation of the economy with seeders $Q = N_F / N\,n$; the level of reliability of the machines, which has assessed by the integrated indicator $\boldsymbol{Кг}$; coefficient of downtime of the mechanic (the subject) $\boldsymbol{Кпм}$.

In Table 1 we show the possible cases in determining the losses of downtime of machine components and dependencies for their determination.

Table 1 *Possible cases in determining losses stay of machine-tractor aggregates and dependencies for their calculation*

	Q ***Кгн; Кг***	***Q=1*** **1**	***Q<1*** **2**	***Q>1*** **3**
1	*Кгн=Кг*	*1.1*	*3=(1-Q) .(1+Кпм).Срм*	*1.3*
2	*Кгн<Кг*	*3=(КгнКг).(1+Кпм) Сд*	*3=(1-Q).(1+Кпм)Срм+ +(Кгн- Кг).(1 + Кпм)Сд*	*3=(1-Q).(1+Кпм)Срм+ +(Кгн- Кг).(1 + Кпм)Сд*
3	*Кгн>Кг*	*3.1*	*3=(1-Q).(1+Кпм)Срм+ +(Кгн- Кг).(1 + Кпм)Сд*	*3.3*

Case 1.1. The actual number of machines is equal to the required *(Q = 1)* and the statistical value of the coefficient of readiness corresponds to the regulatory level of machines reliability ***(Кг; = Кгн)*** downtime losses will be. The technological operations will be done in the agro-technical term by a specified number of machines. This case is optimal and practically possible.

We will note that when *Q = 1* and ***Кг;> Кгн;*** *Q> 1* and ***Кг; = Кгн;***

Q> 1 and ***Кг;> Кгн;*** there will be no losses of machine downtime but there will be losses of inefficient use of the technique. This question is not a subject of our analysis.

Case 1.2 The machinery is not replete with MTA *(Q <1)* and ***Кг;= Кгн***. To ensure continuity of the technological process within the agro-technical term we would require additional number of seeders *(Z):*

(1) $Z=N_н - N_Ф = N_н - N_нQ = N_н(1 - Q),$

or correlated to the statutory number of MTA in the park.

(2) $$Z_1 = \frac{Z}{N_н} = 1 - Q$$

This number of machines will be sufficient to conduct technological operations, if the coefficient of downtime of mechanic) ***Кпм****= 0,* which is impossible. Therefore:

$Z=(1 - Q)(1 + Кпм),$

In addition, downtime losses will be

(3) $З_{1,2}=(1 - Q)(1 + Кпм)\ Срм,$

In which *CRM* are the costs of purchasing and maintaining in operable state the reserve MTA per unit production, levs / h.

Case 2.1. The number of necessary machines is equal to the actual number and their level of reliability is lower than normative.

This is typical case for many areas of our country where there is a sufficient number of machines but the level of repair and service base is unsatisfactory.
Here downtime losses are associated with a reduction of the yield of field crops because of increasing agricultural terms, i.e.

(4) $З_{21}=(Кгн - Кг)(1 + Кпм)Сд,$

In which *Cd* is the relative losses due to a decrease of yield, levs / h

Case 2.2. The park of machines is not replete *(Q <1)* and their level of reliability is lower than normative ***(Кг; < Кгн)***. Then the number of reserve machines will be *(1 - Q) (1 + **Кпм**)* but they will be sufficient for the timely execution of the volume of work or we will have losses from reduced yields because of increased agricultural terms.

(5) $(Кгн-Кг)(1+ Кпм)$ *Сд,* т.е.
$З_{2.2}=(1 - Q)(1 + Кпм)Срм+(Кгн - Кг)(1 + Кпм)Сд.$

By the same dependence we can identify the losses of machines' downtime in cases *2.3* and *3.2* but while for *Q <1* and ***Кг;> Кгн*** we find out that there are not downtime losses, for *Q> 1* and ***Кг; < Кгн*** there are small loses, i.e., though the actual number of machines is greater than the normative. The larger number cannot compensate the low level of machines' reliability. Then there are downtime losses at research park machines *(1,1 <Q <1,3 and 0,7 < **Кг**; <0.95; 0.6 < **Кгн** <0.90).*
Therefore, in order to reduce the losses from not planned downtime of MTA we should create machines reserve, increase the level of reliability of the new machines ***(Кг)***, improve the conditions of operation and maintenance and increase the quality of their repair.

2. Determination of the separate components of downtime losses of MTA

2.1. Determination of losses of yield due to failure agriculture and technical terms

To determine the yield losses due to failure to comply with established agricultural terms we use the coefficient of timeliness of implementation of technological operations.
It shows what part of the yield is lost if the period of implementation of the technological operation is extended by one day. Such coefficients have established in the former USSR, the USA and other countries.

Such specialized studies about the conditions of our country have not published. From the analysis of the results obtained by Saklakov V.D., M.P.Sergeev [4], data in [1, 2], the results of Hunt [8], we find out that despite the wide variety of natural and climatic conditions, these coefficients are not significantly different. This allows us to summarize these studies and to recommend the results for use in the determination of the loss of machine tractor aggregates downtime Table 2.

On the other hand, in GOSNITI (State scientific-reserch tehnological institute) they have found that the losses due to decreasing in yield are *45 ÷ 55%* of the value of the total losses due to downtime. This is an additional reason to look for a way to account these losses

Table 2 *Coefficient of timeliness of the implementation of technical operations in agriculture, K e $_{i,}$ 1 / day.*

№	Type of farming culture	Type of process	
		Sowing	Retraction
1.	Wheat	0005-0009	0.01 - 0.032
2.	Barley	0004-0008	0009-0022
3.	Oats	0004-0008	0.03
4.	Rye	0005-0008	0.03
5.	Millet	0006-0018	0010-0015
6.	Corn grain	0007-0010	0004-0016
7.	Corn feed	0.006	0008-0009
8.	Sunflower	0.008	0032-0036
9.	Soy	0.003	0.004
10.	Peas	0015-0023	0.015
11.	Beans	0003-0017	0.02
12.	Cotton	0.001	0.002
13.	Beet	0.016	0.0002
14.	Potatoes	0009-0012	0015-0037
15.	Tobacco	0.009	-
16.	Grass	-	0.0015

Table 3 *Coefficient of timeliness of the implementation of technical operations in agriculture, K e i, 1 / day*

№	Type of process	Factor of timeliness, *Cd $_i$*
1	Drag	0005-0012
2	Cultivation	0.003
3	Plowing, deep autumn	0002-0005
4	Plowing without reversing layer	0.0006
5	Peeling stubble	0.0006 - 0.011
6	Disking	0.0005

In this case, the loss of yield in value units for the area of a separate crop we can express by the following dependence:

(5) $З_д=0,5Кд_kU_k(C_з-C_{nд})Δ_{дp}F$**,**

Where $Кд_k$ is the coefficient of variation of the yield from the extension of seeding of **k^{-th}** crop / day (taken from Table 2 and Table 3).

U_k - the yield, which is obtained from the crop, if technological operation is performed in optimal agriculture term, kg / ha;

$C_з$ - the purchase price of the crop, lev / kg;

$C_{nд}$ - overall relative costs for harvesting, post-processing and transport of products to the place of delivery, lev / kg;

$Δ_{дp}$ - extension of the implementation of the technological operation, h;

F - Cultivated area occupied by the k^{-th} crop in the business organization, acres.

***2.2.* Determination of the losses from buying and maintaining excess reserve machines**

The losses from buying and maintaining excess reserve machines have determined by the dependence:

(7) $3p=ZC(E_н+d+l)\Delta_{др}F,$

Where **Z** is the required number excess reserve machines that will provide continuity of the process of growing crops, pcs.

C - The initial value of the machine, lev;

Eн - The normative coefficient of efficiency of capital investments

d - The annual rate of depreciation to restore the MTA;

l - The annual rate of depreciation for storing machines.

If we accept that the downtime of machines due to technical reasons is objectively inherent, the coefficient of downtime due to poorly conducted repair service we can define through the dependency:

$$K_{\text{n}} = \frac{T_{\text{n}}}{T_{\text{o}} + T_{\text{b}} + T_{\text{n}}}, \quad \textbf{(8)}$$

Where T_o is the average production of sower, h;

T_b - average time to eliminate refusals h;

T_n - average time of downtime due to poor quality of maintenance service of MTA h.

Thus, the reserve number of reserve machines *Z* will be

$$Z = \frac{K_{\text{n}}}{1 - K_{\text{n}}} = \frac{T_{\text{n}}}{T_{\text{o}}} K_{\text{г}}, \quad \textbf{(9)}$$

We consider the analysis shows there are three possible cases: losses of maintaining reserve equipment in the park, losses of not enough use of the machines, i.e., when there is excess reserve of machines, they have not used efficiently, and no losses, i.e. the machines in the park are as many as are necessary.

Table 4 *State park machines*

Indicators of reliability machines ***Кг; Кгн***	**Type of park equipment**		
	Q = 1	**Q <1**	**Q> 1**
Кг = Кгн =1	***no need for spare machines***	***need of spare equipment***	***no spare machines, and there are over a pool of machines***
Кг = Кгн <1	***need of spare equipment***	***need of spare equipment***	***you may or may not have spare machines***
Кг < Кгн Кг <1; Кгн <1	***needs additional reserve***	***need of spare equipment***	***you may or may not have spare machines***
Кг > Кгн Кг <1; Кгн <1	***has excess reserves of machines, which are not used effectively***	***there may or may not need a spare machine***	***has excess reserves of machines***

Table 5 *Dependencies to determine the number of spare or redundant equipment in the park*

Indicators of reliability machines, ***Кг , Кгн***	**Type the park machines**		
	Normal, Q = 1	**Unsaturated, Q <1**	**Saturated, Q> 1**
Кг = Кгн =1	**0**	$\frac{W}{\omega}(1-Q)$	$\frac{W}{\omega}(Q-1)$ ***Extra equipment***
Кг = Кгн <1	***Required reserve machines*** $\frac{W}{\omega K_{ГН}}(1-K_{ГН})$ **или** $\frac{W}{\omega K_{Г}}(1-K_{Г})$	$\frac{W}{\omega}\left[(1-Q)+\left(\frac{1-K_{ГН}}{K_{ГН}}\right)\right]$ **or** $\frac{W}{\omega}\left[(1-Q)+\left(\frac{1-K_{Г}}{K_{Г}}\right)\right]$	$\frac{W}{\omega}\left[(Q-1)+\left(\frac{K_{Г}-1}{K_{Г}}\right)\right]$ **or** $\frac{W}{\omega}\left[(Q-1)+\left(\frac{K_{ГН}-1}{K_{ГН}}\right)\right]$
Кг < Кгн Кг <1; Кгн <1	***Excess reserve*** $\frac{W}{\omega K_{Г}K_{ГН}}(K_{ГН}-K_{Г})$	$\frac{W}{\omega}\left[(1-Q)+\left(\frac{K_{ГН}-K_{Г}}{K_{Г}K_{ГН}}\right)\right]$	$\frac{W}{\omega}\left[(Q-1)+\left(\frac{K_{ГН}-K_{Г}}{K_{Г}K_{ГН}}\right)\right]$
Кг > Кгн Кг <1; Кгн <1	***There will be losses due to stay, but there will be losses due to excess statutory number of machines*** $\frac{W}{\omega K_{Г}K_{ГН}}(K_{Г}-K_{ГН})$ ***Losses Nedo use of machinery***	$\frac{W}{\omega}\left[(1-Q)+\left(\frac{K_{Г}-K_{ГН}}{K_{Г}K_{ГН}}\right)\right]$ ***If (+) is lost, if (-) no losses, ie shortage of equipment is offset by the high level of reliability.***	$\frac{W}{\omega}\left[(Q-1)+\left(\frac{K_{Г}-K_{ГН}}{K_{Г}K_{ГН}}\right)\right]$

From the analysis of the losses types, according to the status of the machines park we find out that in some of the conditions, there are or there are not losses, depending on the combination of the machines reliability *(Кг , Кгн)* and on the type of machines park (Q). The losses are recorded depending on the sign of the number of necessary or unnecessary machines, calculated by dependencies given in Table 5, where W is the volume of mechanized works in the agricultural organization; ω - machine construction.

3. CONCLUSIONS

1. We justified the main elements of the methodology for determining the downtime losses of agricultural machines connected with increasing terms of the technological operations with underused machines and underused mechanics labor during the downtime of the MTA.

2. We found out that in order to reduce the losses from not planned downtime of machines in agriculture is necessary to create a reserve of MTA, to increase the level of reliability of new and refurbished machines.

3. We specified the methodology for determining the losses of production due to the extension of agricultural terms.

LITERATURE

[1] Baram H.G. and others. Methodology of determining the losses due to downtime of mobile techniques in the fields. - Bulletin GOSNITI. - v. 46, 1976.

[2] Vasilev K., M.Vasileva, N.Tsonev Study on some issues regarding the harvesting of sunflower in Bulgaria. Agriculture technique, 1975, 4, p.47-53.

[3] Pavlov B.V. and others. Designing complex mechanization of agricultural enterprises. - M., 1982.

[4] Saklakov V., M.Sereev Technique and management agricultural manufacture. -M., 1973.

[5] Spiridonov G., G.Tasev Substantiation of the parameters of the distribution system for reserve parts between the units of repair and service. - Report: Ruse (not published) 1985.

[6] Spiridonov G., G.Tasev Determination of downtime losses of agriculture techniques, VIMMESS, v.21 series 5, 1975.

[7] Tasev G. Al. Naneva Study and determination of the loss of agricultural technique. Stay FTA 7.1998, s. 26-31.

[8] 8. Hunt D. Economic justification in pine SH .-SHT, 1963.3 (USA).

UDK: 7.05 COBISS.SR-ID 216027148 **Review Article**

INVESTIGATION OF CONNECTIONS BETWEEN SILHOUETTES AND COLORS IN FASHION DESIGN

Julieta Ilieva
Faculty of Technics and Technologies, Trakia University, Bulgaria
Graf Ignatiev 38, 8600 Yambol, Bulgaria

Abstract: *An investigation of connection between silhouettes and colors according to the consumer preferences is presented in the paper. The connections between silhouettes and colors are investigated with the help of the statistical method of Correspondence Analysis. The results of investigation in combination with the latest fashion trends and colors and forms associations can be used for successful fashion design of new models of clothing.*

Key words: fashion design, colors, silhouettes, correspondence analysis.

ARTICLE INFO
Article history:
Recived 05. mar. 2015. **Recived in revised form** 25. mar. 2015 **Accepted** 05. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

When a fashion designer creates a new model of garment, the designer has to combine his or her idea with the latest fashion trends and the consumer preferences. The silhouette and color are the most visible features of clothing. The paper presents an investigation of connection between silhouettes and colors according to the consumer preferences.

2. METOD USED

The investigation is made with the help of the statistical method of Correspondence Analysis. [3]
Correspondence Analysis is a descriptive/ exploratory technique designed to analyze simple two-way and multi-way tables containing some measures of correspondence between the rows and columns. The results provide information which is similar in nature to those produced by Factor Analysis techniques, and they allow one to explore the structure of categorical variables included in the table. The most common kind of table of this type is the two-way frequency cross tabulation table. [2]

3. INVESTIGATION

The investigation is made about the ladies clothing, because the ladies garments included the full variety of silhouettes and colors. The ladies dresses in the 12^{th} basic silhouettes: close fitted, fitted, semi fitted, rectangular, Y, Y turned, X, U turned under the waist, O under the waist, A, O, and V [4] are colored in the 6^{th} basic colors: red, orange, yellow, green, blue, and purple [1]. In this investigation the system with six basic colors is preferred to the most popular system with seven basic colors (red, orange, yellow, green, cyan blue, indigo blue, purple), because the only one blue included in the 6^{th} color system is more identified by consumers. The 12^{th} silhouettes and the 6^{th} colors are presented in picture 1. The full number of their combinations, included in the study, is 72.

The investigation is made on the base inquire with women consumers: working women and female students. Because sometimes the ladies conform their outfit to their partners' preferences, the study includes inquire with working men and male students too.

Tables 1, 2, 3, and 4 present the frequencies of coincidence between the silhouettes and colors according to preferences of working women, female students, working men, and male students. The results of Correspondence Analysis or levels of connections between the silhouettes and colors according to preferences of working women, female students, working men, and male students are presented in figures 1, 2, 3, and 4.

Close Fitted

Fitted

Semifitted

Rectangular

Y

Y turned

X

U turned under waist

O under waist A O V

Picture 1. Basic silhouettes and basic colors

Table 1. The frequencies of coincidence between the silhouettes and colors according to preferences of working women

Colors / Silhouettes	Red	Orange	Yellow	Green	Blue	Purple	Total
Close Fitted	7	1	0	8	7	10	**33**
Fitted	9	0	2	3	9	3	**26**
Semifitted	11	7	0	2	7	6	**33**
Rectangular	6	4	3	5	11	3	**32**
V	3	4	4	4	5	6	**26**
O	3	3	1	6	7	9	**29**
A	2	6	1	3	6	5	**23**
X	8	5	2	4	7	5	**31**
O under the waist	8	3	3	10	3	6	**33**
Y	13	3	3	5	3	9	**36**
Y turned	7	4	2	6	7	9	**35**
U turned under the waist	8	5	1	4	4	12	**34**
Total	**85**	**45**	**22**	**60**	**76**	**83**	**371**

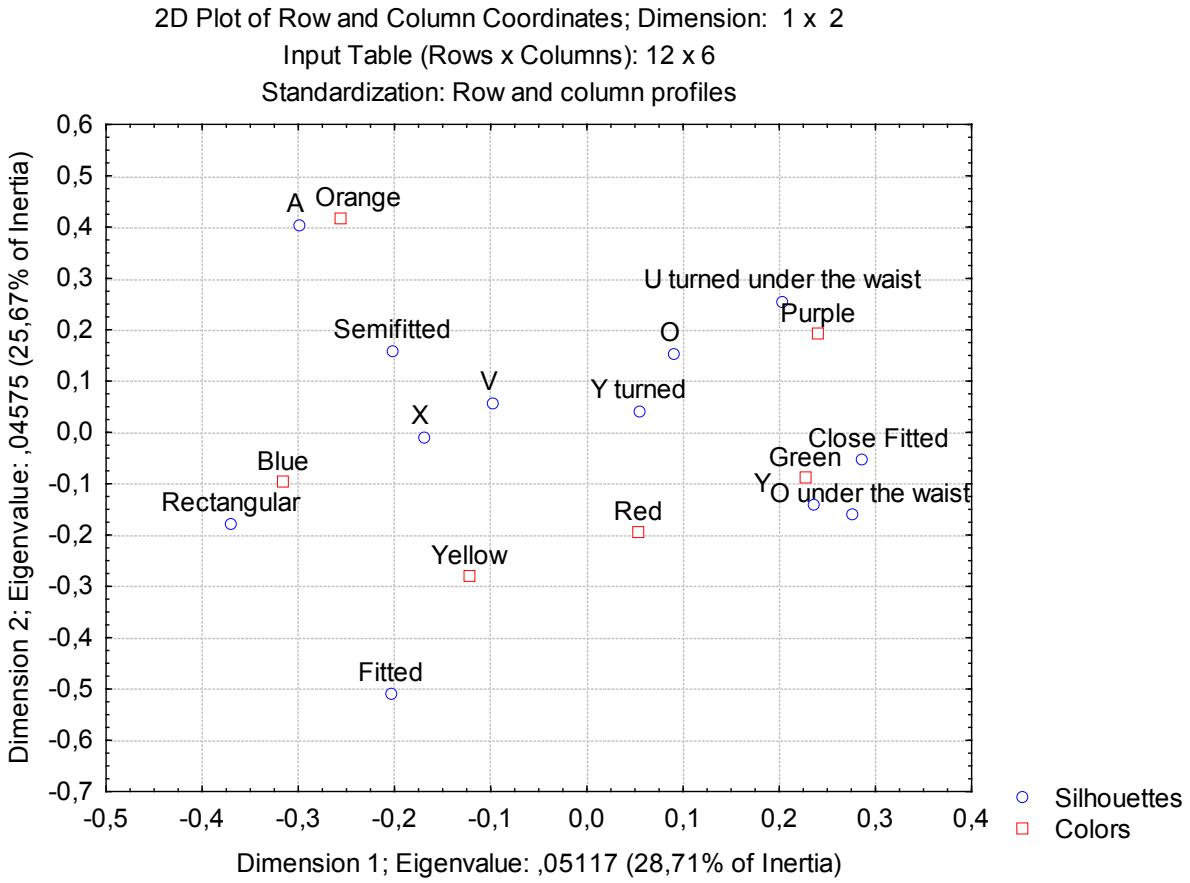


Figure 1.
The levels of connections between the silhouettes and colors
according to preferences of working women

Table 2. The frequencies of coincidence between the silhouettes and colors according to preferences of female students

Colors / Silhouettes	Red	Orange	Yellow	Green	Blue	Purple	Total
Close Fitted	15	2	4	6	13	22	**62**
Fitted	14	1	4	5	14	11	**49**
Semifitted	15	3	4	3	16	12	**53**
Rectangular	11	5	6	5	7	15	**49**
V	10	8	5	4	11	9	**47**
O	13	2	9	7	12	11	**54**
A	14	5	6	4	14	9	**52**
X	12	5	7	2	13	19	**58**
O under the waist	19	4	7	7	15	14	**66**
Y	24	5	2	8	14	12	**65**
Y turned	13	5	6	6	20	18	**68**
U turned under the waist	19	4	6	4	7	21	**61**
Total	**179**	**49**	**66**	**61**	**156**	**173**	**684**

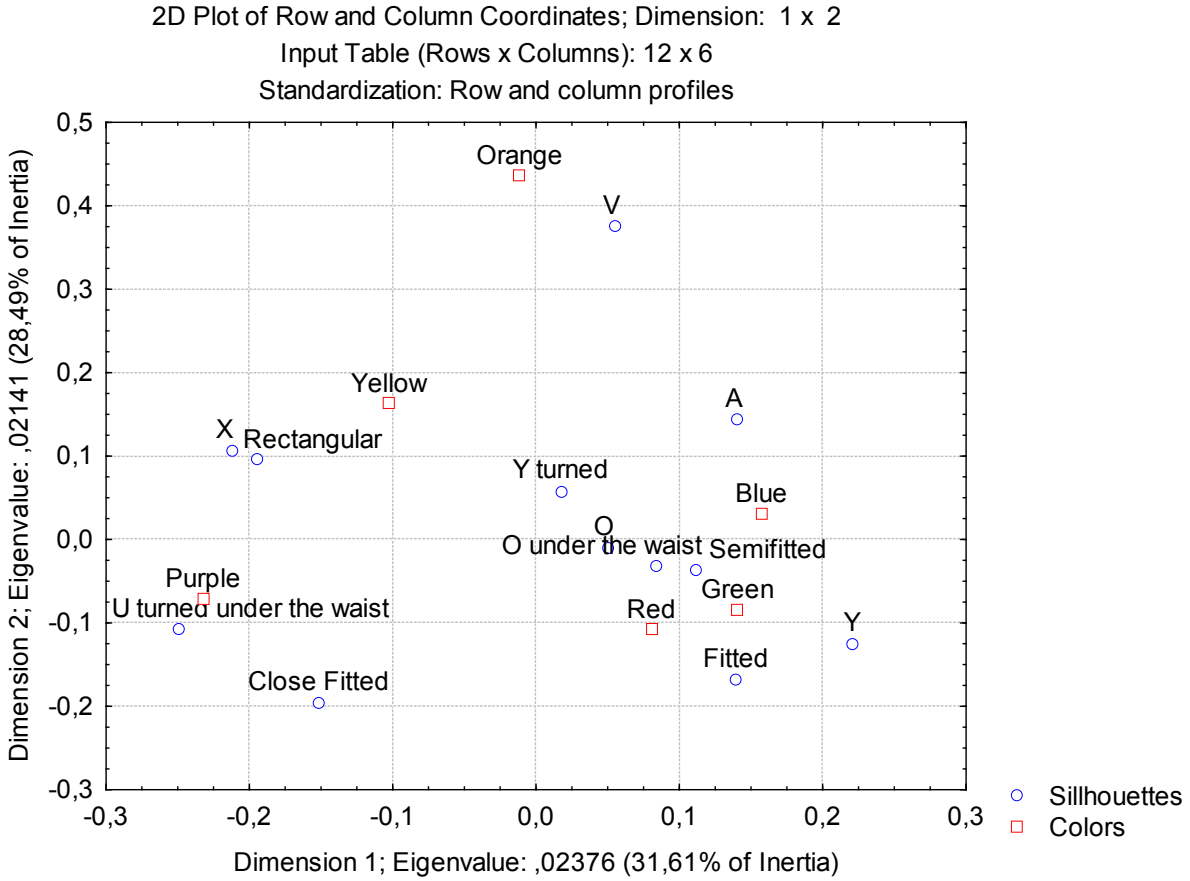


Figure 2.
The levels of connections between the silhouettes and colors according to preferences of female students

Table 3. The frequencies of coincidence between the silhouettes and colors according to preferences of working men

Colors / Silhouettes	Red	Orange	Yellow	Green	Blue	Purple	Total
Close Fitted	3	0	2	5	2	4	**16**
Fitted	3	0	2	4	3	4	**16**
Semifitted	2	2	2	1	3	4	**14**
Rectangular	1	5	3	2	1	2	**14**
V	2	3	2	1	2	5	**15**
O	1	3	0	0	8	2	**14**
A	3	4	1	1	1	4	**14**
X	5	0	2	6	2	2	**17**
O under the waist	1	2	0	4	5	5	**17**
Y	2	2	2	3	4	3	**16**
Y turned	1	4	3	2	3	2	**15**
U turned under the waist	3	3	2	2	3	4	**17**
Total	**27**	**28**	**21**	**31**	**37**	**41**	**185**

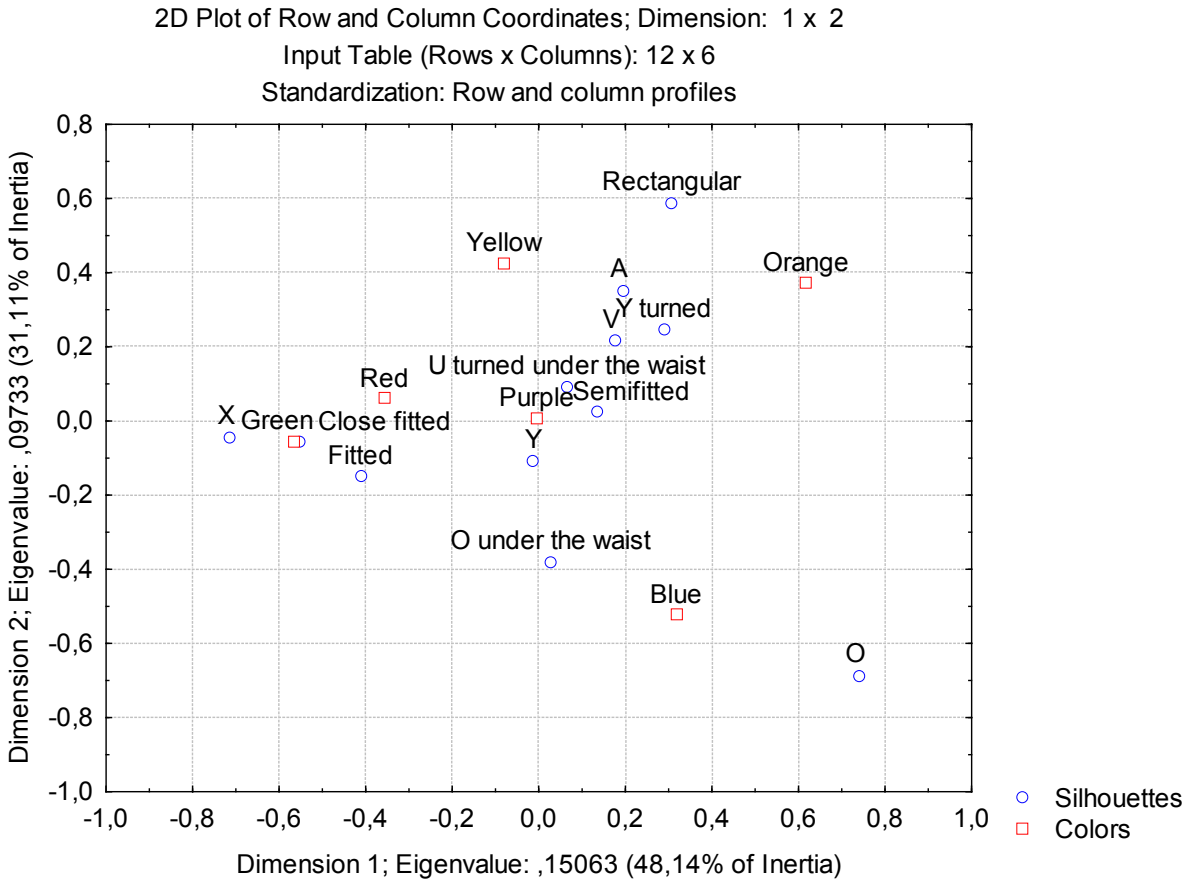


Figure 3.
The levels of connections between the silhouettes and colors according to preferences of working men

Table 4. The frequencies of coincidence between the silhouettes and colors according to preferences of male students

Colors / Silhouettes	Red	Orange	Yellow	Green	Blue	Purple	Total
Close Fitted	8	1	1	8	9	10	**37**
Fitted	6	1	3	5	11	10	**36**
Semifitted	8	8	10	2	7	3	**38**
Rectangular	11	3	4	7	10	4	**39**
V	4	7	2	7	12	5	**37**
O	6	4	10	3	7	8	**38**
A	6	4	4	8	7	8	**37**
X	5	3	4	11	4	5	**32**
O under the waist	11	4	4	7	6	7	**39**
Y	10	3	5	4	3	9	**34**
Y turned	7	5	6	4	9	7	**38**
U turned under the waist	8	4	4	2	6	9	**33**
Total	**90**	**47**	**57**	**68**	**91**	**85**	**438**

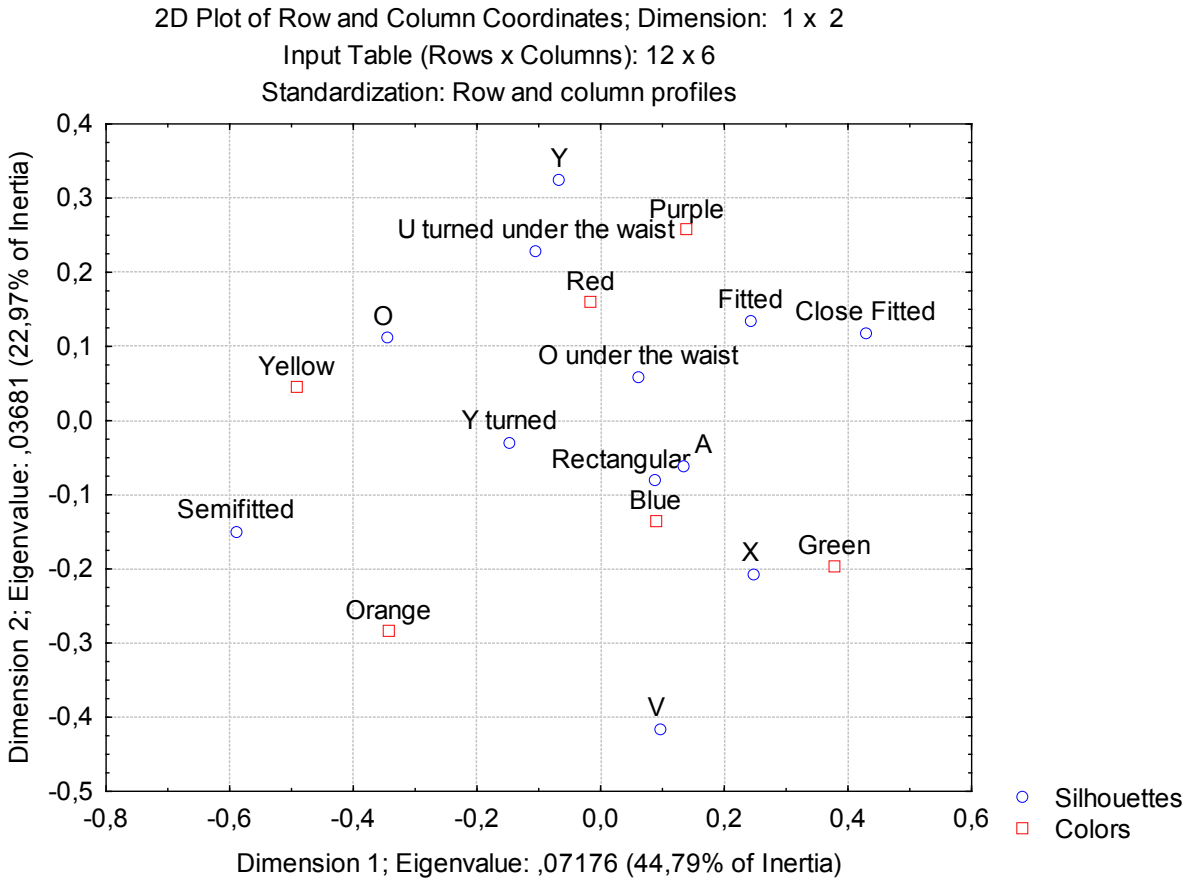


Figure 4.
The levels of connections between the silhouettes and colors
according to preferences of male students

4. RESULTS ANALYSIS

The Correspondence analysis results, presented in graphics in figures 1, 2, 3, and 4, show suitable combinations between silhouettes and colors in ladies clothing according to the preference of the groups of working women, female students, working men, and male students.

For the working women (figure 1) the more suitable combinations of silhouettes and colors are between: the close fitted, Y, and O under the waist silhouettes with the color of green; the U turned under the waist silhouette and the color of purple; the A silhouette with the color of orange; and the rectangular silhouette and the color of blue. Not too strong, but enough strong combinations are: the fitted silhouette and the color of yellow; the Y and Y turned silhouettes and the color of red; the X silhouette and the color of blue; and the close fitted and O silhouettes with the color of purple.

For the female students (figure 2) the more suitable combinations of silhouettes and colors are between: the fitted, and Y silhouettes with the colors of green and red; the semifitted, O, and O under the waist silhouette with the colors of red, green, and blue; the U turned under the waist silhouette with the color of purple; the A silhouette with the color of

blue; the V silhouette and the color of orange; and the rectangular and X silhouette and the color of yellow.

For the working men (figure 3) the strongest combination is between the close fitted silhouette and the color of green. The more suitable combinations are between: the fitted and X silhouettes and the color of green; the close fitted and fitted silhouettes and the color of red; and the semifitted, Y, and the U turned under the waist silhouettes with the color of purple. Not too, but enough strong connections are: the rectangular, Y turned, A and V silhouettes with the colors of yellow and orange; the V silhouette with the color of purple; and the O and O under the waist silhouettes with the color of blue.

For the male students (figure 4) the strongest combination is between the rectangular silhouette and the color of blue. The more suitable combinations are between: the A silhouette and the color of blue; the X silhouette and the color of green; the fitted, U turned under the waist and Y silhouettes with the color of purple; and the fitted, O under the waist and U turned under waist silhouettes with the color of red. The enough strong combinations are: the semifitted and O silhouettes and the color of yellow; the semifitted and V silhouettes and the color of orange; and the V silhouette with the color of green.

It is very interesting that the 4th target groups fix the connection between the U turned under the waist silhouette and the color of purple. The 4th investigated groups of preferences connect the color of green with silhouettes with fitting at the waist, and the colors of yellow and orange with silhouettes without fitting at the waist.

5. CONCLUSION

The results of the presented investigation of connections between silhouettes and colors in combination with the latest fashion trends and colors and forms associations (symbolism and influence) can be used for successful fashion design of new models of clothing

6. REFERENCES:

[1] Cortes Cl. (2003). Color in Motion [Online]. Available: http://www.mariaclaudiacortes.com [2010].

[2] Hill T., Lewicki P. (2007) Electronic Statistics Book [Online]. Available: http://statsoft.com/textbook/stathome.html [2007].

[3] Kazlacheva Z. (2010). The Use of Suitable Methods of Statistical Analysis in Fashion Design and Clothing Constructing. Proceedings of the International Scientific Conference eRA-5, pp. 432-437, 15-18 September 2010, Piraeus, Greece.

[4] Kazlacheva Z. (2012). Design and Pattern Making of Ladies' Dresses in Different Silhouettes. Yambol, Bulgaria, Faculty of Technics and Technologies, Trakia University, 2012, p. 54, ISBN 978-954-9999-81-5.

UDK: 677.054 COBISS.SR-ID 216027404 Review Article

SYNTHESIS OF MECHANISMS FOR ACTUATING OF KNIFE BOXES OF JACQUARD MACHINE "GROSSE EJP4"

Roumen Roussev, Diana Balabanova
Faculty of Technics and Technologies - Yambol
Trakia University - Stara Zagora, Bulgaria

Abstract: *The mechanism for driving the knife box of Jacquard machine "Grosse EJP4" is investigated. The measurements of the units were taken from a working machine with possible accuracy. The aim of this work is to modernize with minimal costs the mechanism for driving the knife box of Jacquard machine "Grosse EJP4" by synthesis of new cam using uninterrupted asymmetrical law of the second transfer function.*

Keywords: *synthesis, weaving machine, mechanisms for a knife boxes, lows of motion, transfer functions, determination of the cam profile*

ARTICLE INFO
Article history:
Recived 04. mar .2015 **Recived in revised form** 24. mar. 2015 **Accepted** 05. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

The shed formation mechanism largely determines the parameters required for the optimum functioning of the manufacturing process. The significant place in these conditions is occupied by the law of motion of healds. According Hrones [7], Mitchell [8] and the other, the high-speeds, the large reduced masses and the elasticity adduce to the output unit required continuous function of the acceleration over the whole interval of movement of the mechanism. It has been found from a number of studies [2] that the law of motion of the healds must be asymmetric.

This is associated with the variation of the tensions and the deformations of the wrap threads in the process of shed formation [3]. The rapid movement of the healds to shed treadle motion and the slow movement to end position is reflected favorably on warp threads breaks.

The mechanism for driving the knife box of Jacquard machine "Grosse EJP4" is investigated [1]. The measurements of the units were taken from a working machine with possible accuracy. The aim of this work is to modernize with minimal costs the mechanism for driving the knife box of Jacquard machine "Grosse EJP4", by synthesis of new cam using uninterrupted asymmetrical law of the second transfer function.

2. STRUCTURE AND ACTION OF THE MECHANISM.

The movement is realized in the following manner (Fig. 1). On the shaft (1) of the Jacquard machine is attached cam (2). The roller (3) which is mounted on the bascule 4 is rolled down the cam. The second arm of the bascule (4), trough the lever (5) is connected to the upper knife box (N1). Knife box (N1) leads in four points (four ends of the frame). Because of that this mechanism is implemented on the right side (mirror) as well. The

displayed figure is duplicated on the other side of the machine. Lower knife box N2 is driven in the same way. The mechanism is consistently connected to the camshaft mechanism with swinging roller follower (2, 3 and 4) and crank mechanism (4, 5 and N1).

The mechanism works in the following way: when the cam (2) rotate and roll (3) goes from small to large radius, the rocker (4) rotates counterclockwise. The lever (5) rises up and lifts knife box (N1). When the roll (3) goes from large to small radius of the cam (2), the bascule (4) rotates clockwise. Then, when the lever (5) goes down the knife box (N1) descends. The knife box (N2) moves synchronously and phases opposition of the knife box (N1).

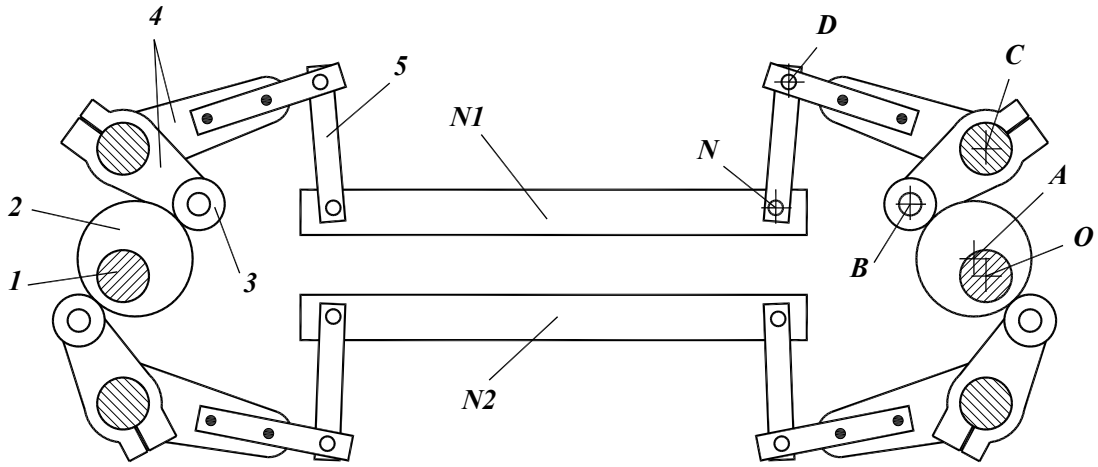


Fig. 1. Actuating of the knife boxes of the Jacquard machine GROSSE

3. SYNTHESIS OF THE MECHANISM FOR ACTUATING OF THE KNIFE BOXES.

The mechanism to the actuating of the knife boxes can be modernized through the improvement of transfer functions of the individual it mechanisms and reallocating the transfer ratio between them. This task is difficult for solvable four-bar mechanisms. In addition, a change in the dimension of the units [11] leads to the construction of a new Jacquard machine. The most economical option is to synthesize a new cam, with an improved law of motion. To take account of the impact of the transfer functions, we have the law of motion of knife boxes setting of the output link of the mechanism and trough transmission functions to find the law to synthesize the cam. This is done by inverting the input and output of the mechanism. In the synthesis of the cam the basic parameters of the existing cam mechanism should be preserved. Analysis [1] of the mechanism is carried out under the following parameters of units: CS = 100 mm, CD = 250 mm, DN = 145 mm AXLE = 140 mm, distance between the axis of rotation of the cam and the direction of movement of knife boxes - m = 230 mm, angle between the arms CD and BC of the bascule - $\delta = 54$ °. From the profile of an actual workable cam defined transfer functions of the cam mechanism [1]: displacement function – ψ, firs - ψ' and second - ψ'' transfer functions. Wingspan of the bascule BC is established $\psi \approx 29$ °. The output of the cam mechanism (bascule BC) is input of the crank mechanism. The transfer functions of the crank mechanism S (displacement), S' (first transfer) and S''(second transfer) are calculated by the method of vector contours.

3.1. Choice of law of motion of knife boxes.

Proposed are asymmetrical laws for a second transfer function, which are continuous functions in the whole interval [8]. One of them is the so-called "polynomial", representing the exponent polynomial. He has type:

$$(4) \quad \Delta\psi = C_1.\xi^3 + C_2.\xi^6 + C_3.\xi^9;$$

$$(5) \quad \psi' = 3.C_1.\xi^2 + 6.C_2.\xi^5 + 9.C_3.\xi^8;$$

$$(6) \quad \psi'' = 6.C_1.\xi + 30.C_2.\xi^4 + 72.C_3.\xi^7;$$

where $\xi = \varphi / \varphi_{\max}$ (φ is the current angle, $\varphi_{\max}$ is the phase angle of rotation of the cam, which is accepted for 180 ° for the rise phase of the bascule and 180 ° for the return phase).

The constants C_i (i = 1, 2, 3) are defined from limited term: at $\xi = 1$ $\Delta\psi = \Delta\psi_{\max} \equiv \delta$ (angular motion, accepted value $\delta = 29^0$) and $\psi' = \psi'' = 0$. The system of three equations of first degree with three unknowns is received. The system is solved by the method of Cramer, such answers have been received $C_1 = 1.518, C_2 = -1.518, C_3 = 0.506$. To obtain a larger absolute extreme in the first half of the interval the abscissae is transformed, as ξ replaced by $(1-\xi)$. For the sign to be positive, the function changes the sign. For the second transfer function ψ'' is given by (6):

$$(7) \quad \psi'' = -6.C_1.(1-\xi) - 30.C_2.(1-\xi)^4 - 72.C_3.(1-\xi)^7.$$

This law is used as a second transfer function for movement of knife boxes of the jacquard machine. To take account of the impact of a crank mechanism the transfer functions are obtained to invert his input and output:

$$(8) \quad \sigma' = 1/S' \text{ - for first transfer function}$$

$$(9) \quad \sigma' = -S''/S'^3 \text{ - for second transfer function}$$

As noted above, the mechanism for actuating the knife boxes of the jacquard machine Grosse consists of sequentially linked the cam mechanism and crank mechanism. The common transfer functions will be:

$$(10) \quad \chi' = \psi'.\sigma' \text{ - for first transfer function and}$$

$$(11) \quad \chi'' = \psi''.\sigma' + \psi'^2.\sigma'' \text{ - for second transfer function}$$

The synthesis of the cam mechanism is made by those transfer functions (fig. 2).

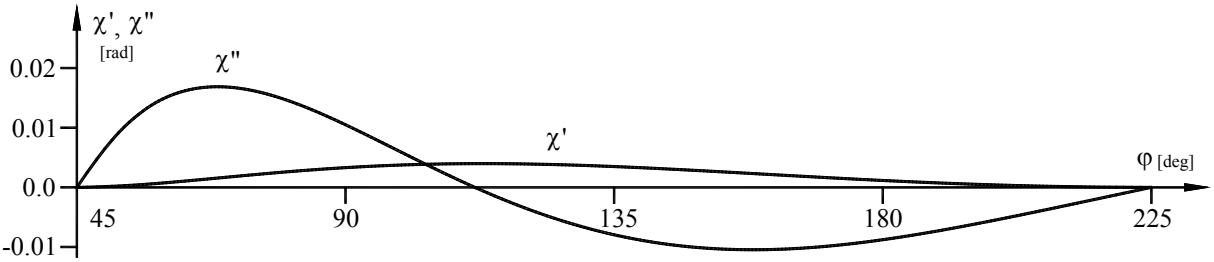


Fig. 2 *The functions χ' and χ'' for synthesis of the cam.*

3.2. Determination of the cam profile.

A detailed approach for the synthesis of cam mechanisms is presented by Paleva [7]. It includes several stages: analysis of the technology of the manipulation process, determining the conditions for structural-dimensional synthesis, target function, functional structural synthesis of mechanism, the choice of law of motion and the determination of the cam profile

A. Determination of the basic parameters.

The basic parameters of the mechanism are the length of the carriage OC, bascule length CD, the initial angle of the bascule, bascule's move and the radius of the roll. Mathematical models for the determination are presented [10, 3, 4, 9]. For the modernization of the mechanism for actuating of the knife boxes of the jacquard machine with minimal means retained the dimensions of the existing mechanism.

B. Transfer functions.

The transfer functions for synthesis of the cam are found in numerical form after inversion of the input and output of the mechanism. They are shown graphically in Fig. 2.

C. Determination of the cam profile. It is performed by the method of equivalent for-bar mechanisms on the basis of the kinematic mechanisms equivalence [2]. For each value of the generalized coordinate φ there is the four-bar mechanism OABC, which is equivalent to the cam mechanism to at least the second order. In it point O coincides with the axis of rotation of the cam, point A is the center of curvature of the cam profile, point B is the center of rotation of the roll and so on. Point C is the center of rotation of the bascule. Is used, the following mathematical model (Table 1):

Table 1

Coordinates of relative instantaneous center of velocity P	$x_P = L.\psi'/(\psi'-1),\ y_P = 0$
Coordinates of the point B	$x_B = L + R.\cos\psi\ ;\ y_B = R.\sin\psi$
Determination of the angle between link OA and collineation axis PQ	$tg\mu = \psi'.(1-\psi')/\psi''$
Angular coefficient of the straight line defined the position of the unit with general plane motion	$k_n = y_B/(x_B - x_P)$
Angular coefficient of the collineation axis	$k_q = (k_n + tg\mu)/(1 - k_n.tg\mu)$
Coordinates of the absolute instantaneous center of velocity Q	$x_Q = (k_{BC}.L - k_q.x_P)/(k_{BC} - k_q)$ $y_Q = k_{BC}.(x_Q - L)$
Angular coefficient of the straight line defined the position of the crank OA	$k_{OQ} = y_Q/x_Q$
Coordinates of the hingle A	$x_A = k_n.x_P/(k_n - k_{OQ});\ \ y_A = k_{OQ}.x_A$
Coordinates of the Equidistant points on normal BP – center B of the roll, B_0 from cam profile and B_i – center of the machining tool with radius r_i	$x_{B_{ij}} = x_{B_j} + (r_i - r)signk_n/\sqrt{1+k_n^2}$ $y_{B_{ij}} = k_2(x_{B_{ij}} - x_{P_j})$
Conversion of the coordinates from the coordinate system Oxy in plane of carriage to coordinate system OXY of the cam, fixed in its initial position	
$\begin{bmatrix} X_j \\ Y_j \end{bmatrix} = [R_{-\varphi}]\begin{bmatrix} x_j \\ y_j \end{bmatrix} = \begin{bmatrix} \cos\varphi_j & \sin\varphi_j \\ -\sin\varphi_j & \cos\varphi_j \end{bmatrix}.\begin{bmatrix} x_j \\ y_j \end{bmatrix}$	

4. CONCLUSION

The modernization of the mechanism for actuating of the knife boxes of the Jacquard machine is proposed, by improving the law for their motion. An asymmetric low for the second transfer function is used, which is set on the output link of the mechanism. Thus, taking into account the influence of transfer functions of the components mechanisms. The cam mechanism with swinging roller follower is synthesized, with randomly assigned a law of motion. The modernization of the mechanism can be accomplished only with the substitution of the cam, without modifying the rest of the details.

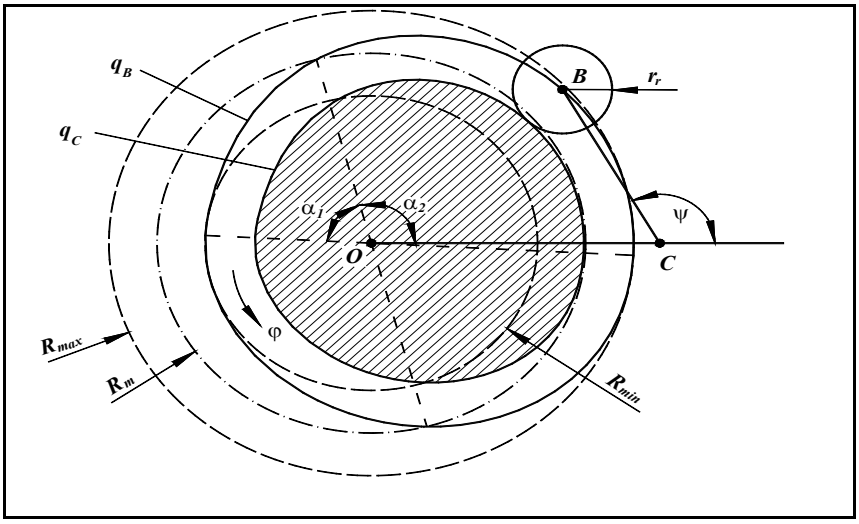


Fig. 3. Profile of the cam and main geometrical dimensions

5. REFERENCES:

[1] [1] Balabanova D., R. Roussev, K. Deyanov, Kinematic analysis of the mechanism for driving the knife boxes in jacquard machine "Grosse EJP 4", ICTTE 2014, Yambol, p. 236-241

[2] [2] Galabov V., Synthesis of the mechanisms in robotics, TU – Sofia, 1992.

[3] [3] Galabov V., I. Andonov, Defining the areas of initial position of the output link in the synthesis of cam, band and lever mechanisms. Part I Mechanisms with the rotation of the input and bascule in the output. Mechanics of machines, №105/2013, p. 69-75.

[4] [4] Galabov V., I. Andonov, Defining the areas of initial position of the output link in the synthesis of cam, band and lever mechanisms. Part II Mechanisms with the rotation of the input and slider in the output, Mechanics, №105 / 2013, p.76-82.

[5] [5] Djivanov K., Trifonov K., Stilyanov D., An improved low for motion of heald frames for weaving machines, Textile industry 1/1975, p. 14-19.

[6] [6] Kevorkyan A., Textile materials science and testing, Technique, 1977.

[7] [7] Paleva- Kadiyska B., Study of transporting materials of the sewing machines, thesis for PhD, 2015.

[8] [8] Roussev R., V. Galabov, Lows for motion of heald frames in weaving machines, Textile and clothing, 11-12 /2000, p. 14-18.

[9] [9] Roussev R., V. Galabov, Synthesis of the cam mechanisms with swinging follower with two rollers for weaving machines, 10/ 2001, p. 12-17.

[10] [10] Roussev R., V. Galabov, Synthesis of the cam mechanisms with diametrical cam for weaving machines, 4-5/ 2003, p. 31-35.
[11] [11] "Grosse" - Musterungsanlage, 1978.
[12] [12] Hrones J. A. Analysis of Dynamic Forces in a Cam-Driven SYSTEM> Transactions of the ASME 70, 1948 pp. 473-482.
[13] [13] Mitchell D. B., Tests on Dynamic Response of Cam – Follower Systems, Mechanical Engineering, 72 June, 1950, pp. 467-471

UDK: 7.05 COBISS.SR-ID 216027916 **Review Article**

THE GOLDEN SQUARES IN FASHION DESIGN

Zlatina Kazlacheva
Faculty of Technics and Technologies of Yambol,
Trakia University of Stara Zagora, Bulgaria
Graf Ignatiev 38, 6800 Yambol, Bulgaria
e-mail: zlatinka.kazlacheva@trakia-uni.bg

Abstract: *This paper presents the use in fashion design of the squares tiling variants, which are based on the proportions of the Golden section. As a result of the use of the versions of squares tiling on the base of Golden section proportions for designing of aesthetic, beautiful and harmonic clothing, it can be concluded that in fashion design the Golden squares can be used in different position, combinations, proportions toward the clothing sizes, and color decisions.*
Key words: *Fashion Design, Golden Ratio, Squares Tiling, Pythagorean Tiling.*

ARTICLE INFO
Article history:
Recived 28. feb .2015 **Recived in revised form** 02. mar. 2015 **Accepted** 05. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

As a symbol of beauty and harmony the proportions in the Golden ratio are used in creation of different type of tiling, which are used in design. This paper presents the use in fashion design of the squares tiling variants, which are based on the proportions of the Golden section. The idea about the paper is inspired by the article [3], which presents the use in fashion design of the squares tiling models, based of Fibonacci numbers proportions. The inspiration comes by the reason that the spiral form squares tiling on the base Fibonacci numbers proportions is similar to the spiral form squares tiling on the base the Golden ratio. By this reason another variant of squares tiling in Golden ratio proportions are looked for, similar to the Fibonacci series squares tiling, formed side by side [1]. The third variant, used in the presented paper, is a variant of Pythagorean tiling in proportions of Golden section [5].

2. SQUARES TILING IN GOLDEN PROPORTIONS

Figure 1 presents the spiral form squares tiling on the base of the Golden ratio. [2, 4] A Golden rectangle (a rectangle with proportion of the sides equal to the Golden ratio) is drawn. A square with sides, equal to the larger side of the Golden rectangle, is set on the larger side of the Golden rectangle. Both the Golden rectangle and the square form a bigger Golden rectangle. A square with sides, equal to the larger side of the bigger Golden rectangle, is put to the larger side of the bigger Golden rectangle. The same drawings repeat in the spiral direction and the squares in proportions of Golden ration form a squares tiling in spiral form. This tiling is the frame for creation of the Golden spiral [4].

Figure 2 presents the side by side squares tiling on the base of the Golden Ratio, which is similar to the Fibonacci series squares tiling, created side by side in two perpendicular linear directions, which is presented in [1]. A Golden rectangle is drawn. A square with sides, equal to the larger side of the Golden rectangle, is set on the larger side of the Golden rectangle. Both the Golden rectangle and the square form a bigger Golden rectangle. A square with sides, equal to the larger side of the bigger Golden rectangle, is put

to the larger side of the bigger Golden rectangle. The same drawings repeat in two perpendicular linear directions and form other variant of squares tiling in side by side or a diagonal form.

Figure 3 presents a Golden variant of Pythagorean Tiling [5]. In presented variant the proportion between the sides of the smaller and bigger squares is equal to the Golden ratio.

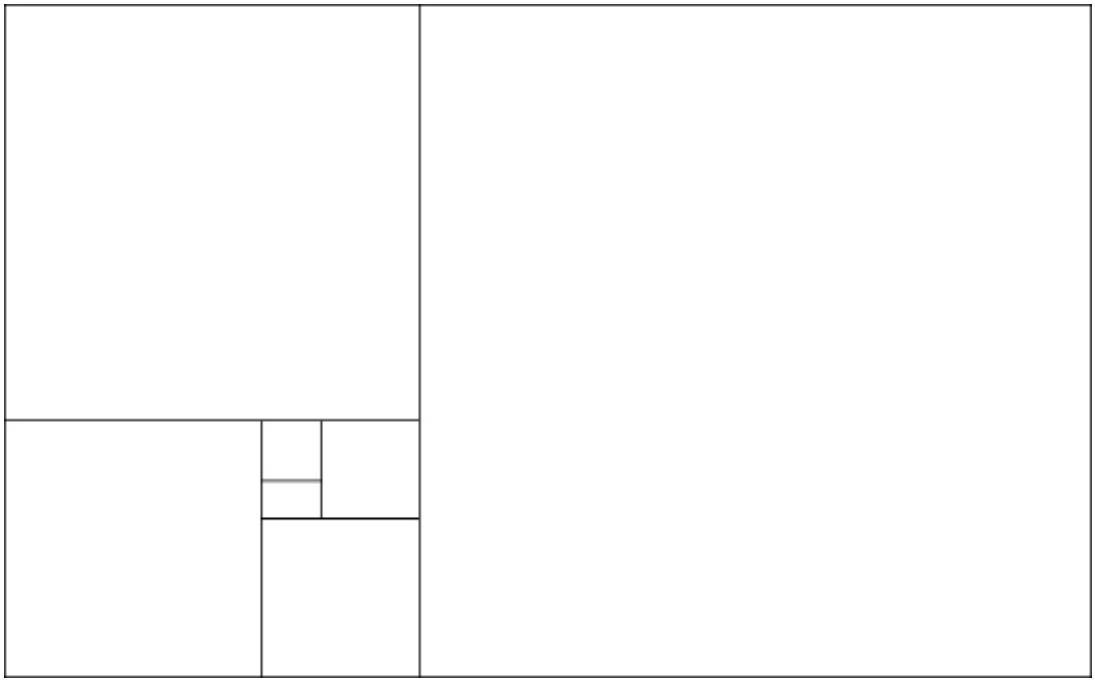


Figure 1. The Golden squares tiling in spiral form

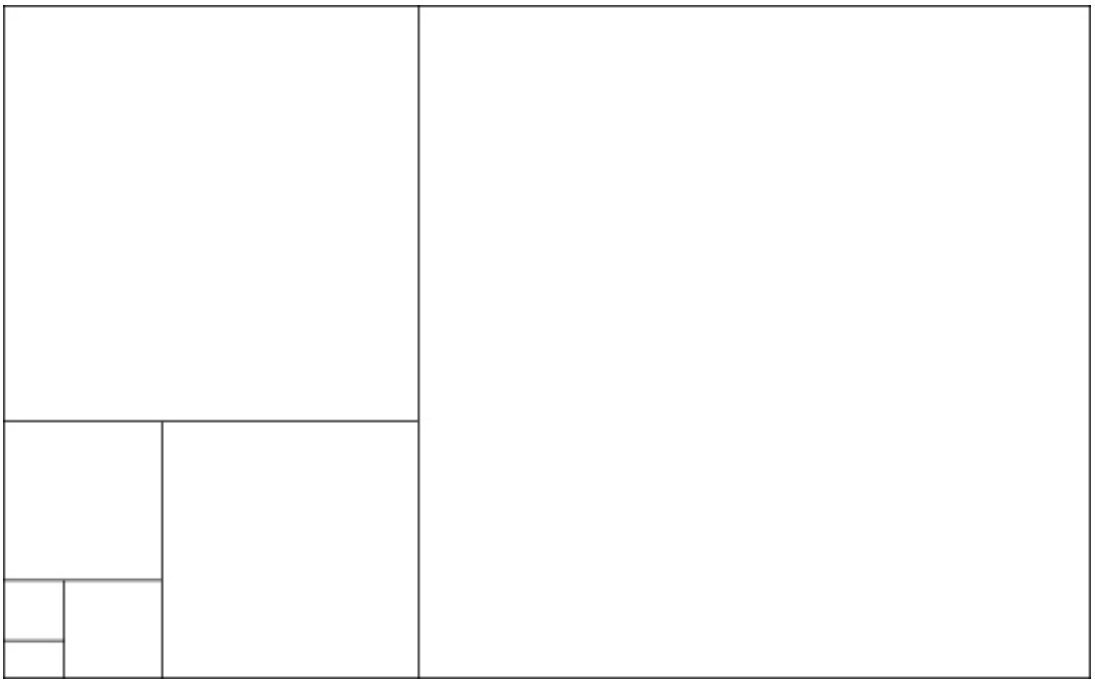


Figure 2. The Golden squares tiling in two perpendicular linear directions

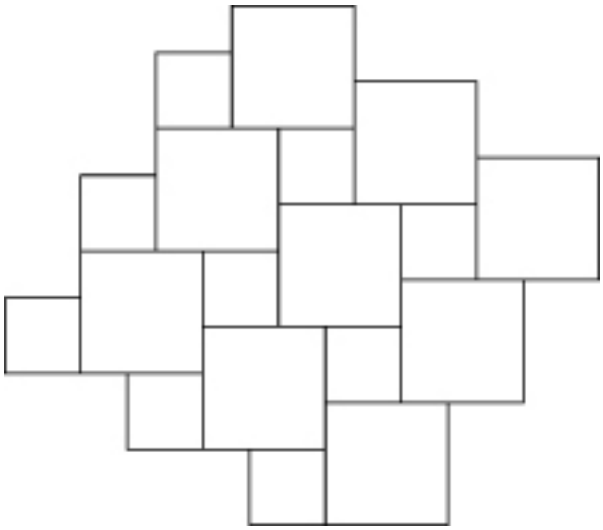


Figure 3. Pythagorean tiling in Golden ration proportion

3. THE GOLDEN TILING WITH SQUARES IN FASHION DESIGN

Figures 4 and 5 present models of ladies' dresses with design using the Golden squares tiling in spiral form, which is shown in figure 1. The differences in the use of the tiling are in the situation of the tiling in the front, the tiling proportions toward the dress, and the color decisions.

In the dress shown in figure 4 the basic Golden rectangle lies on its smaller side and it is situated close to the middle of the waist line. The color decision is on the base of two contrast colors.

In figure 5 the basic Golden rectangle lies on its larger side and is situated on the waist line close to the right side seam. The color decision is in the blue range.

The size of the Golden tiling in the dress, presented in figure 4 is a little smaller than the size of the tiling in the dress, which is shown in figure 5.

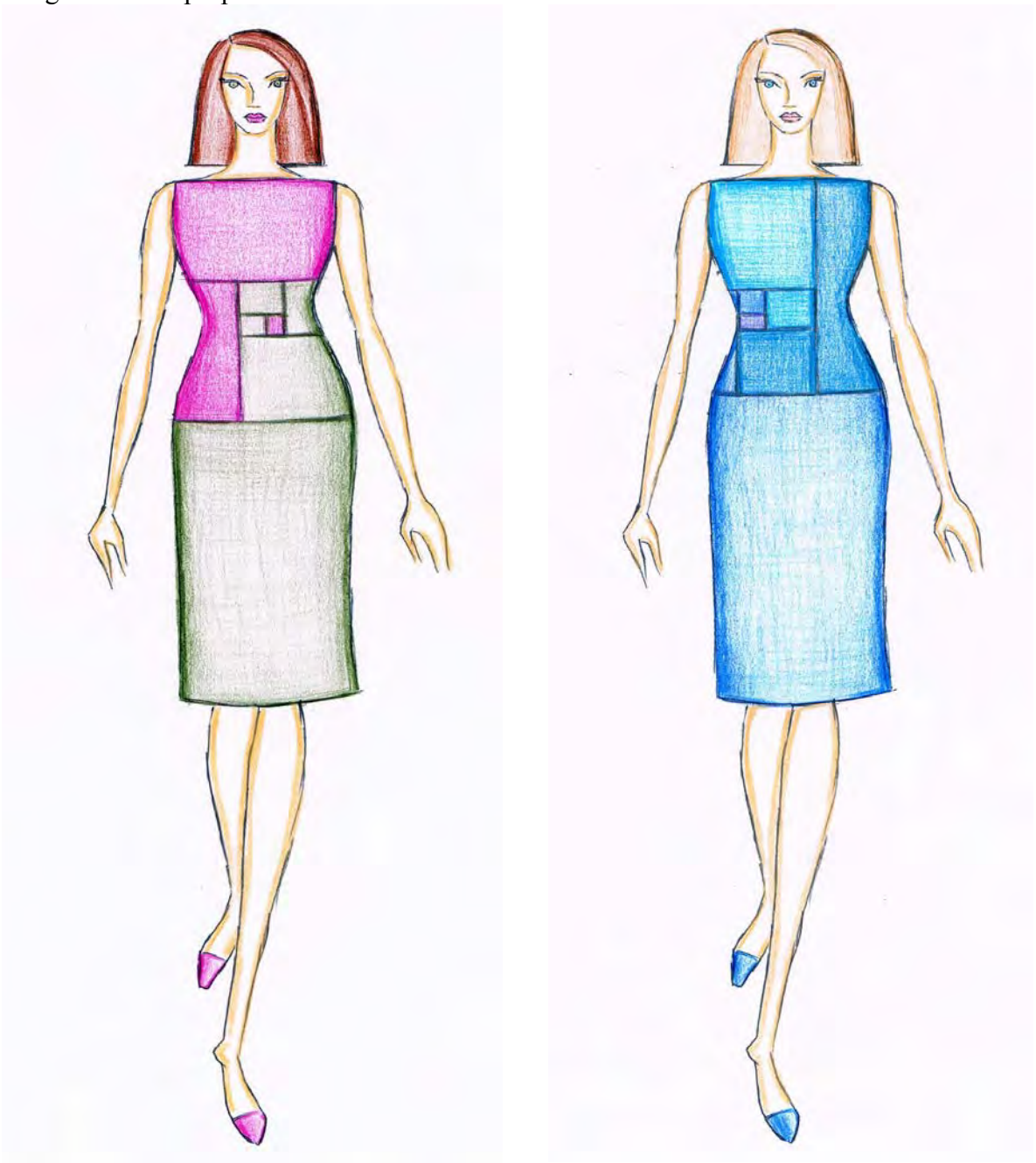
Figures 6 and 7 present models of ladies' dresses with design using the Golden squares tiling in two perpendicular linear directions.

In the lady's dress, shown in figure 6, the basic Golden rectangle is lies on its larger side and it is situated in the center of the waist line. Two forms of the Golden squares tiling in two perpendicular linear directions are created on the base the Golden rectangle. Two colors are used for the square, which are formed around the basic Golden rectangle. The Golden rectangle and the places outside the both forms of tiling are colored in different color than the both colors used in tiling. The color scheme in the tiling is the next: the both 1^{st} and 2^{nd} squares, which are drawn around the Golden rectangle, are colored in one and the same color. The next two 3^{rd} and 4^{th} squares are colored in one and the same color too, but different than the color of the 1^{st} and 2^{nd} square. The 5^{th} and 6^{th} squares are colored in the same color like the 1^{st} and 2^{nd} ones; the 7^{th} and 8^{th} squares are colored in the same color like the 3^{rd} and 4^{th} ones; and etc.

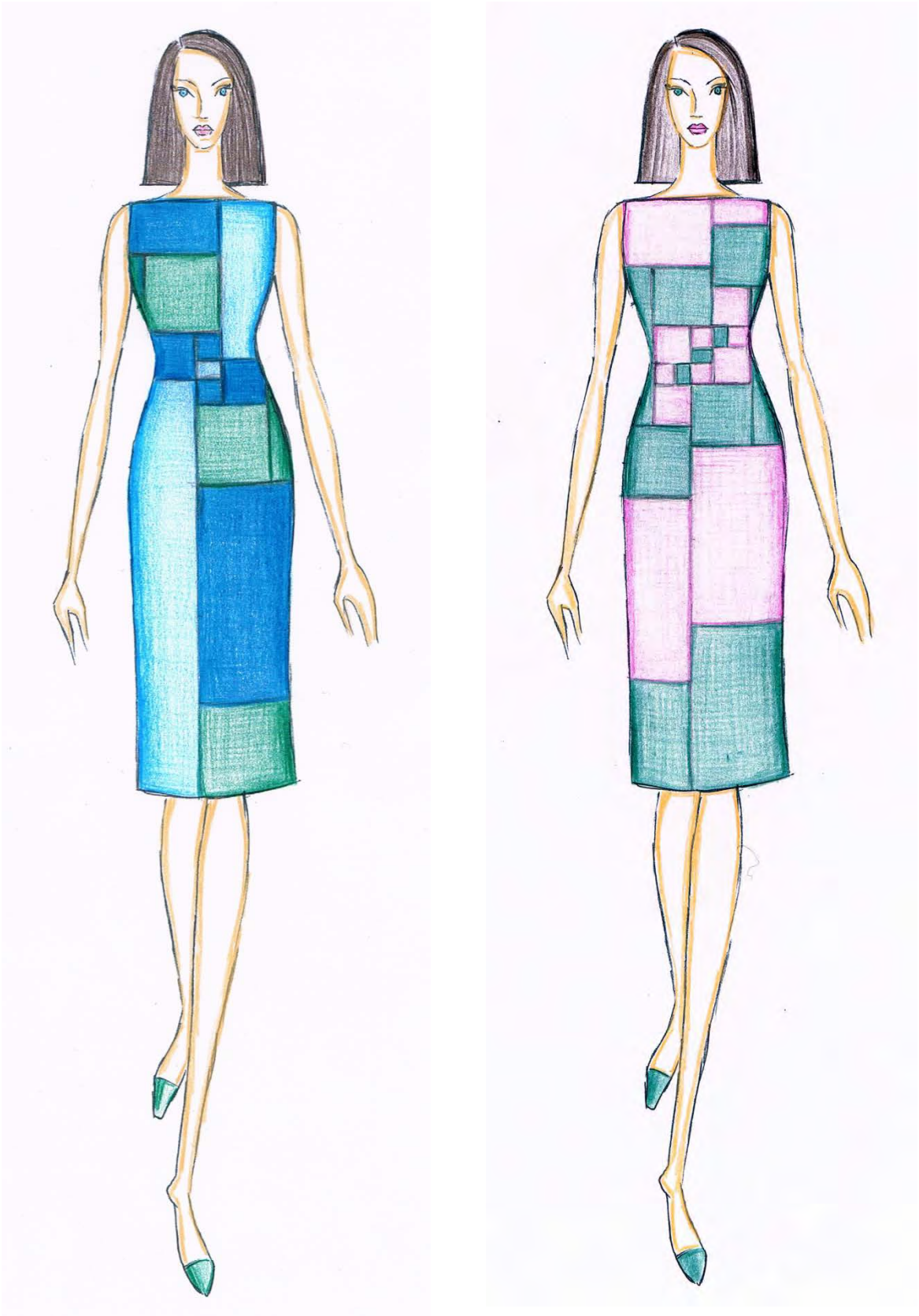
The design of the lady's dress in figure 7 uses the same way of use of the Golden squares tiling in two perpendicular linear directions, but in this creation, the empty places is filled with forms of the same tiling. Two colors scheme is used for the basic Golden rectangle and the squares. The color scheme is the same like the color scheme in the tiling in the dress in figure 6 as the basic Golden rectangle is colored in the color of the 3rd and 4th squares.

The design of the lady's dress, presented in figure 8, uses a quad-spiral version of Golden squares tiling in two perpendicular linear directions, which is shown in figure 2. This quad-spiral version is inspired by quad-spiral version of Fibonacci squares tiling in two perpendicular linear directions from [1]. The color scheme with 2 colors is the same like the dress in figure 7. By this way of coloring the effect of increased Golden rectangles rows is made. The model in figure 8 the center of the quad spiral is situated in the middle of the breast.

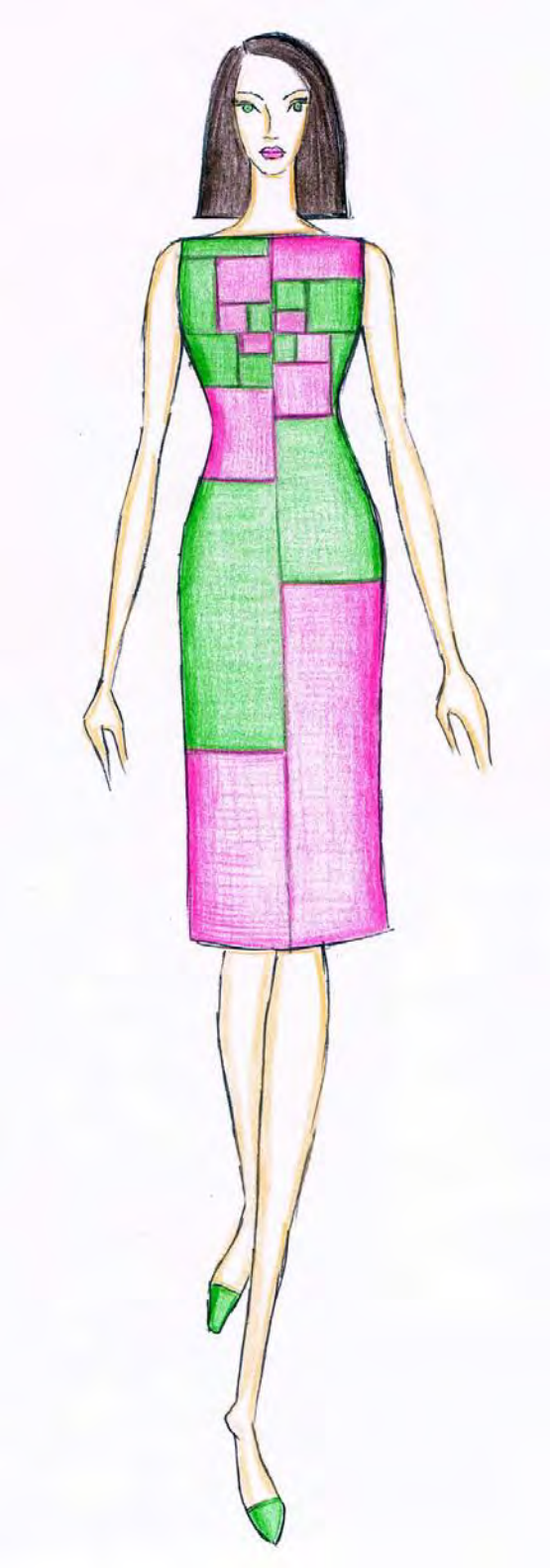
The design of the model of a lady's dress, presented in figure 9, uses Pythagorean tiling in Golden proportions in two colored model.



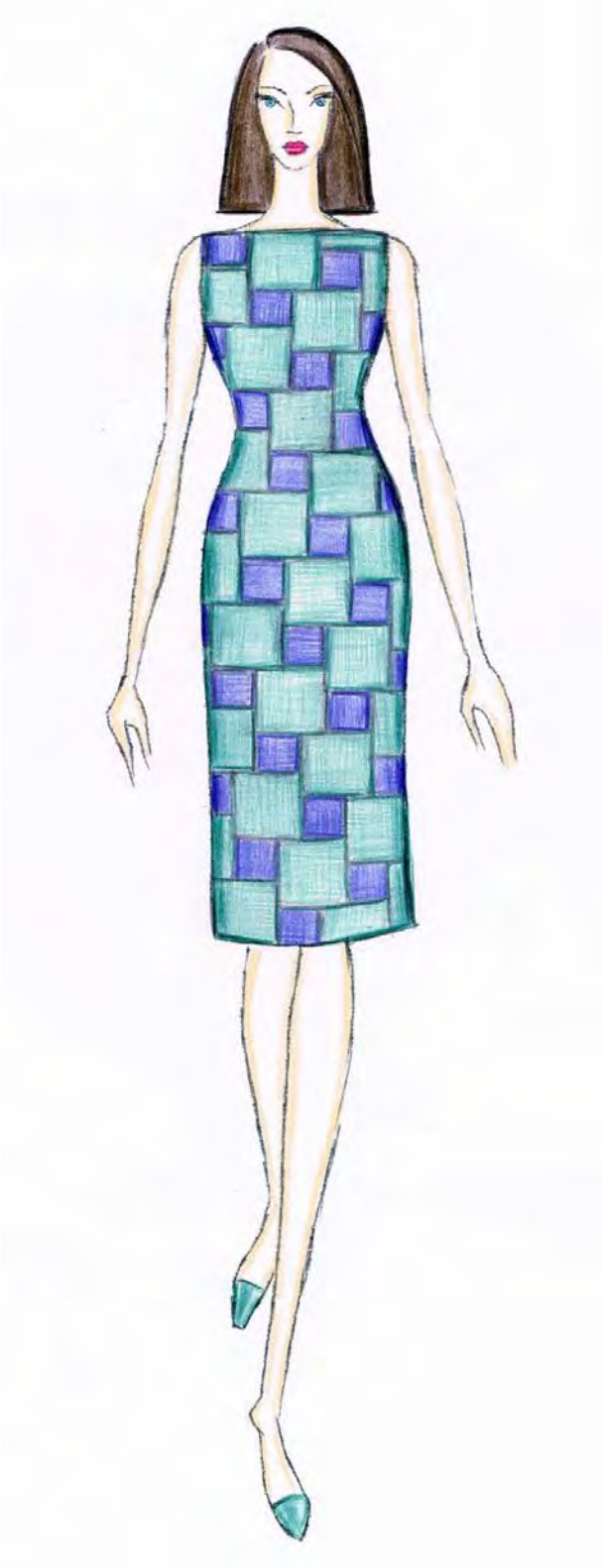
Figures 4 and 5. Design of ladies' dresses using the Golden squares tiling in spiral form



Figures 6 and 7.
Design of ladies' dresses using the Golden squares tiling in two perpendicular linear directions



Figures 8. Design of a lady's dress using the quad-spiral version of the Golden squares tiling in two perpendicular linear directions



Figures 9.
Design of a lady's dress using Pythagorean tiling in Golden proportions

4. CONCLUSION

As a result of the use of the versions of squares tiling on the base of Golden section proportions for designing of aesthetic, beautiful and harmonic clothing, it can be concluded that in fashion design the Golden squares can be used in different position, combinations, proportions toward the clothing sizes, and color decisions.

5. REFERENCES:

[1] Baird E. (2009). Fibonacci Series Tiling, with Triangles. http://erkdemon.blogspot.com/2009/06/fibonacci-series-tiling-with-triangles.html. [March-April 2014].
[2] Golden Rectangles. http://www.math.harvard.edu/archive/101_spring_00/www/gallery/gold/ index.html. [April 2015].
[3] Kazlacheva Z. (2014). Fibonacci Squares in Fashion Design. ARTTE Applied Researches in Technics, Technologies and Education, Vol. 2 No. 2, 2014, pp. 91-98; https://sites.google.com/a/trakia-uni.bg/artte/articles/artte-vol-2-no-2.
[4] Lee J. Logarithmic spiral. 10 Lessons in Fractals, Complex Patterns, and Chaos. http://mathforum.org/lisab/fourth_lesson/part_4.htm. [April 2015].
[5] Morey J. (2006). Pythagorean Tiling. PolygonCraze. http://polygoncraze.blogspot.com/2006/09/pythagorean-tiling.html. [April 2015].

UDK: 637.5'64:338.439.5]:004 COBISS.SR-ID 216028428 Review Article

APPLICATION OF COMPUTER VISION SYSTEM FOR QUALITY ASSESSMENT OF PORK MEAT

Zlatin Zlatev[1], Antoaneta Dimitrova[1], Stefan Ribarski[2], Ivan Penchev[2]

[1]Trakia University, Faculty of Technics and Technologies, Yambol, Bulgaria
e-mail: zlatin.zlatev@trakia-uni.bg
[2]Trakia University, Faculty of Agriculture, Department of Meat and Meat Products, Stara Zagora, Bulgaria

Abstract: *The present work is a review and analysis of different approaches, methods and tools for computer vision in the evaluation of quality indicators of pork meat. The authors have developed and delivered software as a tool that allows analyzing and evaluating key elements in meat - meat tissue, fat, bone and skin. In the graphic user interface, which is a part of the software instrument is built-in functions for pre-processing of visual images and histogram analysis of the used color features.*
Keywords: *Meat quality assessment, Graphical User Interface, PSE, Fat content in meat.*

ARTICLE INFO
Article history:
Recived 01. mar .2015. **Recived in revised form** 03. mar. 2015 **Accepted** 16. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

Safety, quality and wholesomeness of pork meat can be ensured only through the integration of law and control of the entire food chain. Achieving these indicators on food also is a goal that requires joint efforts and skills of experts from different professional areas – agronomists, technicians, and engineers [9]. Synchronous operation between them would be possible if they are qualified for additional opportunities to identify, monitor and act on indicators of safety, quality and wholesomeness of meat. The scientists mostly rely to objectify this process on modern technologies and providing them automatic control systems.

Despite many new facilities, machinery and processing lines in the meat industry there is still a big part of the routine process stages and operations (grading, sorting, and packaging) are performed manually and / or visually by people. This situation is due to many factors, but the most important reason is that labor costs are capitalized to compete with new technological equipment.

All these facts give us grounds to launch a study on the feasibility of using computer vision systems as an alternative and fast method for determining the main quality parameters of pork meat.

The problem of the existing defects in the pork meat is of interest to researchers and manufacturers for many years. One of the important factors affecting the quality of the final product, and the economic result of the processing of pork meat is quality of raw material used. The importance of properly detecting meat of lower quality becomes significant.

An important and frequent diversion in pork meat quality defect is PSE (pale, soft, exudative). The exact identification of this defect is very difficult. Many experiments were carried out to develop methods to assess the quality of pork meat and to discovery defects in continuous measurement (for example, on conveyor belt). One of the most commonly used criteria is the value of pH. Moreover, there are known methods of using the changes in thae color and electrical conductivity. They help to identify the defects in meat. Despite the high

accuracy of these methods, they are labor-intensive and difficult to apply for measurement in flow industrial environment.
These methods have some drawbacks. There is no single criterion for determining meat quality based on these parameters. The color is an important indicator of the quality of pork because it is one of the most important characteristics affecting the evaluation of the user. One of the main methods for measuring and evaluation the color is CIELab color model by a colorimeter.

The benefits of computer-based methods of image analysis are confirmed by many authors. Statistical evaluations were used to determine the correlation between physics-chemical parameters of pork and changes in the components of various color models [7,8] (RGB, HSV, Lab, XYZ, etc.). The image analysis allows tracking of the color change on the surface of the pork meat, and determining the ratio of fat, bone, skin, muscle and connective tissue.

Computer vision systems have proven to be suitable for objective evaluation of food products [2,7,9]. The computer vision, including recording, processing and analysis of images is a non-destructive method to assess the visual quality performance of food [8].

The aim of this work is to analyze the achieved results in assessing the quality of pork meat and to offer programming tool that accelerates and automates the process of identification of the main elements in meat - meat tissue, fat and bones.

2. EXPOSITION

2.1. Main indicators of the quality of pork meat

The meat has some typical external signs by which we can judge about its freshness, and thus its quality. The color is determined by the amount of myoglobin in muscle fiber. It is influenced by sex, age and breed, the ratio between muscle and fat tissue. The muscle and fat tissue are better for the nutritional value of the meat because they contain essential nutrients but connective, bone and cartilage tissue are adversely.

The fat content is mainly determined by chemical analysis, but it is expensive and time-consuming method. Some measurements such as the number, size and spatial distribution of fat is impossible to perform by chemical analyzes.

The object of this study is the development of software tool that allows analyzing and evaluating key elements in meat – meat tissue, fat and bones.

2.2. Evaluation of the color characteristics of pork meat

The application of computer vision reduces the possibility of incorrect assessment of the quality of meat due to human error modification of environmental conditions, fatigue and experience of the evaluator. Computer vision systems can replace many expensive, labor-intensive and time-consuming methods and provide nondestructive obtaining of color data measured on the surface of the meat.
Data for the amount of meat tissue, fat and bones can be obtained with continuous measurement on a conveyor belt, which is difficult by conventional methods for determining the quality of the meat.

There is requirement of analysis of formed color images to obtain these data. Regression methods are used usually [2,4,5]. These methods have the necessary information to assess the quality in processing and sorting of food. Comparison with databases at all stages of quality assessment is important for accurate decision about the quality of the tested meat and it is a major part of image processing. The tools such as neural networks, fuzzy

logic and genetic algorithms are part of the means to detect defects in pork meat [2]. Neural networks and fuzzy logic have been successfully applied in computer vision systems used in other sectors of the food industry [7,10,11,12].

2.3. Evaluation of the main elements in pork meat

There is indicated in the literature that regression methods using correlations can determine the relationship between the composition of meat and intersection, which is measured [2]. Relatively high values of R = 0,83 for determination of lean meat, and lower results in the determination of fatty content, and good results in determining the percentage of meat - fat. The optimal coefficients are obtained at security levels 92% to determine the amount of content veins R = 0,78, while the percentage of veins R = 0,72, and for fat R = 0,70. These studies show that the methods of image processing can be used as an alternative to classical methods for automated inspection in various stages of processing meat. There is developed system of machine vision operating in real time, which determines the quality of fresh meat by measuring color and fat. The meat is sorted by hand depending on the quality. Accepted quality criteria are weight, pH, defects, fat content, muscle color and homogeneity of the color. Quality criteria depends on the thickness of subcutaneous fat, muscle color, homogeneity of the color but this grading depends on subjective factors. The authors propose a method for the detection and measurement of subcutaneous fat and methods for segmenting muscles to assess the color. We discovered a correlation R = 0,83 between the manual measurement of subcutaneous fat and measuring system of image processing. The developed system is working well, which means that measurements of color and fat have good statistical reliability.

Methods are proposed [3] for color segmentation to detect defects in fresh meat. Healthy skin is characterized by color features in different color areas and different methods of segmentation. The right choice of color channel and segmentation method gives good results in the detection of defects. Disparate healthy skin and the defects determine the choice of method and threshold segmentation. Segmentation methods based on S and H components of the HSI model are not sensitive to shading the sides of the meat and produce good results in the detection of defects. There is studied the use of image segmentation for grading veins, fat and muscle connections and we found out relationship between these areas and the level of salting the meat. The authors developed robust segmentation algorithm for different areas of the color images of meat in two steps – computation of high contrast grayscale image by linear combination of RGB components and segmentation using k-means [1].

The stability of the color of vacuum pork meat pieces during cold storage cupboard is researched and the initial state of vacuum packaging, the level of oxygen permeability and ultraviolet light of packaged products is studied also [5]. The basic process of discoloration as a result of destruction of nitric oxide in the presence of oxygen depends on the degree of suction. The careful control of these factors is important for optimizing packaging and storage to preserve the color of the product. The color of the surface of the product in vacuum is measured by colorimeter. We found out that the parameters of the Hunter “a” correlated with subjective color points and it has a standard deviation 0,2. To reduce the interference of packing material and because of the product variability the parameter “a” is normalized to its initial value. The combination of light and the presence of oxygen in the package are a major cause of discoloration of the product [4, 5]. In other studies they used multifactor experiment to research the interactions between certain factors – oxygen and its distribution, changes in volume, level of reflection and nitrite levels, affecting the color stability of meat products packaged under different conditions.

Statistical analysis shows the significant effect of these main factors to reduce redness of the sausages. The selection of non-optimal values for a parameter could affect many other values that affects the color change during transporting and storage of products. Thermally processed meat products are characterized by the method of handling, their organoleptic and chemical parameters as indicators of quality [6]. The color of these products is measured using colorimeter CIE Lab color model. The technical analysis does not give good results for the determination of meat quality.

Basic technical analysis methods use wavelength reflection and absorption by the object in the visible light spectrum. These methods are suitable for the study of food also.. They give average values to small areas of the sample and should be measured many points to get the color profile of the product. The authors determined that only the summary results of technical, chemical and organoleptic analysis can provide accurate data on the quality of the product.

2.4. Description of the developed software for assessment the quality of pork

Figure 1 shows the graphical user interface (GUI) "Pork meat quality assessment" developed in the Matlab 7.11 programming environment. In the creation of software we used system functions and tools of GUIDE Templates. The interface is built on a modular basis and consists of four modules:

1.Module for recognition of fat, meat and bone tissue;
2.Module for histogram analysis of the image specified by the user color model;
3.Visualization module;
4.Module For classification.

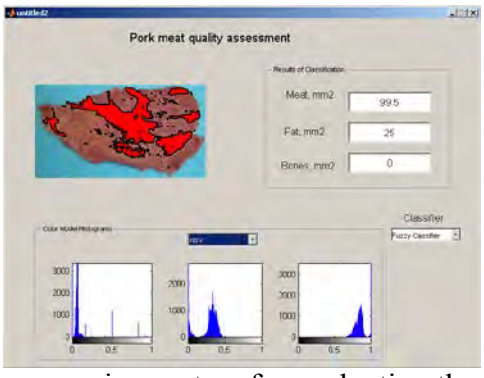
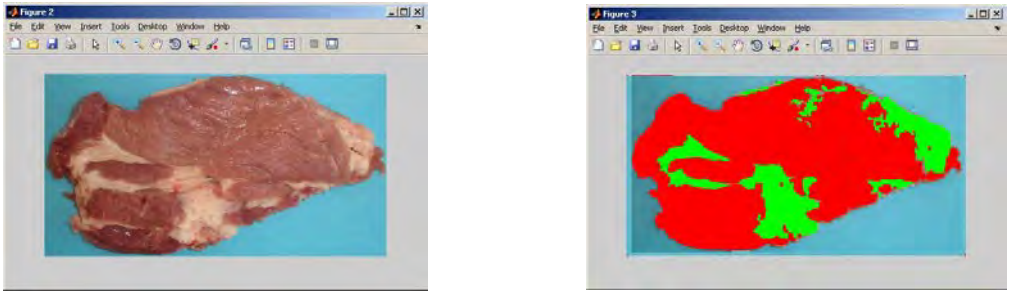


Figure 1. GUI of programming system for evaluation the quality of pork meat

Through the graphical interface we develop assessment the quality of pork by images using integrated criteria, rules and classifiers as the preliminary processing image meat is done by an additional built-in function. The interface allows individual assessment of meat and evaluation of a sample of meat. The instrument is set and complete testing of new types of meat and includes extracting, evaluating and ranking by informativeness of color features which are typical for the respective type of meat. Histogram analysis of color features is performed in interactive mode, which allows selecting the attribute.



a) Original image b) Image after processing

Figure 2. Image processing of pork meat in order to determine the ratio of meat / fat

Figure 2 illustrates the performance of the subroutine for image processing of pork meat. The ratio of meat / fat in pork is an important parameter because of the demand of lean meat by consumers. Selection of pigs for meat increasing the amount of tissue leads to another problem – this occurs the increase of risk of occurrence of the defect PSE, which in turn requires research of methods for accurate and timely determination of this ratio.

3. CONCLUSION

The following conclusions can be drawn by authors based on the review and analysis of published results related to the application of computer vision systems for quality assessment of the main indicators of pork:

1.Computer vision systems are appropriate tools for fast and non-destructive determination of main elements of pork in laboratory and industrial conditions.

2.The results of the analysis of the literature showed more accurate determination of lean meat (R = 0,78÷0,83) and lower results in measuring the fat content (R = 0,70÷0,79).

3.There is developed software tool whith facilitates for the determination of defects in pork using histogram analysis of the images and classification of meat tissue, fat and bones.

4. REFERENCES:

[1] Antequera, T., Caro, A., Rodríguez, P.G., & Pérez, T. Monitoring the ripening process of Iberian ham by computer vision on magnetic resonance imaging. Meat Science, 76, 561-567, 2007

[2] Brosnan, T., & Sun, D. Improving quality inspection of food products by computer vision e a review. Journal of Food Engineering, 61, 3-16, 2004

[3] Chao, K., Park, B., Chen, Y. R., Hruschka, W. R., & Wheaton, F. W. Design of a dual e camera system for poultry carcasses inspection. Applied Engineering in Agriculture, 16(5), 581-587, 2000

[4] Du, C. J. & Sun, D.-W. Automatic measurement of pores and porosity in pork ham and their correlations with processing time water content and texture. Meat Science, 72, 294–302, 2006

[5] Du, C. J. & Sun, D.-W. Correlating shrinkage with yield, water content and texture of pork ham by computer vision. Journal of Food Process Engineering, 28, 219–232, 2005

[6] Fortin, A., Robertson, W.M., & Tong, A.K.W. The eating quality of Canadian pork and its relationship with intramuscular fat. Meat Science, 69, 297-305, 2005

[7] Mladenov M.I., Analysis and evaluation of grain quality, Rousse, 2011, ISBN: 978-954-712-530-8 (original is in Bulgarian)

[8] Mladenov M.I., Intelligent sensors and systems, ISBN 978-954-712-493-6, Ruse, 2010, (original is in Bulgarian)

[9] Mladenov M.I., M.P. Deyanov, Design of sistems for control of technological objects, Rousse, 2013, ISBN: 978-954-712-596-4 (original is in Bulgarian)
[10] Mladenov M., S. Penchev, M. Dejanov , M. Mustafa. Quality assessment of corn grain sample using color image analysis.// Sensing and Instrumentation for Food Quality and Safety,Volume 5, 2011, No Issue 3, pp. 111-127
[11] Timmermans, A. J. M. Computer vision system for online sorting of pot plants based on learning techniques. Acta Horticulturae, 421, 91–98, 1998
[12] Wang, H.-H., Sun, D.-W. Evaluation of the functional properties of cheddar cheese using a computer vision method. Journal of Food Engineering, 49(1), 47–51, 2001
[13] Ying, Y., Jing, H., Tao, Y., Zhang, N. Detecting stem and shape of pears using fourier transformation and an artificial neural network. Transactions of the ASAE, 46(1), 157–162, 2003

UDK: 005.53:368(497.6) COBISS.SR-ID 216028684 Review Article

SERVICE SPECIFICITIES OF THE INSURANCE COMPANIES IN THE REPUBLIKA SRPSKA

Saša Ćudić[1], Miloš Sorak[2]
[1]DUNAV Insurance, Banja Luka, Bosnia and Herzegovina,
[2]University in Banja Luka, Faculty of Technology, Banja Luka, Bosnia and Herzegovina

***Abstract** :The paper presents specificities of the services of the insurance companies in the Republika Srpska. The objective of the presentation of specificities of services of the insurance companies in the Republika Srpska is to indicate their growing importance in the society.*
The first part of the study refers to the general presentation of the nature and characteristics of the services. The other part presents specificity of services of the insurance companies in the Republika Srpska.
***Key words**: services, definition, classification, quality, specificity, insurance companies.*

ARTICLE INFO
Article history:
Recived 25. feb .2015 **Recived in revised form** 06. mar. 2015 **Accepted** 23. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

The problem of quality of services at the world market in the circumstances of a very strong competition and all the faster changes in the surroundings is getting more and more attention nowadays. The research has proved that the services nowadays in the countries of OECD represent more than 60% of the overall economic activity, and in the most developed countries even more than 70% [7]. That is why, due to its specificity, a special importance is nowadays attached to the problem of managing services, both from the practical and research point of view, because the service quality has become the most important strategic factor of the success of organizations. When an organization gets a bad reputation with regard to the quality, it takes it a lot of time to change the situation. If the organizations want to remove bad reputation, it is necessary for them to manage competitive advantages, particularly quality of significant characteristics of service quality, because by an adequate satisfaction of users' requirements it is possible to express satisfaction – intense enthusiasm of the service beneficiary and gain the reputation – attribute of an "extraordinary distributor".

For the mentioned reasons, within the framework of this study we shall consider both the nature and characteristics of services, but also the specificities of the insurance companies in the Republika Srpska. The purpose of this is to present importance of the quality of service characteristics for the satisfaction of customers, and consequently the market representation and business quality of the companies dealing with service sale. How to find out what are the requirements of customers with regard to the significant characteristics of services that should be raised to a higher level, is one of the most frequent questions posed to organizations of any kind. For that purpose, various methods and techniques are developed and modified in order to improve the processes aiming at raising the level of identification of significant service characteristics that are not at the level of competitors.

The purpose of an increased attention to the significant characteristics of service quality is to act by a feed-back on increasing the observed use value of the service. The observed use value implies the value that the customer sees when purchasing or using a

service. Therefore the organizations aspire to increase their competencies, necessary in order to permanently increase the observed use value of services [114].

2. NATURE AND CHARACTERISTICS OF INSURANCE COMPANIES' SERVICES

2.1 Nature and characteristics of services

2.1.1 Notion of service

There are numerous definitions of service, more or less differing from one another. Those differences refer to the different ways of perspective of the authors who have dealt with the problem of the role of service in the market game. If the services are considered in the context of marketing and overall economic activity, they are inseparable from the consumer himself/herself, i.e. from the user of the specific service. Production of services may but does not have to be connected with the physically palpable good. That is why there are different ways of understanding the notion of a service. Those differences are not essential, but are more a consequence of somewhat different approach to studying, level of authencitity and purpose of observation.

Standard SRPS ISO 9000:2008 [10] that describes basics and also establishes terminology related to the notions in the system of quality management, ties the notion of service directly with the definition of the term "product". In the abbreviated version it is defined as the „process result", and in the expanded version as the „result of the set of mutually related or interacting activities that transforms entrance elements into exit elements". Nevertheless, standard SRPS ISO 9000:2008 has additionally defined the service as the "result of at least one activity that is performed in the interface between the deliverer and beneficiary and as a rule it is of a non-material nature".

In a similar way the notion of a product and service has also been defined by Kotler [4]. According to him:

product is all that can be offered to the market to satisfy the needs and wishes of customers,

service is each activity or use that one participant offers to another, those being essentially impalpable, and as a result they do not have an ownership over something. It may but does not have to be tied to a certain physical product.

Apart from the mentioned definitions, in the scientific literature, the following definitions are often emphasized:

Fitzsimmons [3] defines a service as a perishable in time, imalpable experience for the consumer that participates in the role of a co-producer,

Zeithaml and Bitner [9] define service as acts, processes and performances,

Berry [1] describes service as an „act, procedure and execution".

Simeunovic [7] in his thesis mentions that it is very difficult to meet a clean service or goods. He also mentions that each goods is accompanied with a service, and service is accompanied with a palpable object.

The above mentioned indicates that services are activities that are mostly of a impalpable character and they result in certain benefits, i.e. they solve a certain problem of the beneficiary that he/she is ready to pay for directly or indirectly.

2.1.2 Basic characteristics of services

In the scientific literature there is a discrepancy among authors in defining service characteristics. Those differences are a consequence of somewhat different approach to studying, level of analyticity and purpose of observation of service characteristics. Still, there

are some more significant specificities of services about which there is the biggest degree of agreement among the experts in this field. Those are:
Service impalpability;
Heterogenous (variable) service;
Simultaneous (inseparable) production and consumption of service;
Perishable (non-durable) service;
Impossibility to possess a service [8].

Service impalpability, implies that the service is physically invisible, has no smell, taste, cannot be noticed or felt by some of the senses, which is the case with palpable (physical) goods.

Heterogeneous (variable) service, is the next characteristics that separates services from physically palpable products. There lies the basic problem of the service standardization, taking into account the fact that services represent processes, i.e. that the service is provided in the interaction of the employee and the consumer. Because of the different situation of use, but first of all of the person providing that service, and other elements, it is difficult to perform standardization of services, which is not the case with classic products.

Simultaneous (inseparable) production from consumption of service, characterizes simultaneous conduct of production and consumption, i.e. providing and using. That is where the beneficiary perceives all visible operations in the course of providing services, and that is why marketing should take place at the same time with providing, i.e. using the service. In such situations, process is simple, because the service is first bought and then consumed (produced). In doing so, the consumer (beneficiary) is an integral part of the process of production and delivery of service.

Perishable (non-durable) service, is also called non-storagebility, since the service cannot be stored, preserved, re-sold or returned. That is why the offer of the service is tied to a certain moment, so the unused capacity of service offer cannot be kept for a future consumption. Therefore there is a problem of charging for a lost time. Exactly for the mentioned characteristics there comes the name of perishable service as the name of the service characteristics.

Impossibility of possessing a service, is based on the impalpability and non-storagebility of service. That is the reason for impossibility of having ownership over a service. Namely, by purchasing a product the buyer becomes the owner and he/she can dispose of that product at his/her own will. On the other hand, when a service is given, it does not become ownership of the person who has paid for it. Practically, the one purchasing a service has a right to use it. That is why giving a service does not end with the transfer of ownership from the salesman to the buyer. The buyer essentially buys only the time and the very process of performing the service.

From the point of view of a beneficiary, according to Radakovic and Cosic [6], services have the following characteristics:
Time – refers to how long the beneficiary has to wait for the service and how long its provision lasts;
Timeliness – refers to whether the service will be given right in time;
Completeness – refers to the completeness of providing a service;
Politeness – refers to the attitude of the personnel being in contact with the beneficiary;

Durability – refers to whether the service is always given in the same way to each beneficiary;
Accessibility and suitability – refers to how easily the beneficiary can obtain the service;
Accuracy –refers to whether the service has been given in the proper way;
Response – refers to how fast is the reaction to unexpected problems;
Tidiness – refers to the look of the ambience in which the service is provided.

2.1.3 Classification of services

It results from the above mentioned that the majority of products, generically considered, are somewhere between a clean (physical) product and a clean service. Besides, services are very much different based on the use for consumers, complexity and a whole series of other criteria. That is why for the purpose of their good quality study we perform their classification. The most frequent ways of classification of services are those that are applied by the national statistics institutes. Still the practice shows that the systems of observance of the national institutes are not of a big help for business people. Namely, they point to some global trends, but for taking a decision in everyday business it is necessary to know many other characteristics and indicators. That is why the researchers, according to the process of providing services that implies answers to the questions on the nature of service and beneficiary (object) of service, have developed different ways of service classification.

The services that are based on the process from people to people require from the consumers to visit a „service factory", i.e. the place where service is given. These are so called services of a high risky contact. That is why it is very important to take account of some elements:
Objects are one of the elements in providing service;
Process of providing service has to be created in line with the consumers' needs;
Selected suitable location is very important;
Creation of a suitable pleasant atmosphere influences to a high degree the perception of a service process and overall satisfaction;
Taking into account other needs of consumers, i.e. overall satisfaction, that also implies information, parking, food, toilet...

Many of the bases for classification result from the basic characteristics of services (impalpable, heterogeneous, inseparability of production and consumption, perishability and impossibility to own a service). Some of other significant classifications divide services to:
market (profit-orientated) and non-market services (non-profit-orientated),
services to consumers and business services,
services depending on the involvement of consumers,
services depending on the manner of delivery,
services based on technology and
services provided by the people [11].

Radakovic and Cosic [6] have classified services into the same type processes as in making material products. They think that a more natural system of classification of services puts accent on the degree of working intensity (first of all on the quantity) and degree of customization (rather than on standardization). The working intensity in services implies the number or frequency of user having new requests, while customization implies possibility of adapting services to an individual user. From that point of view all processes of providing services can be classified to:

individual services, which are close to the name of a professional service,
serial services, which are close to the name of a service shop,
big-series services and
mass servces, which are close to the name of a service factory.

2.2 Specificity of services of the insurance companies in the Republika Srpska

2.2.1 Structure of services of the insurance companies in the Republika Srpska

Insurance is a very specific activity, and it is also a fruitful business, since beside banking it represents one of the pillars of the financial system of each country. That is why insurance has always been a subject of supervision in each country. That is also recommended by the International Association of Insurance Supervisors (IAIS), which has developed basic principles of insurance supervision [5].

Specificity of the insurance companies' services reflects in the fact that a beneficiary, when using services in case he/she is not satisfied, cannot replace the service by another and often will not even complain. However, the beneficiary can take a simple decision to use in future services of the insurance companies the services of another company. Therefore, satisfying needs and wishes of more and more demanding beneficiaries at the market due to a more and more intensive competition represent an imperative of each insurance company.

At the market of insurance in the Republika Srpska from 1990 to 2010 there are several domestic and foreign insurance companies, whose number is gradually growing in the last decade. The decade before last has been characterized by a weak degree of insurance development. The reasons should be looked for in the economic situation, political instability, disloyal foreign competition, and a little bit in the inertia of the state institutions towards these activities (visible through the tax policy, etc.).

The insurance market of the RS, based on the comparative analyses with the markets from the surroundings (FBiH, Serbia, Croatia, Slovenia), is just „in its infancy". Comparative analyses refer to the amount of the life and non-life premiums for 2010 for the observed markets, according to which Slovenian insurance market is most developed compared with the number of inhabitants, then follows Croatia, Serbia, FBiH and at the bottom of the list there is the market of the RS [13].

The low life insurance premiums in the RS is an indicator of underdeveloped market, which speaks about the bad standard of the population, because there is the biggest percentage of the insurance policies that are legally binding. Exactly because of that the crisis that has shaken world insurance market from 2008 has not been significantly transferred to the RS insurance market.

The RS insurance market in the institutional context consists of 11 insurance companies with the seat in the RS, 9 branch offices of the insurance companies from FBiH, Ombudsman in insurance, Protection Fund of the RS and Insurance Agency of the RS.

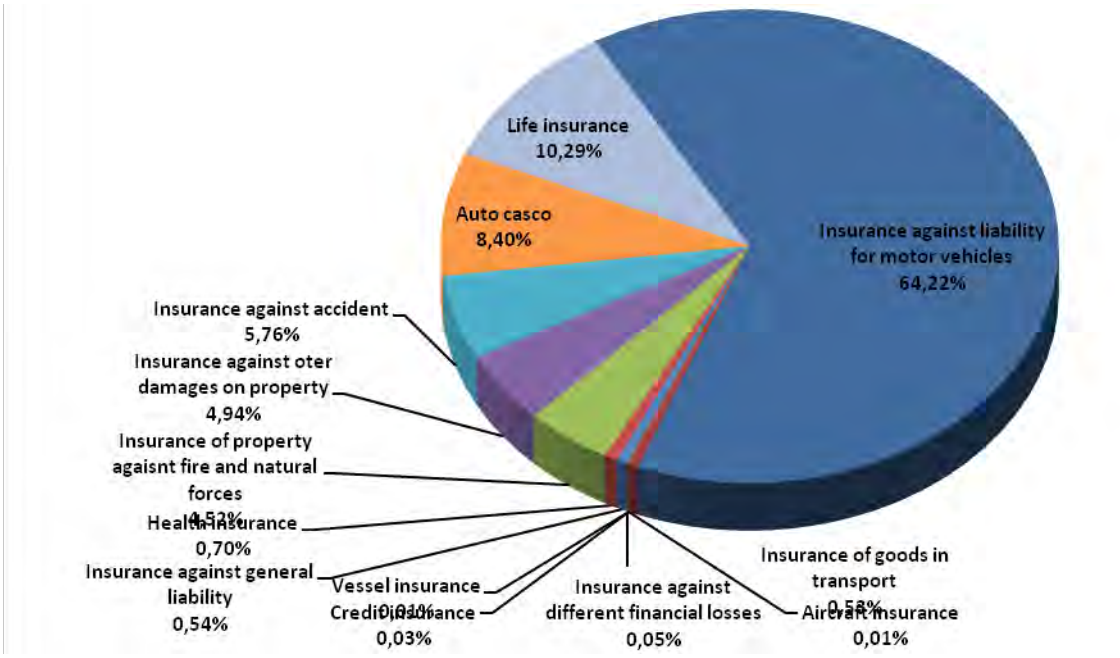
2.2.2 Macroeconomic indicators of the RS insurance market

The portion of insurance in the nominal GDP for 11 insurance companies with the seat in the RS [14] for 2011 was 1.49 percent and is bigger by 0.01% compared with 2010. This indicator is a lot lower than it is the case at the developed markets. These data indicate that the insurance sector in spite of the growth of 7.12% in 2011 compared to 2010 is still relatively undeveloped (Table 1.) [14].

Table 1: Basic indicators of the RS insurance market status

Year	Premium per capita [KM]	Premium/GDP (%)	Growth rate of the insurance sector
2009	59.43	1.43	-
2010	85.56	1.48	2.19
2011	91.64	1.49	7.12

Structure of the insurance premium is presented in picture 1[14].



Picture 1: Structure of the insurance premium at the RS market for 2011

Table 2 presents the number of insurance policies for 2010 and 2011 at the RS insurance market and rates of their growth[14].

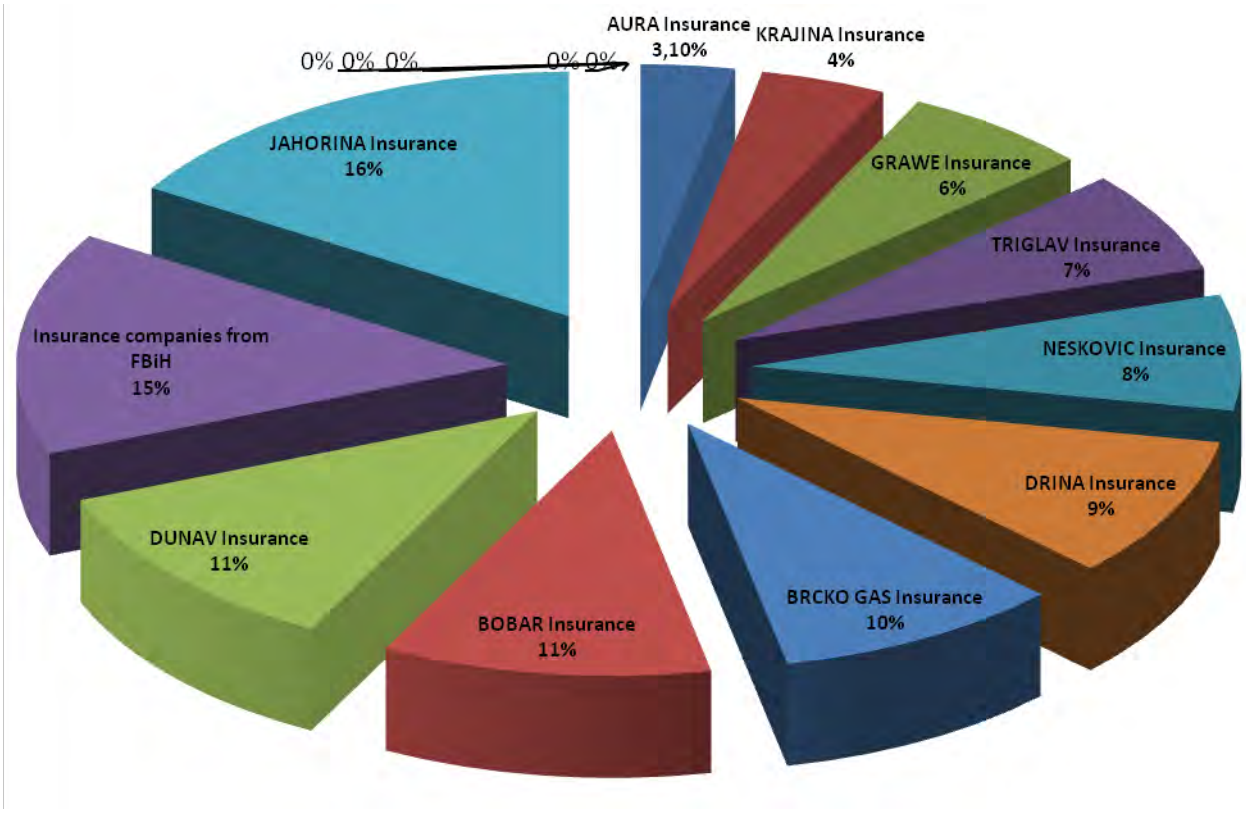
Table 2: Number of insurance policies for 2010 and 2011 at the RS insurance market and rates of their growth

Type of insurance	2011 [KM]	2010 [KM]	Percentage growth
Health insurance	31,077	27,748	12.0%
Auto casco	14,510	12,398	17.0%
Insurance of property against fire and natural forces	11,576	10,514	10.1%
Insurance against accident	307,572	259,794	18.4%
Insurance against liability for motor vehicles	381,052	362,039	5.3%
Insurance against general civil liability	588	374	57.2%
Insurance against other damages on property	7,807	6,964	12.1%
Insurance against different financial losses	9	8	12.5%
Insurance of goods in transport	329	229	43.7%
Other insurance	97	69	40.6%
Life insurance	47,162	38,702	21.9%
TOTAL NON-LIFE INSURANCE	754,617	680,137	11.0%
TOTAL	801,779	718,839	11.5%

The biggest part of insurance premiums goes to the legally binding insurance of the owner of a motor vehicle for the damages against third parties. The least growth has been realized in the field of insurance of property against fire and natural forces. In spite of the trend of growth of life insurance premium, it is still far away from the developed markets of the European Union where this indicator in average amounts to around 60 percent.

The trend of growth of insurance market in the Republika Srpska, considering the indicators in absolute amounts, shows that the insurance market compared to the markets of the countries in the region is still undeveloped. For example, the average premium per capita in the EU amounts to 1,879€, in Slovenia 1,023€, in Croatia 202€, and in Serbia 75.5 EURO [12].

For the development of the insurance sector in the RS, what is needed are macroeconomic conditions – economic and monetary stability, adequate tax incentive, bigger standard of the citizens, developed culture of insurance, high degree of confidence in the financial sector and developed securities market – the conditions that the RS should only realize in future. When it comes to the distribution of market representation, the biggest market representation for 2011 at the RS insurance market belonged to the Insurance Company „Jahorina". The insurance companies that follow are „Dunav", „Brčko-gas" and „Drina" Insurance. Insurance companies „Aura" and „Mikrofin" have the smallest part of the market cake, 3.04 and 1.8 percent, respectively (picture 2.) [14].



Picture 2: Market representation of the insurance companies in the RS for 2011

The insurance companies that deal with life insurance are „Jahorina", „Dunav" and „Grawe" Insurance which are at the same time, according to the ownership structure (together with „Triglav Krajina Kopaonik" Insurance), foreign insurance companies, while other companies are focused only to non-life insurances and originate in the RS.

The RS insurance sector employs 1,373 employees, which compared to the same period in 2010 represents a growth by 10.33%. The biggest calculated premium of life insurance in 2011 prevailingly belongs to «Grawe» Insurance and it amounts to 9.4 million KM with the growth rate of 10.23% compared to the previous year. However, the biggest growth rate of the life insurance premium in 2011 compared to 2010 belongs to «Dunav» Insurance (index 2011/10 is 4.501), i.e. a leap from 65.05 thousand to 293.42 thousand KM of the calculated life insurance premiums [14].

The insurance with the biggest calculated premium in the whole of 2011 has „Jahorina" Insurance (14.8 million KM), and it is followed by „Bobar" Insurance (12.9 million KM) and „Brčko gas" Insurance (12.07 million KM). If we consider the representation of the car liability premium in the total invoiced premium, „Dunav Insurance" with the representation of 54% represents a leader at the market of the Republika Srpska with the smallest part of insurance against car liability in the total invoiced premium. At the same time this means that Dunav Insurance from the aspect of representation of the property premium in the overall premium in 2011 with 46% represents a leader from the aspect of quality of the insurance portfolio and at the same time also from the aspect of diversification of the insurance risks.

3. CONCLUSION

Presentation of the nature and characteristics of services, as well as of the specificity of services of the insurance companies in the Republika Srpska within this study has the objective of pointing to the growing importance of services in the society. That is why

nowadays systemic search is conducted to select the most significant characteristics of service quality. Their improvement by applying quality tools enables a rise of the observed use value of service by the service beneficiary, and consequently it gives rise to the market representation and quality of the company business. In doing so it is very important to permanently reconsider significant characteristics of the quality of services and processes, because that is also done by the best in the class, and then to perform reengineering of the processes they get achieved with the goal of raising the observed value of services.

3. REFERENCES:

[1] Berry, L. L.: „Service Marketing is Different. Business", May/June, 1980.
[2] Bouman K: Strategija u praksi, IK Prometej, Novi Sad, 2003.
[3] Fitzsimmons, J.A., Fitzsimmons, M.J.: „Service Management – Operations, Strategy", Information Technology, Mcgraw-Hill International Edition, 2006.
[4] Kotler, Ph.: „Marketing Management", eleventh edition, Pearson Education, Inc, Upper Saddle River, NewJersey, 2003.
[5] Miškić, M.: „Korporativno upravljanje sa posebnim osvrtom na društva za osiguranje", Doktorska disertacija, FTN, Novi Sad, 2008.
[6] Radaković N., Ćosić I.: „Osnove proizvodnih i uslužnih tehnologija, Radni materijal", FTN, NoviSad, 2007.
[7] Simeunović N.: „Istraživanje uslova za primenu metoda i tehnika operacionog menadžmenta u uslužnim sistemima", Doktorska disertacija, FTN, NoviSad, 2012.
[8] Veljković S.: „Marketing usluga", Ekonomski fakultet Beograd, Beograd 2009.
[9] Zeithaml, V.A., Bitner, M.J.: „Services Marketing - Integrating Customer Focus Across the Firm. McGraw-Hill College", 2002.
[10] SRPS ISO 9001:2008.
[11] www.scribd.com/prodzeskhn/d/62819262-Usluzni-menadzment
[12] www.cea.eu: CEA Statistics N°44.
[13] Centar za osiguranje, Srbija
[14] Agencija za osiguranje RS

UDK: 336.71(477) 005.511:336.71 COBISS.SR-ID 216029196 Review Article

STRATEGIC PLANNING GUIDANCE LENDING AND INVESTMENT ACTIVITIES OF COMMERCIAL BANKS IN UKRAINE

Svitlana V. Andros[1], Tetiana V. Romanok[2]
[1]The National Academy of Telecommunications named after O.S. Popov, Odessa, UKRAINE
E-mail: andros.sv@ukr.net,
[2]SHEE «Kyiv National Economic University named after Vadym Hetman», Kyiv, UKRAINE
E-mail: romanok_tanja@bigmir.net

***Abstract**: Conceptual approaches to strategic planning bank. The basic methodological principles that formed the basis for the strategic planning model banks. Present classification strategies for primary schools based on the principle that underlies the process of strategy formation. Revealed similarities and differences between different conceptual approaches to strategy formation inherent in this schools. The basic planning functions that implement a methodology consistent transformation of long-term goals and objectives of credit and investment banking activities in the specific parameters of their daily financial transactions.*
***Keywords**: bank, objectives, credit and investment, planning, strategy, goals.*

ARTICLE INFO
Article history:
Recived 28. mar .2015. **Recived in revised form** 30. apr. 2015 **Accepted** 10. may. 2015. **Available online** 04. jul. 2015.

1. INTRODUCTION

Theoretical aspects of strategic planning (SP) are devoted to a number of studies. Well-known pioneers of strategic planning are considered to be A.D. Chandler, K. Andrews, I. Ansoff [Chandler 1962, p. 27; Ansoff 1989, p. 189].

They are the founders of the School of Design of strategic planning, which has developed model strategy development institutions as achieving compliance with internal and external opportunities for its development. The main base model is a model of strategic planning at the Harvard Business School, is led by K. Andrews. Incidentally, H. Mintzberg calls this model "model school design" because it is based on the belief that the strategy formulation process is based on a few basic tenets, which, taken together, provide a "design strategy" [Mintzberg 2000, p. 177].

According to this model, the strategic planning process is a kind of the point of intersection of the identified opportunities and threats of the external business environment. Threats are expressed in the form of key success factors and the strengths and weaknesses of the resource potential of the institution, expressed in different abilities to develop. It is clear that the condition of the bank must be on the one hand, the result of using the strengths aimed at extracting maximum benefit from the opportunities and counter threats, and the other - from the use of favorable external factors to address weaknesses and avoid dangerous situations.

2. GENERAL REGULATIONS

Turning to the model outlined in the strategic planning framework of our research will focus on the major methodological principles underlying the construction of: 1) the strategy-making processes credit and investment banking must be controlled, conscious process thinking. In this regard, K. Andrews emphasizes that strategic thinking should be based not on intuitive, and the conscious experience, calling suddenly emerging strategy of "conceptual enemy

strategy"; 2) control strategy formation process credit and investment banking should make head; 3) model of the strategic plan should be simple and informative; 4) strategy credit investment banking must be unique and is regarded as the result of creative design; 5) strategy formulation process credit and investment banking must be completed when an alternative strategy with full description and made the final selection of the best of them; 6) strategy credit and investment banks should combine simplicity of perception and fullness of expression, described clear language; 7) strategy credit and investment banking should include development of a mechanism for its implementation. We agree with these principles, because all elements of the structure of the bank, through its leadership should have some knowledge and financial resources, and most importantly, the desire to implement the chosen strategy. Finally, the fundamental provisions of the School of Design of strategic planning are to ensure consistency between external opportunities and internal resources of the banks.

3. SCHOOL STRATEGIC PLANNING

The school planning (Ansoff I., P. Lorange, D. Steiner, D. Shendel) strategy formation institutions seen as a formal process [Lorange1982, p. 347; Steiner 1983, p. 17; Shendel 1979]. Yes, I. Ansoff introduced in the strategic planning concept formalized goals, and describes the process of strategic planning as a formalized flowchart that provides a detailed list of design factors that are taken into account in decision-making and placed a priority on providing them with weight factors, and various diagrams and rules of choice alternatives. In addition, I. Ansoff believes that the process of developing a strategy of diversification of banks prior decision related to ensuring systemic effect of all the elements that make up its organizational structure. In its sum or separately, these strategies form the overall strategy of product / market for the bank.

An important contribution to the development of the school plan made provisions of H. Steiner. Note that the model can be considered G. Steiner symbiosis models Harvard group. However, unlike the design school planning in the first place, considering the practical implementation of the model is extremely formal, automatically. The study of the informal model school design school becomes a strict sequence of steps. Second, school planning introduces the strategic planning process strategic key figure – the planner. The school positioning (Porter, R. Katz, B. James, J. Quinn) considers strategy formation as an analytical process [(Porter 2005, p. 124; Katz 1970, p. 329; James 1985, p. 49]. By the way, M. Porter stated in the "Competitive Strategy" general competitive strategy, until recently considered workable instrument of the banks. In fact, Porter argued the principles of emergence of competitive advantages of banks, which are formed by creating at each stage of their values.

Referring to the review presented above schools, it should be noted that the main difference between the positioning school of strategic management schools of design and planning is as follows. Positioning School declares limited number of strategies that can be used in a particular situation and bring the desired results. The choice of such strategies will allow the bank to take a favorable market position, which themselves provide protection from competitors. Thus, B. Henderson emphasizes that the condition of a successful institution is that it has a portfolio of products that are characterized by different rates of sales growth and different market shares [Henderson 1979, p. 75]. The content of the portfolio, in fact, is a function of the balance of cash flows, and only institution with a diversified balanced portfolio can use its own forces to reasonable capitalization growing opportunities.

Thus "experience curve" as representatives of the school invention positioning suggests that ceteris paribus institution that first entered the market, is able to dramatically increase the price and achieve competitive advantage. As you know, each bank develops its own strategy of credit and investment. It is clear that with a fairly significant range of potential external forces

will be wide enough and the range of possible policies. According to the approach of Porter rightly speak of "two basic types of competitive advantages of firms - low cost and differentiation." These advantages, combined with the "scale" business provide a real opportunity to develop three main generic strategies of their behavior ("Leadership expenditure", "differentiation", "focus").

Thus, the school is considering positioning strategy is a unique perspective, but as a generic position. This strategic planning process is reduced to a model that allows, based on a limited set of circumstances, to choose the only correct strategy for credit and investment banking. Thus, according to representatives of the school of business (J. Shumpter A. Cole, K. Knight), a major factor in ensuring the success of the bank is a personalized guide that is based on the strategic prediction [Shumpter 1982, p. 455; Knight 1967, p. 478]. Cognitive School (school knowledge) is considering building strategies as a mental process. Representatives of this school (M. Layls, R. Reger, E. Huff, G. Thomas, G. Simon), based on cognitive psychology, analyze strategic process in terms of cognitive abilities humans [Reger 1994, p. 565; Thomas 1993, p. 51; Simon 1958, p. 239]. School education (R. Lapierre, Charles Lindblom, G. Repp, S. Winter) examines the process of strategy development institutions as a process that is constantly evolving [Lindblom 1963, p. 69; Winter 1982, p. 81].

The school authorities (A. McMillan, D. Sarrazin, E. Petihryu, John Bouer) interpret the process of developing the bank's strategy as a process of negotiation [Bower 1970, p. 311]. To emphasize H. Mintzberg, B. Alstrend, D. Lempel [Mintzberg 2000, p. 295], namely school authorities stressed the importance of using political methods to implement strategic changes. The school culture (D. Johnson, J. Spender, C. Roth, J. Dix, F. Rieger) the process of strategy formation is considered as a process of social interaction based on shared members of beliefs and understanding [Johnson 1993, p. 53; Spender 1992, p. 21].

For instance, the school environment (M. Hannan, J. Freeman, W. Astley, K. Oliver) give an overview of the process of strategy formation, revealing the special role of the external environment, which is defined as a set of some "external forces" that are not an organization [Freeman 1977, p. 729; Astley 1984, p. 529; Oliver 1991, p. 171]. The content as we are able, this school is based on the "theory of situational factors", which describes the relationship between specific dimensions of the environment and certain characteristics of the organization. School of strategic management configuration (P. Handavalla, D. Miller, P. Friesen, R. Miles) is based on two important positions – configuration and transformation [Miller 1986, p. 245; Miles 1978, p. 562].

Moreover, under stable configuration refers to the structure and the external environment, and under transformation - the process of the development strategy of the institution. Therefore, we believe that most members of the school configuration examine changes in the organization as a quantum leap, which means simultaneous changes in many organizational components.

Moreover, the quantum jump is believed to D. Miller and P. Friesen, changes are instantaneous (although they do not deny the gradual development). This approach assumes that banks in turn eliminate the forces that oppose the change, the consistent implementation of actions. In other words, the bank actually makes an attempt to make the jump to a new stable position, with a new set of strategies, structures and principles of culture with the new configuration.

Turning to the subject of our article, we note that the formation of the optimal option plan loan and investment banking activities aimed at achieving the objectives of the guidance given in the required time efficiency is the main function of the support of strategic decisions managers. The plan includes quantitative requirements for credit-options investment banking - amounts, terms, interest rates, risks of financial transactions. Implementation of these plans will achieve the desired future financial condition of banks. In this regard, D. A. Laptyrev notes that the characteristic functions of planning is that it provides a solution to the financial problems of

synthesis future state banks or provides an answer to this question: "What should be the loan and investment activities of banks that they have achieved the objectives set for the right time" [Laptyrev 1995, p. 119]. Depending on the timing of achieving the objectives of the bank plans can be divided into long-term and medium-term, efficient, current objectives (Fig. 1).

4. MANAGEMENT POLICY DECISIONS CREDIT INVESTMENT BANKING

Shown in Figure 1 classification plan loan and investment banks in terms refer to the standard solutions - plans. Custom solutions are classified by type of situations requiring data solutions. However, they directly affect the timing of certain typical decisions and can make changes to their corresponding values. Standard solutions containing a set of planned parameters of credit and investment activities that are associated with the initial data on the activities of the Bank and necessary targets. The decisions are formed on a continuous basis at specified intervals.

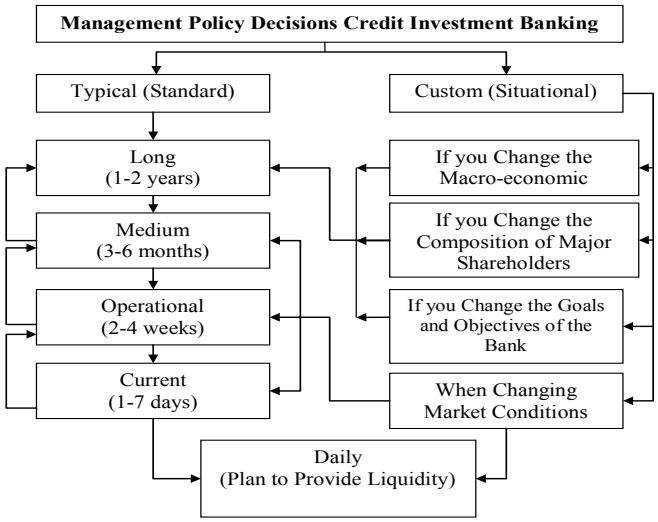


Fig. 1. General classification scheme and the interaction of strategic decisions

Custom solutions, in contrast to the typical contain a set of planning parameters of the bank. They have no direct connection to the original data on the activities of the Bank and necessary targets. Forming such decisions as the emergence of a situation. Consider the typical content of strategic decisions. Long-term planning is intended to study the prospects for development and ways to achieve long-term goals of the banks.

5. STRATEGY OF CREDIT AND INVESTMENT BANKING

The first long-term planning aimed at financial justification Comprehensive Program of the bank that defines trends and quantitative indicators of its development for the future, and includes targeted programs of certain activities of banks. Figure developing the Comprehensive Program of the bank is shown in Fig. 2.

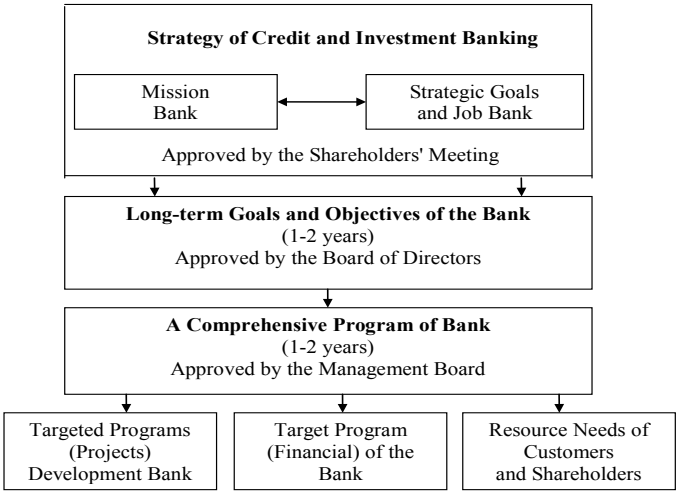


Fig. 2. Integrated Program Development Bank

The background to meet the challenges of long-term planning of credit and investment banking provisions are strategies of banks. This is related to the Bank's mission and the goals and challenges facing them in the future. As required by the strategy formed the goals and objectives of banks for a period of long-term planning. Developed targeted programs and activities in certain areas of the banks in ensuring that the goals and objectives.

6. PLANNING (FORMATION OF SOLUTIONS)

The content and results of the planning function for different levels of the strategic decisions schematically shown in Fig. 3.

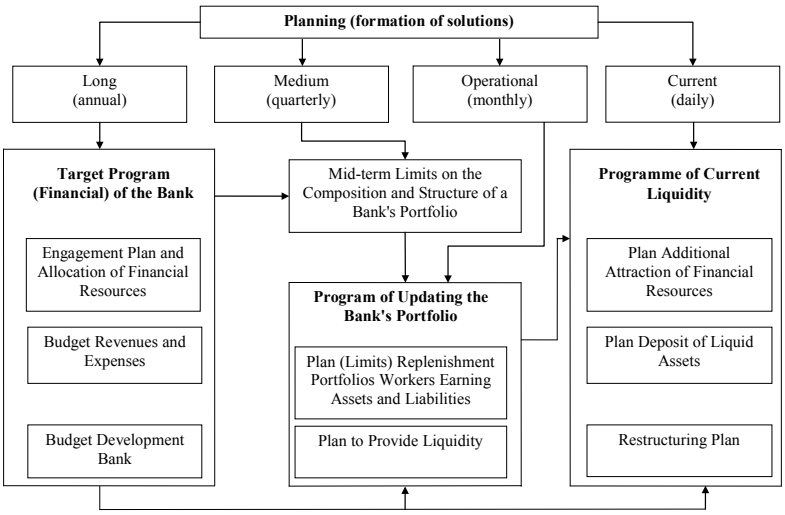


Fig. 3. Summary and results of planning credit and investment banking

As shown in Fig. 3, to study the feasibility and determine optimal routes and conditions for achieving long-term goals developed target program Development Bank. Target program includes a plan to attract and allocate resources. Target program determines generalized requirements change parameters portfolios workers earning assets and liabilities of the bank in the form of appropriate amounts of average rates and terms of attraction and allocation of resources in the planning period; budget revenues and expenditures of the bank, including budget

development bank that determines the composition and terms of financing specific target programs included in an integrated program for the bank. As additional sections to the target program Development Bank plans may include tax deductions and reservation of resources. Results formation of the target program of the bank is used as baseline information for future planning steps.

Medium-term planning provides the specification requirements of targeted programs of the bank in a short time interval. These requirements serve as background information (the main target parameters) in solving the medium term. By the way, medium-term planning is not mandatory planning stage and can be replaced surgical planning. The results of problem solving operational planning are: plans to replenish working portfolio liabilities (earning assets) in the form of limits on the amounts, rates and terms of attraction (location) resources for each office or portfolio of financial instruments; operational plan to provide liquidity, taking into account the payment schedule in previous agreements and forecasting the movement of client funds.

Specific plans for financial transactions appear on stage surgical planning. Current planning is to adjust operational plans of banks in the event of situations related to deficiency or excess liquidity caused by unforeseen traffic before clients' funds. Note that in this case the effect of operational plans to replenish working liabilities portfolios and the earning assets of the bank suspended and formed the following decisions: plan to attract resources to support the current (instantaneous) liquidity, which determines the source of solvency, including efficient resource allocation at the interbank lending market , Plan deposit of liquid assets; plan for restructuring of the banking portfolio, which means the necessary adjustments in nomenclature, the amounts and timing of return of the assets in the interests of the requirements of the current and medium-term plans - in case of excess liquidity or changes in market conditions; conditions of sale of liquid assets - in case of lack of liquidity or changes in market conditions.

However, we note that we have considered the planning function collectively implement a methodology consistent transformation of long-term goals and objectives of banks in specific parameters of their daily financial transactions. On the appointed implies that planning as a process of formation and optimization options for the development of banks aimed at training interrelated in terms, means profitability and performance indicators of financial solutions for the future. To this we add that such planning is targeted and provides consistent daily movement of the bank to set goals by making available for the performance units to certain decisions presented in the form of system planning documents / settings. In this regard, it is logical to us to turn to a more detailed consideration of the content of planning credit and investment banking (see Fig. 3)

In terms of features support strategic decision-making, the main task of credit and investment banking is the process of forming and optimal use of resources in achieving their goals towards increase of bank profits. Depending on the timing of achieving the goals we previously identified several species (long-term and medium-term) solutions. Each of these solutions is related to various aspects of obtaining and using resources. This can be seen in Fig. 3 are not reflected strategic credit and investment decisions. This is done intentionally due to the fact that these solutions have a special place in the formation of bank resources. Consider the features of this type of strategic decisions and their role in the process of strategy development banks.

Foreign experience of corporate governance research A. S. Vyhanskoho [Vihansky 1998, p. 69] show that credit and strategic investment decisions related to the problems of the external environment of the bank. Strategic decisions related to the selection of market segments and product range offered banking products for specific customer groups. By strategic credit and investment problems can be attributed, at least, answer the following questions: what are the long-term goals of banks; which customer segments oriented banks and offered them food: they should be stored and how will develop; new products must be developed by the bank and how they are distributed on customer segments; what should be the structure of the bank and borrowed

distribution and equity in key areas of its activities; how to optimize interbank activity (banking processes) and to strengthen the position (ensure survival) of the bank in the market.

It should be noted that all of the above strategic issues of banks require adequate decision-making under conditions of uncertainty about the future value of a limited amount of total resources and the banks. Therefore, according to A.S. Vyhanskoho the formation of a strategy by a number of features that defines the acceptable limits of complexity and its realization. Whereas according to scientists, we manage that, firstly, the strategy of banks does not give an accurate or detailed picture of the future. As a result of the formation of the bank's strategy produced a model of the future of the bank - a set of qualitative and quantitative characteristics of the main bank's financial position, its organizational culture and market position and in some areas of business, major customers, partners and competitors. Therefore we can say that the bank's strategy is aimed at determining the conditions and ensure the survival of the bank in the future in the competition.
So, secondly, the strategy of the bank has strict theory, which would determine the order of certain tasks or actions in specific situations. The development strategy of the bank may not be the direction the construction process to develop strategic solutions to a finite set of actions (charts, procedures, rules). Although there are a number of general recommendations, rules and schemes for problem analysis, selection and implementation of the bank's strategy, the formation of the declared strategy – is poorly formalized creative process symbiosis of art intuition and senior management to define strategic goals and lead them to the bank.

Third, a process of strategy development bank provides significant cost management effort, time and resources aimed at creation: strategic planning system, which is quite different from the procedure developed in bank revenue and expenditure budgets (sometimes mistakenly referred to as "financial plans"); services that monitor the external environment of the bank (customers, competitors) and the environment – the overall situation in the country and the situation in the money and financial markets, which are in the interests of the bank. This service marketing communications with clients gain strategic importance that goes far beyond the tasks of this market analysis, advertising products of the bank, forming its business image and brand promotion; system of staff recruitment of senior executives who have not only appropriate "communication", but also the skills of strategic thinking and management.

And finally – fourth, unlike operational, strategy development bank not produce them, they do not always attract the attention of management. Moreover, if they are not specifically identify, problems may go unnoticed at all against the backdrop of a significant number of operational issues, "understand a little of the current problem, then we will be engaged (at your leisure) strategy" – that's short formula common mistake managers. Typically, sources of bankruptcies and failures of their fellow bank executives are willing to see any reason other than errors and failures in shaping the strategic priorities of the bank.

Fifth, errors Strategy Development Bank (chief among which is the lack of strategy) have serious consequences, which in most cases cannot be repaired during the current activity. The main drawback of the development strategy is the lack of resources to pay for obligations of the bank, reducing the bank's share in the market segment of banking products.
Successful development plans does not guarantee their effective implementation. Strategy development credit investment bank is a serious intellectual part of the strategic problem. The strategy is a complex practical problem management. Solving this problem involves applying appropriate organizational culture that allows for the chosen strategy, including the creation of motivation and work organization.

Implications of the bank's strategy always give the opposite effect on planning at all levels and all activities. Therefore, the bank cannot go to the development strategy of the bank, if it has no objective opportunities and subjective conditions for the implementation of the Strategy.

By the way, V. Akulov says [Akulov 1999, p. 23] that the basis of strategic decision is the balance of interests of various institutions, groups, individuals interested in the development of the bank. The balance of interests determines how much the bank will move its target orientation as the Bank's mission and goals facing him. Strategy development credit and investment bank activities, the formation of its general objectives determined by the specific business environment and its dynamics in the implementation of goals. The main objective of banks in the development of the bank's strategy is to understand the global trends of social development and its mission in this development.

The mission defines the relationship between banks and other entities. Therefore, a set of decisions on priority use of society's resources for the implementation of its mission – the bank's strategy - implementing plans through defined goals, objectives and actions. We believe that the Bank's mission is to serve factor in attracting customers to show that the needs of customers can satisfy more effectively. Choosing the mission of the bank - this is the first step on the way to its successful development and bankruptcy.

Features of the structure and condition of the environment, which determines the system capacity of the bank to meet the specific needs of the market, the system generates resources that can use the bank to carry out its mission. These resources define the structure of the loan and investment portfolio, technological profile and qualification of personnel, and long-term changes in bank survival and development in an environment that dictates the market. Formation of the mission and goal setting bank can get answers to strategic questions: what bank operates and what it seeks. However, giving an answer to these conceptual issues, instead we get the following, equally complex and fundamental: how to be organized by the mission and achieve the strategic objectives of the bank in the near, medium and longer term?

In order to answer these questions it is necessary to refine and bring to quantitative indicators mainly qualitative position strategy credit and investment banking activities. This can be done by developing a coherent hierarchical system specifying each other planning documents, subordinate only requirement strategic goals. The upper level of this hierarchy is schematically shown in Fig. 3.

The strategy contains a limited number of common targets quantified. Limited stock overall strategic objectives of the bank stated in the strategy, is divided to more long-term (for the period 1-2 years) private purposes. Some of these goals may well be measurable (quantitative) indicators. The measures are intended to hold in providing long-term goals, which leads to the achievement of the mission and approach to strategic objectives combined into a Comprehensive Program's development bank. A comprehensive program for the period formed long-term goals, in 1-2 years.

Formation of the Comprehensive Program of the bank in a single process development strategy of the bank is a preparatory step to the next lower-level planning of credit and investment banking. At this level may be applied mathematical methods and study support solutions using mainly numerical values. Structurally Integrated Development Bank program consists of targeted programs for business development bank programs of regional and international development programs of the bank.

Among the targeted programs takes place special target program of the bank. It performs the following functions: determining long-term plans for credit and investment banking; determines the mode of financing other targeted programs of the bank is a financial justification for implementing the goals and objectives set out in the Comprehensive Program Development Bank. Meeting the challenges of long-term planning by forming target program of the bank is the first step in the quantitative study of the formation of strategic decisions.

As noted above, the task of forming a plan loan and investment banks can be classified in Class optimization problems. The wording of these tasks involves determination of initial data,

output results, control parameters controlled parameters and performance indicators. With regard to long-term planning phase of the general statement of the task of forming long-term solutions, designed as a target program Development Bank recommended formulate as follows. Thus, the source information for the formation of the target program Development Bank Group comprises the following initial data: guidance and directive leadership that are formalized in the form of long-term goals and objectives of the loan and investment bank; original financial state, that balance sheet; previous history of the bank, which affect its activities in the plan period; Features the ability of banks to attract and placements of financial and money markets in the planning period; regulatory requirements of the National Bank of Ukraine.

At least long-term goals and objectives of the loan and investment bank, i.e. its main goals and objectives can be identified by the following parameters: dates of the beginning and end of the planning period; resource requirements on costs for targeted programs for business development bank and ensure its credit and investment activities; needs of customers in credit resources; necessary non-operating expenses; required operating profit; desired average level of liquidity; allowable average risk of default assets.

Needs of customers in credit resources are applications in the terms, amounts and dates of receipt of the funds needed for bank customers to solve production problems in the planning period. The required level of liquidity determines the minimum required amount of assets that are in a liquid form, which should be reserved to pay for obligations of "on demand". Permissible average risk of default of assets is the average percentage of assets irrevocably lost. By the way, this indicator shows that the magnitude of risk management which is laid in long-term planning. In conducting the risk of non banking assets must be kept to a minimum value.

However, the planned size of this risk can be considered as a measure of bank stability to adverse external influences and force majeure. The value of risk in which the bank comes to the end of the planning period at zero operating profit can be defined as the maximum possible or critical.

Thus, the problem of the last three groups of variables among the set of parameters that characterize the main goals and objectives of the loan and investment bank is the basis for the decision of the bank's major contradiction between profitability, liquidity and risk management at the level of long-term planning.

Side purpose, expressing quality requirements for credit and investment banks can be set using one of the offered lower performance indicator, elected to the conditions of the bank. As these indicators suggests using: the total amount of borrowed resources for the period -> min; average acquisition cost for the period -> max; average yield allocation for the period -> min; period average effective interest margin -> min; abstract in period means the Fund of obligatory reserves -> min.

The first proposed indicators corresponding to a lack of financial resources in the market, and the second corresponds to a lack of free resources in the bank. The third describes the excess resources in the market and low returns accommodation. The fourth parameter specifies the conditions under which the bank has access to large volumes of low-cost resources and "works on the back." Fifth allows you to create long-term plan of the bank is able to minimize temporarily withdrawn funds banks located in the Fund of obligatory reserves of the National Bank of Ukraine.

One might think that some of these indicators recorded us exactly the opposite. For example, who in practice minimizes yield placement? However, there is no error, because solving the problem with these criteria is to find permissible limit, which characterizes the "worst" conditions calculated to achieve goals. This allows you to have a "gap" to compensate for the unfavorable development of the financial situation, which is due to the action of a large number of uncertainties. Uncertainties occur in predicting the different conditions of the bank in the future.

The second and third criteria of efficiency allow us to find such plans credit and investment activity in which the goals and objectives of these activities will be achieved in difficult circumstances. Terms can be as input costs or minimum yield placement. This is due to the lack of general methods of optimization plans on an arbitrary set of criteria. The composition and structure of fixed initial results obtained during the formation of the target program Development Bank is shown in Fig. 4 These results can be divided into two groups: control and software (managed) settings These results can be divided into two groups: control and software (managed) settings.

As shown in Fig. 4, the control parameters are organized into two programs. Applications determine quantitative requirements for attracting and allocating resources to achieve the goals of the bank. The programs have the following structure.

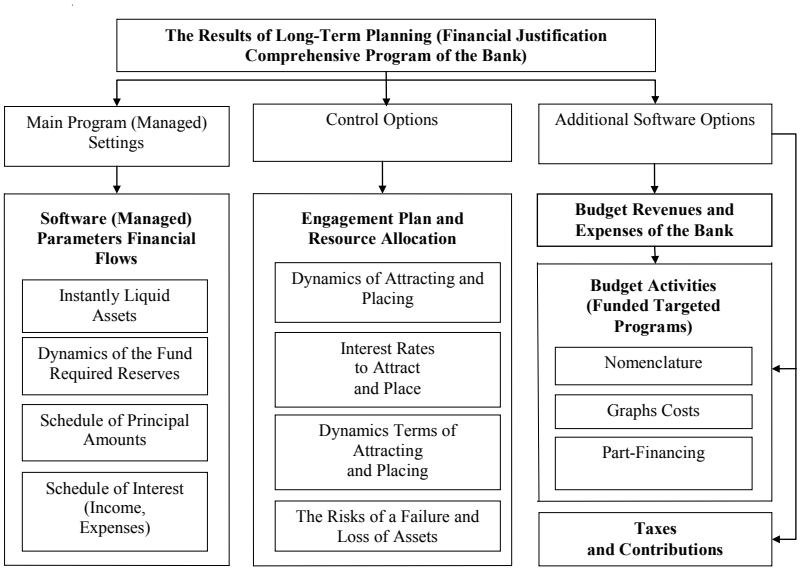


Fig. 4. Structure of the initial results of long-term planning

7. CONCLUSIONS

Program involvement: software volume and dynamics of attraction; average in terms of timing and the maximum allowable interest rate of attraction; average in terms of the minimum allowable time involvement.

Program Download: Software volume and speaker placement; average in terms of timing and the minimum allowable interest rate for; average in terms of the maximum time of placement. Software parameters expressing quantitative "consequences" to use bank control actions defined control parameters, and can be divided into two groups: basic and advanced software options.

The main program parameters define the characteristics of financial flows of the bank arising control actions.

The main program parameters are: software instantly balances of liquid assets; programmatic abstract dynamics of the Fund required reserves; program and speaker volume returns of fixed amounts of receivables and payables; program and speaker volume returns amounts of interest on receivables and payables; program scope and dynamics of interest income and expenses.

Additional software options are the eligible costs of the development and current activities of the bank. These include: the development budget, which determines the order and

terms of financing targeted programs of the bank: the range of programs financed from the budget; graphics consumables payments for each program; part-financing: priorities, minimally significant amount of expenditure; Program payout tax: income, income property. All managers and program parameters are calculated as a function of time in the range of long-term planning. On this basis, can be formed long-term limits on the values that characterize. The evolution of bank portfolios as the entire planning period, and at some reporting dates.

It should be noted that these limits are justified in terms of focus on long-term goals and objectives of the bank. Thus, the results of long-term financial planning quantified directions (ways) to achieve long-term financial goals of the bank, which is the first step towards the realization of strategic.

It is proposed to distinguish discussed above school strategic planning into three groups. The first three represented schools (schools of design, planning, positioning) are prescriptive in nature. They reveal the question as to how the strategy should be developed. The other six schools are considering specific aspects of strategy formation. Their supporters are not interested as prescriptions ideal strategic behavior as a description of real processes of development strategies.

To ensure the integrity of the strategic plan credit and investment banking should include financial and administrative strategies. The financial strategy is a set of rules and means to ensure financial growth potential banks. Administrative strategy provides a set of rules on organizational development banks. Strategy development banks should be linked to specific strategic alternatives, as well as a synergistic effect as characteristic of the integrity of the bank.

Side purpose, expressing quality requirements for credit and investment banks can be set using one of the offered performance: the total amount of borrowed resources for the period -> min; average acquisition cost for the period -> max; average yield allocation for the period -> min; period average effective interest margin -> min; abstract in period means the Fund of obligatory reserves -> min.

The first proposed indicators corresponding to a lack of financial resources in the market, and the second corresponds to a lack of free resources in the bank. The third describes the excess resources in the market and low returns accommodation. The fourth parameter specifies the conditions under which the bank has access to large volumes of low-cost resources. Fifth allows you to create long-term plan loan and investment bank. This plan can minimize temporarily withdrawn funds banks located in the Fund required reserves of the National Bank of Ukraine.

Long-term financial planning provides a preliminary quantitative study on the feasibility of the formulated verbal level strategic goals of the bank. The general formulation of the task of forming strategic decisions we formulated this way. For given parameters: source of financial condition; history of its lending and investment activities; the ability of banks to attract and allocate funds on the financial markets in the planning period. Thus, it is necessary to find such optimal in the sense of the chosen criteria (indicators) efficiency, control and software options that would ensure long-term goals of credit and investment banking performance and regulatory requirements of the National Bank of Ukraine.

8. REFERENCES:

[1] Chandler A.D. *Strategy and Structure: Chapters in the History of the Industrial Enterprise.* M.I.T. Press: Cambridge, (1962).

[2] Ansoff I. *Stewardship* / I. Ansoff // [Text]: [abridged translation from English] / [science editor and author of the foreword L.I. Yevenko]. - M.: Economy (1989). - 519 p.

[3] Mintzberg H. *Teaching strategies* / H. Mintzberg, B. Alstrend, J. Lempel // [English translation]. - St. Petersburg .: Peter, (2000). – 277 p.

[4] Lorange P.L. *Implementation of strategic planning.* Englewood Cliffs. -N.Y.: Prentice Hall, (1982).-537 p.

[5] Steiner, G.A., Kunin, H.H. *«Formal Strategic Planning in the United States Today»* Long-Range Planning (16, 3, 1983: 12-17).

[6] Schendel, D.E., Hofer, C.H. *Strategic Management: a new view of business policy and planning* (Boston: Little, Brown, (1979).

[7] Porter, Michael E. *Competitive Strategy* [Text]: *a methodology for analyzing industries and competitors* / M.E. Porter; [translated from English I. Minervin]. – M.: Alpina Business Review, (2005). - 454 p.

[8] Katz, R.L. *Cases and Concepts in Corporate Strategy* (Englewood Cliffs, NJ: Prentice Hall, (1970)).

[9] James, B.C. «Reality and the Fight for Market Position» *Journal of General Management* (Spring 1985: 45-57).

[10] Henderson, B.D. *Hendemm on Corporate Strategy* (Cambridge, MA: Abt Books, 1979).

[11] J. Schumpeter, *Theory of Economic Development (Study of business profits, capital, credit, interest, and cycle conditions)* [Text]: [translated from English] – M.: Progress (1982). - 455 p.

[12] Knight, K.E. «A Descriptive Model of the Intra-Firm Innovation Process» *Journal of Business of the University of Chicago* (40, 1967: 478-496).

[13] Reger, R.K., Gustafson, L.T., De Marie, S.M., and Mullane, J.V. «Refraining the Organization: Why Implementing Total Quality Is Easier Said Than Done» *Academy of Management Review* (19, 1994: 565-584).

[14] Bogner, W., Thomas, H. «The Role of Competitive Groups in Strategy Formulation: A Dynamic Integration of Two Competing Models» *Journal of Management Studies* (30, 1, 1993: 51-67).

[15] March, J.G., Simon, H.A. *Organizations* (New York: John Wiley, (1958).

[16] Braybrooke, D., Lindblom, C.E. *A Strategy of Decision* (New York: Free Press, 1963).

[17] Nelson, R.R., Winter, S.G. *An Evolutionary Theory of Economic Change* (Boston: Harvard University Press, 1982).

[18] Bower, J, L. *Managing the Resource Allocation Process: A Study of Planning and Investment* (Boston: Graduate School of Business Administration, Harvard University, 1970).

[19] Mintzberg H., Alstrend B., J. Lempel. *Teaching strategies* / [translated from the English, edited by J.N. Kapturevskogo]. – St. Petersburg: Publishing House "Peter" (2000). – 336 p. – (Series "Theory and Practice of Management").

[20] Hellgren, B., Melin, L. *«The Role of Strategists' Ways of Thinking in Strategi Change Processes»* In J. Hendry, G. Johnson, and J. Newton, eds., Strategic Thinking: ieadership and the Management of Change (Chichester: John Wiley, 1993:47-68).

[21] Spender, J.C. «Strategy Theorizing: Expanding the Agenda» *Advances in Strategic Management* (8, 1992: 3-32).

[22] Hannan, M., Freeman, J. «The Population Ecology of Organizations» *American Journal of Sociology* (82,5, 1977: 929-964).

[23] Astley, W.C. «Toward an Appreciation of Collective Strategy» *Academy of Management Review* (9,3, 1984: 526-533).
[24] Oliver, C. «Strategic Responses to Institutional Processes» *Academy of Management Review* (16, 1991: 145-179).
[25] Miller, D. «Configurations of Strategy and Structure: Towards a Synthesis» *Strategic Management Journal* (7, 1986: 233-249).
[26] Miles, R.E., Snow, C.C., Meyer, A.D. *«Organizational Strategy, Structure, and Process» American Management Review* (July 1978: 546-562).
[27] Laptyrev D. A. *Planning the financial activities of the bank: necessity, opportunity, efficiency*. – M.: ASA, (1995). – 312 p.
[28] Vikhansky O. S. *Strategic Management: [tutorial 2nd edition.]* - M. : Gardarika, (1998). – 291 p.
[29] Akoulov V., Rudakov M. *Features decision subject of strategic management* // *Theory and Practice of Management,* (1999), № 3. P. 23-28.

INSTRUCTIONS FOR THE AUTHORS

All papers need to be sent to email: emit@kcbor.net

Every sent magazine gets its number, and author(s) will be notified if their paper is accepted and what the number of the paper is. For every correspondence that number will be used. The paper has to be typed on a standard size paper (format A4), leaving left margins to be at least 3 cm. All materials, including tables and references, have to be typed in single column. The paper needs to be in the form of triplicate, considering that the original one enclosure of the material can be photocopied. Presenting paper depends on its content, but usually it consists of a title, summary, text references, legends for pictures and pictures. Type your paper in MS Word and send if on a diskette or a CD-ROM.

TITLE PAGE

Every article has to have a title page with a title of no more than 10 words: name (s), last and first of the author (s), name of the institution the authors (s) belongs to, abstract with maximum of 45 letters (including space), footnote with acknowledgments, name of the first author or another person with whom correspondence will be maintained.

SUMMARY

Second page needs to contain paper summary, 200 words at the most. Summary needs to hold all essential facts of the work-purpose of work, used methods (with specific data, if possible) and basic facts. Summaries must have review of underlined data, ideas and conclusions from text. Summary has no quoted references. For key words, at the most, need to be placed below the text.

CENTRAL PART OF THE ARTICLE

Authentic papers contain these parts: introduction, goal,methods, results, discussion and conclusion. Introduction is brief and clear review of problem. Methods are shown so that interested a reader is able to repeat described research. Known methods don't need to be identified, it is cited (referenced). Results need to be shown clearly and logically, and their significance proven by statistical analysis. In discussion, results are interpreted and compared to existing, previously published findings in the same field. Conclusions have to give an answer to author's goal.

REFERENCES

Quoting references must be in a scale in which they are really used. Quoting most recent literature is recommended. Only published articles (or articles accepted for publishing) can be used as references. Not-published observations and personal notifications need to be in text in brackets. Showing references is as how they appear in text. References cited in tables or pictures are also numbered according to quoting order. Citing paper with six or less authors must have cited names of all authors; if seven or more authors' wrote the paper, the name of the first three authors are cited with a note "et all". If the author is unknown, at the beginning of papers reference, thearticle is named as "unknown". Titles of the publications are abbreviated in accordance to Index Medicus, but if not listed in the index, whole title of the journal has to be written. Footnote-comments, explanations, etc., cannot be used in the paper.

STATISTICIAL ANALYSIS

Tests used for statistical analysis need to be shown in text and in tables or pictures containing statistical analysis.

TABLES AND PICTURES

Tables have to be numbered and shown by their order, so they can be understood without having to read the paper. Every column needs to have title, every measuring unit (SI) has to be clearly marked, preferably in footnotes below the table, in Arabian numbers or symbols. Pictures also have to be numbered as they appear in text. Drawings need to be enclosed on a white paper or tracing paper, while black and white photo have to be printed on a radiant paper. Legends next to pictures and photos have to be written on a separate A4 format paper. All illustrations (pictures, drawings, diagrams) have to be original and on their backs contain illustration number, first author last name, abbreviated title of the pa- per and picture top. It is appreciated if author marks the place for table or picture. Preferable the pictures format is TIF, quality 300 DPI.

USE OF ABBREAVIATIONS

Use of abbreviations has to be reduced to minimum.

Conventional units can be used without their definitions.

IMPORTANT: In order to obtain UDK numbers from the National Library of Serbia, the author for correspondence is obliged to deliver year of birth of all authors listed in the paper to the magazine's Editors.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд
62
EMIT : Economics Management Information Technology / Editor in Chief Radmilo Nikolić.
- Vol. 1, No. 1 (2012)- . - Bor (Kralja Petra Prvog 23) : Građanska čitaonica Evropa, 2012- (Bor : Kompjuter centar Bor). - 30 cm
Tromesečno
ISSN 2217-9011 = EMIT. Economics, Management, Information, Technology
COBISS.SR-ID 190266636

Rex **RAKITA** EXPLORATION doo Bor
Affiliate of Freeport-McMoRan

"Rakita Exploration" doo Bor
ul.: Suvaja 185a, Bor
tel.: 030/21-55-005

Info centar, Bor
ul.: Moše Pijade 28/1
tel.: 030/425-839