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EXPLORATORY FORECASTING APPROACH TO BANKING SERVICES

Forecasting the technical-technological changes is of great importance in contemporary conditions, because those changes are becoming bigger and faster and have a significant impact on deconomy and society. This kind of forecasting is of particular importance for building up the development plans and programs. Technology forecasts use different methods including the Delphi method that is one of the most widespread methods of intuitive forecasting. Financial services today, especially in banking, are characterized by keen competition and large number of innovations that arise as a result of ICT development. That is why observing changes and forecasting future trends in this field are of high importance. The aim of this paper is to present the implementation of the Delphi method which is the exploratory approach to forecasting in service organizations. This method is used for predicting the time of introducing new technologies in banks of Serbia.

Keywords: technology forecasting, the Delphi method, banking services.

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ПОШУКОВИЙ ПРОГНОЗ ЯК МЕТОД АНАЛІЗУ
БАНКІВСЬКИХ ПОСЛУГ

У статті підкреслено, що прогноз технічних і технологічних змін дуже важливий у сучасних умовах, оскільки такі зміни трапляються швидко і радикально впливають на розвиток економіки і суспільства в цілому. Подібний прогноз важливий для складання планів і програм розвитку. У технологічних прогнозах використовуються різні методи, наприклад, метод Дельфі як найбільш поширений для інтуїтивного прогнозування. Фінансові сервіси, особливо в банківській галузі, характеризуються високою конкурентністю і великою кількістю інновацій як результатом розвитку інформаційно-комунікаційних технологій. Представлено результати застосування методу Дельфі як методу пошукового прогнозування щодо діяльності організації у сфері послуг. Метод використано для прогнозування термінів впровадження нових технологій в сербських банках.

Ключові слова: технологічне прогнозування, метод Дельфі, банківські послуги.

Табл. 1. Літ. 24.

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ПОИСКОВЫЙ ПРОГНОЗ КАК МЕТОД АНАЛИЗА
БАНКОВСКИХ УСЛУГ

В статье подчеркнута, что прогноз технических и технологических изменений очень важен в современных условиях, поскольку такие изменения случаются быстро и радикально влияют на развитие экономики и общества в целом. Подобный прогноз важен для составления планов и программ развития. В технологических прогнозах используются различные методы, например, метод Дельфи как наиболее распространенный для интуитивного прогнозирования. Финансовые сервисы, особенно в банковской отрасли, характеризуются высокой конкурентностью и большим количеством инноваций как результатом развития информационно-коммуникационных технологий. Представлены результаты применения метода Дельфи как метода поискового прогнозирования относительно деятельности организации в сфере услуг. Метод использован для прогнозирования сроков внедрения новых технологий в сербских банках.

Ключевые слова: технологическое прогнозирование, метод Дельфи, банковские услуги.

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1. Introduction. Over the past four decades, we witnessed the development of technology forecasting directly related to forecasting within organizations. Not only in theory but in practice as well, this development was encouraged by the increase in complexity, competition and rapid changes in business environment. Reduction of business uncertainty and clearer understanding of the relations between influential factors represents a precondition for efficient management over the dynamics of technological innovations. Changes that resulted in the development of information technologies and modern production technology have increased the need for applying technology forecasting. In spite of the fact that great number of managers are well aware of the need for forecasting development, only few of them are acquainted with the overall spectar of existing methods, techniques, and their characteristics. In addition, only a small number of managers possess knowledge that is necessary for adequate selection and successful application of adequate methods in specific situations (Balachandra, 1980).

Sudden and rapid changes in the field of technology affect all aspects of everyday living. All companies should decide whether and when to introduce new technology, which is not always considered to be a progress, since they need to wait for the new technology to start running smoothly in order to pay off and bring additional incomes (DeLurgio, 1998).

Companies aspire to be the first in their field of business to accept new technology and use it in an optimal way, thus creating better market position with respect to competition (Reger, 2001).

Technology forecasting in developed countries is a process focused on recognizing critical generic technologies, and most likely it will exert great influence on economic, environmental, and social development in general. However, for underdeveloped and developing countries the role of technology forecasting is of great importance for identifying technology niches – technology domains in which it is possible to accomplish a competitive position at the world market. Activities of technology forecasting are being intensively applied in the OECD countries as a result of recognizing even greater importance of new technologies not only for the competitiveness of industry but also for accomplishing objectives of economic and social development. There's also a need to set priorities in exploratory-development activity due to greater budget limitations and increase in complexity and diversification of technology development, which rapidly increase costs of exploration and development (OECD, 1999). Technology forecasting today is of great importance for the survival of companies and industries, and is increasingly considered to be a strategic approach. Technology forecasting began to play an important role in companies' strategic planning, as well as in their race for comparative advantage. Since their inception, the techniques of technology forecasting have been significantly improved. Earlier, they we used exclusively for the needs of exploration and development (solely for forecasting the future of technology). However, they are now used in all organizational units of a company (for forecasting new market trends and making strategic decisions) (Janisch, 1966).

Technology forecasting actually represents the research of development in the domain of technology in which it is possible to assess the applicability in the long run. In other words, technology forecasting could be used in the initial state of innovation

process, when decision-makers and others involved in the process wish to learn which important trends are to be expected in the years to come (Coates, Fahrooque, Klavans, Lapid, Linstone, Pistorius, Porter, 2001). Technology forecasting is being used in many situations, from the development of the vision of future to making decisions on investing into developing technologies. Technology forecasting offers a detailed review not only on existing technologies but on developing technologies as well, and the way these two technologies substitute or affect each other (Porter, Roper, Mason, Rosini, Banks, 1991).

Today, technology forecasting is of extreme importance for the survival of companies, and even entire industries, and it is even more considered to be a strategic approach. Technology forecasting started to play an important role in companies' strategic planning, and their race for corporate advantage (Kutlaca, 2007). Since its inception, the techniques of technology forecasting have been significantly improved. Earlier, they were used solely for the needs of research and development (exclusively for forecasting the future of technology), but today, they are used in all organizational units of a company (for forecasting new market trends and making strategic decisions). Therefore, they are nowadays used by decision makers who use intelligent information as the most important tool. For this reason, the techniques of technology forecasting that are being developed since 1970 have grown into a scholastic approach that could be identified with the process of competitive intelligence (Albright, 2002).

A company is able to get an insight in its future internal possibilities and weaknesses thanks to forecasting based on scientific grounds. It is also in position to learn the condition of available resources, such as technical-technological capacities, information system, staff potentials, marketing capacities, and market competitiveness. Through forecasting, a company is able to learn about a market, factors (that act upon certain branches and activities), its positions, and competition strength. It is also able to perceive its nearer and farther surrounding together with the risks associated with future and unknown events. Only through continual forecasting a company is able to get prepared for future uncertainties, to perceive all problems within business, to evade turmoil and discontinuities, to recognize and anticipate unwanted phenomena and prevent them if possible, and if not, to adjust to those phenomena the best way it can. Forecasting will not only help explore dangers, but future business chances as well, which it will use for gaining competitive advantage and longterm development, which is the basic goal of every company. It allows company not only adjust to future changes, but also to initiate various changes in its own environment. By taking different kinds of actions in the present, a company will be in position to alter its future, to point it in the right direction, to remodel it and adjust it to own needs with the goal of achieving a desired future (Servo, 2011).

This paper will present the example of the application of Delphi method as one of the best known methods of technology forecasting, which was used in explorations for forecasting the weather of introducing new technologies, i.e. new services in banks in Serbia.

2. The Development of Financial Services. A service sector today significantly contributes to economic development, employment rate and gross domestic product in most of developed countries. In the USA and Great Britain services develop at high

speed, accounting for three quarters of GNP and 85% of employment (Tidd, Hull, 2003). The need for creating innovative service organizations has been perceived, but there are still little data on the specificities of innovations management. In the study on European companies (OECD, 2005), more than 60% of the polled business subjects and more than 50% of all the polled subjects in the field of financial services said they have introduced a new product or service in the last 3 years – which is more than the average share in production companies.

Technology innovations that are to be found in the heart of the development of contemporary financial services are oriented to increasing the profitability of financial institutions. Innovating should provide cost reduction and the improvement in precision, speed, field of activity, and reliability of transactions between financial institution and clients as users of a certain service (Nightingale, 2003).

– Precision. Due to great complexity in understanding and modeling implications of any transaction, simplified rules are being used in order to assess risk and perform resource allocation. Innovations that improve precision and allow for profitable adjusting of services offered with users' requests bring economic results.

– Speed. Bearing in mind the fact that financial markets experience fast changes, technology must help in getting timely information based on which managers make decisions that allow optimal allocation of resources.

– Field of activity. The expansion of market through the increase in number and diversification of clients represents a potential for more successful operating since it increases the solvency of contracts, reduces risk from illiquidity, and allows for the use of advantages of the economy of scale.

– Reliability. The increase in the reliability of technologies and organization processes increases the velocity and economic benefits, but operational risks require special attention.

The development of IT allows for new forms of cooperation and doing business not only between various organizations that provide financial services (banks, brokerage firms, pension funds, insurance companies etc.), but also between financial organizations and clients. The introduction of e-banking services represents an example of radical innovation in service provision that completely altered previous way of business operating (new services are created, as well as new processes of service provision). New generations of e-banking services were developed later and then adjusted to different types of users, for example, e-banking services for large companies, e-banking for SME, and home banking. Modern development of home banking services that satisfies certain needs of clients brings a series of incremental innovations in financial services provision.

Banks will sometimes invest in certain channels of service provision not only to reduce costs, but also to avoid the risk of losing clients. Therefore, services differ depending on how close/direct contact between clients and providers they actually require. If a user wants to check his account balance, he doesn't need to meet face to face with bank clerk, but instead, he can find out this information via e-banking. However, if he wants to find alternative ways for money investment, a meeting with a bank clerk may be necessary. These two ways of service provision also differ depending on the sensibility to the development of information technologies, i.e. the difference is to be found in how much the development of information technologies will

affect the way of delivering and consuming these services. In general, the introduction of information technologies in the process of service provision should provide the following things (Looy, Gemmel, Van Dierdonck, 2003):

- Optimization of the process of service provision;
- Standardization of the process of service provision which guarantees reliable quality of services offered;
- A guarantee of service offer regardless space and time.

3. Delphi method. In order to obtain actual forecasts, we should pay special attention to the selection of forecasting information, which must be accurate and relevant. Forecasting is a generator of input information that we receive from the surrounding. Good selection is needed regarding the methods and forecasting techniques, after which follows the selection of observed variables. At the end of forecasting, the obtained results should be perceived critically (Mishra, Deshmukh, Vrat, 2002).

Delphi method is one of the best-known qualitative forecasting methods in the long run, especially when quantitative methods are not adequate. It is applied for forecasting the probability and time of the emergence of future events. In order to give a prognosis, a group of experts identifies and defines the given event, the probability of its development and possible time of future event. Delphi method is also important because of the impartiality of participants bearing in mind that opinions and presumptions of forecasting experts are based on collecting data through polls, i.e. on filling out the questionnaires. Experts fill questionnaires independently of each other, which gives this method the impartial character when it comes to judgment (Makridakis, Wheelwright, Hyndman, 1998).

Delphi method was developed in the 1940s at the American RAND Corporation for military purposes, but its use in public for technology forecasting started in the 1960s (Linstone, Turoff, 2002). Delphi has 4 important characteristics: anonymity (there's no physical contact among participants), more iterations (several stages of interviews), controlled data on the results accomplished (results of the previous stage of interviewing are shown to participants for the insight), and statistical presentation of the answers (Obradovic, 2004).

Basic steps within Delphi method are as follows (Goldfisher, 1992; Levi Jaksic, Marinkovic, Petkovic, 2011):

- The group of experts is formed, as well as a questionnaire concerning the forecasting theme;
- The first stage of interviewing is carried out by submitting the questionnaires to panel members;
- The answers are then analyzed and the results of these analyses are shown to experts at the second stage of interviewing. After that, they adjust their answers in line with these results, until they reach a consensus.
- In the end, the collected information are summed up and analyzed, and the results are presented.

The country with most experience in such forecasting is Japan. The best-known researches were conducted by scientific and technological institutions every 5 years starting from 1971. Their goal was to collect information that will help in easier decision making and introducing strategies on the level of government's agencies or pri-

vate entrepreneurs. As a method of technology forecasting, Delphi was also used in many other countries such as Germany, England, Hungary, and France (Obradovic, 2004).

Delphi method has plenty of advantages. The process allows the collection of stances of great number of experts. In this way, we accomplish better statistical reliability and easier reaching of consensus. Delphi allows experts to freely and anonymously change their opinion and stances regarding some questions. The advantage is to be found in the fact that researches that have been carried out and modified depending on a research field can be used in other countries as well. In the past, the most important deficiency of this method was recognized in the price and duration of forecasting since it involves great number of people in order to accomplish important goals. It is now possible to overcome these disadvantages by using modern information-communication technologies. Questionnaires could be sent via Internet to great number of experts in different parts of the world. The lack of Delphi method is that bad formulation of a questionnaire could lead to bad results, which is why it is necessary to dedicate great attention to production of questionnaires and proper questions (Makridakis, Wheelwright, 1978; Martino, 1993).

One of the more successful examples of the use of Delphi method that is commonly quoted in literature is its use in automobile industry (Levi Jaksic, Stosic, Marinkovic, Obradovic, 2007).

Office for the Study of Automotive Transportation (OSAT), a unit of the University of Michigan Transportation Research Institute (UMTRI), is engaged in the analysis of development and future trends in the automotive industry. The goal was to allow research and analysis, provide information resources and communication via forum in order to perceive the increasing needs of international auto industry. A research carried out in 1992 showed that smaller vehicles with lower fuel consumption will gain popularity in the following decade. This report was based on the answers obtained from more than 200 experts in the auto industry who dealt with marketing, technology, and materials. According to this forecast, the purchase price and the repayment period have remained important factors for the buyers who opt for passenger cars or light trucks. Future owners will be mostly troubled by the factors of quality, design, manufacturer's reputation, brand image, and performances, which proved to be true. Fuel consumption, safety and car technology have become much more important for buyers in the period until 2009. As for the purchase method, the respondents were relatively conservative in their forecasts regarding the use of Internet while purchasing cars. Delphi forecasted that 75% of buyers in the last decade will surf Internet for new vehicles before purchase, while 25% of them actually bought cars online. Even though the respondents perhaps overseen the potential of the net in car sales, they predicted the increase in orders from 15 to 50% in the previous decade. Experts came to the conclusion that Japanese and European manufacturers will do better in maintaining good relations with the buyers than their colleagues in the US. In addition, the research showed the increase in the number of car manufacturers and plants, while the number of models remained almost unchanged. Experts also predicted that the development cycles will shorten by 24–33% until 2007. In comparison to the manufacturers from Europe and the USA, Japanese manufacturers have preserved the leading position with the shortest cycles.

Strategic consequences – Short cycles of car development allow manufacturer to place car on the market shortly after defining customer demands. The longer the cycles, the less chance for a vehicle to justify current expectations. In 1992, the length of cycles of American manufacturers hit 48 months, while the cycle in Japan lasted for 36 months. This 12-month advantage was reduced to 8 months, and the forecasts said that they will take only 4 months by 2007. In the same frame, the results showed that the cycles of American manufacturers will drop from 48 to 24 months. Today, European manufacturers closely follow their American colleagues, but according to the forecast, they had less possibilities for development.

Technology development, especially in the field of IT, represents the base of the overall economy development, with the special accent on the influence of technological innovations on the development of the service sector in terms of improving the existing and creating completely new forms of connection and business. This trend is expressed in the field of financial services, firstly in banks' operating, where we witness intens competition. Therefore, they constantly compete in their efforts to meet users' needs through the development of organization services (Looy, Gemmel, Van Dierdonck, 2003; Obradovic, Marinkovic, Romic, 2007).

4. The applications of Delphi method in banking. Questions of special importance while giving a forecast on the development of banking business refer to the forecasting of needs for introducing new technologies in the existing service offer, time when new technology is about to emerge at the domestic market, moment when it will completely replace the existing offer, possibility to adequately involve certain technology in existing business, necessary conditions (for example, education of both employees and service users) for successful application of new technology, effects of the application of certain technology etc (Looy, Gemmel, Van Dierdonck, 2003).

A strategic analysis of new information technologies that could be applied in banking was carried out in 2011 at a domestic bank headquartered in Belgrade. The forecasting was carried out in 3 stages by using Delphi method. The selected panel consisted of 6 experts who answered 10 questions each. Their final prognoses could help in determining the optimal moment for introducing certain technologies and planning investments. Both the content of these questions and the review of answers are given below.

- Question №1 When will you introduce E-evaluation software for the evaluation of employees?
- Question №2 When will you introduce a new platform for supporting AML (anti-money laundry) services?
- Question №3 When will you change CORE system of the bank (bank's core information system)?
- Question №4 When will you introduce a credit bureau (application for assessing clients' credit rating)?
- Question №5 When will you introduce the application for recording workers' performance during the day?
- Question №6 When will you introduce the scheduling of banking services?
- Question №7 When will you install the system for ATMs that will read foreign cards?

- Question №8 When will you introduce a branch office that will offer 24 hour services?
- Question №9 When will you introduce a system according to which every company will be able to perform financial inspections (debit and credit) via Internet?
- Question №10 When will you introduce a system for cutting queues (a device on which it is possible to select a service and get a number that appears on the screen when its client's turn)?

6. Poll results. Delphi method was conducted in 3 stages for every question. The results obtained after processing answers are given in Table 1:

Table 1. Results of the forecasting conducted by Delphi method

Statistical indicators obtained by Delphi forecasting				
Question	Statistic indicators - round	Arithmetic mean - t_n	Variance - σ_{12}	Standard deviation - σ_n
question №1	I	5.49	6.11	2.47
	II	4.66	1.29	1.13
	III	4.33	0.92	0.95
question №2	I	5.60	1.64	1.28
	II	4.66	1.19	1.09
	III	4.83	1.18	1.09
question №3	I	3.00	3.66	1.91
	II	5.00	1.33	1.15
	III	4.83	1.20	1.10
question №4	I	5.33	9.90	3.14
	II	4.33	4.26	2.06
	III	5.71	0.71	0.84
question №5	I	6.16	1.89	1.37
	II	5.83	1.18	1.08
	III	5.52	0.50	0.70
question №6	I	4.33	0.92	0.96
	II	5.50	0.91	0.95
	III	5.47	0.64	0.80
question №7	I	5.49	6.11	2.47
	II	6.00	1.66	1.28
	III	3.33	0.92	0.95
question №8	I	6.60	14.44	3.80
	II	1.80	6.25	2.50
	III	5.07	3.17	1.70
question №9	I	6.83	11.40	3.37
	II	4.16	4.53	2.12
	III	4.36	3.25	1.80
question №10	I	3.16	11.16	3.34
	II	5.83	7.60	2.75
	III	5.66	3.85	2.49

Conclusion. In the fields that experience significant changes, such as banking, it is very important to discover and understand early signals of warning. There is no single method or forecasting technique that would be adequate for all possible situations. The described results of interviewing could provide prognosis of the future state in the surrounding, as well as the possibility of technology progress and introduction of innovations expected by the polled experts.

Contemporary business environment is innovative, which implies the need for great number of information and constant investment in obtaining new information. Innovative environment also implies the need for permanent forecasting. A company should invest in information, and be able to timely realize and decode signals that hold messages on market, political, and technology changes. Information is the only resource whose value grows in line with its usage. In the world of information, scientific development, turbulent changes, forecasting is used for decision-making and it helps in accomplishing goals since it serves as an orienteer for taken activities. Forecasting should help company choose fields and methods of operating, as well as resources allocation. It should also be able to take desired and planned actions, and to avoid subsidiary behavior and make forced business moves to survive.

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