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FINANCIAL INNOVATIONS AND THEIR ROLE IN THE MODERN FINANCIAL SYSTEM – IDENTIFICATION AND SYSTEMATIZATION OF THE PROBLEM

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Abstract

This paper discusses the role that financial innovations play in the modern financial system, aiming at identifying and systematizing the core problems and definitions related to this issue.
The paper first describes the importance of the financial system and financial markets in the economy, explaining their functions and presenting their particular characteristics, focusing on their innovativeness. Then, based on the theoretical studies, the broad definition of the financial innovations is developed, stating that any new developments in any elements of the financial system, including: markets, institutions, instruments and regulations, can be regarded as financial innovations if they are perceived as new by the end-user of innovation. Next, the systematization of the most important types of financial innovations is presented regarding different classification criteria, such as: sources of innovations, motives for innovations, their effects or functions. As financial innovations are not a homogenous group of financial developments, their implications for the financial system can be ambiguous, thus the final assessment of their role can not be generalized and should be made on a case-by-case basis. The information presented in this paper can be regarded as an introduction, encouraging to do further research, as the complexity of the financial innovations makes them an interesting and important subject for this.

JEL classification: G10, O31
Keywords: financial system, financial market, financial innovations

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Introduction

The dominant feature of the modern financial system is a high pace of innovations, both in terms of their number and value. Thus, it is important to analyze their influence on the financial system. Recently, many studies devoted to this problem have been published, however, they concentrated mainly on the global financial crisis perspective or on a single type of financial innovations. In addition, there is neither a unified definition of financial innovations nor uniform classification of their types applied in these studies.
Therefore, the main aim of this conceptual paper is to undertake an attempt to systematize the current state of knowledge relating to the financial innovations. The paper examines the existing literature relevant to the problem of financial innovations and their role in the financial system. Based on this survey, taking into consideration the definition of financial system, a definition of the financial innovations in the broad and narrow meaning is

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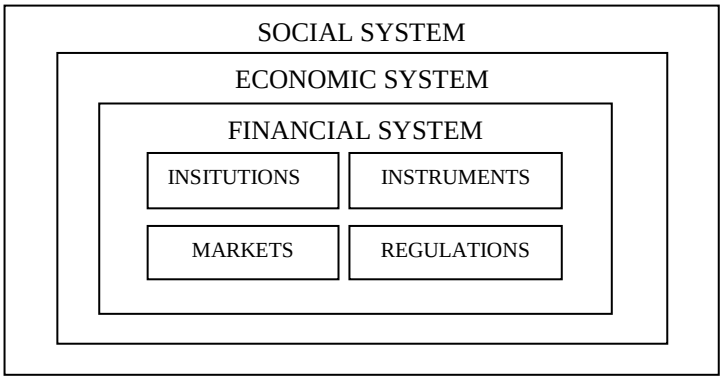
developed. Then, the applied classifications of the financial innovations are analyzed and systematized, according to the most important criteria. Another issue discussed in the paper is connected with the functions that are fulfilled by the financial innovations. As they are not a homogeneous group, they can perform various functions, however these functions should be also classified. The paper includes the proposition to order these functions according to the functions of the financial system, based on the assumption that the main aim of the financial innovations is to improve the efficiency of the financial system in performing its functions. Obviously different financial innovations can have different effects on the financial system. Thus, the paper ends with the conclusion that each single financial innovation should be analyzed separately regarding its mechanism of functioning and potential consequences for the entire economy.

The findings of this paper in a form of the systematized knowledge related to the financial innovations can be a valuable starting point for further research in this area of financial economics.

The importance of the financial system in the modern economy

The modern economy cannot exist without the efficient financial system that is defined as the collection of markets, institutions, instruments and regulations through which the financial securities are traded, interest rates are determined and financial services are produced and delivered around the world (Pietrzak, Polański and Woźniak, 2008, p. 20; Rose and Marquis, 2009, p. 3). The financial system is regarded as one of the most important creations of the modern society and it is described as an integrated part of the economic system and by this – a significant part of the social system (Pietrzak et al., 2008, p. 15) – see figure 1.

Figure 1: Financial system as a part of the social system



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As the integrated part of the global economic system, the financial system determines the cost and the quantity of funds available in the economy to pay for every day purchases. It creates the mechanism for the flow of funds between various economic entities such as: households, business firms, governments and financial institutions.

There are different approaches towards the classification of the financial system functions. According to the first one – the general approach, the financial system plays functions that can be grouped in three sets: (1) monetary function, (2) capital allocation function and (3) controlling function (Pietrzak et al., 2008, p. 18). The monetary function is connected with the

process of money creation in the economy and the process of money transfer between economic entities by the organization of the payment system. The capital allocation function is realized in two dimensions – the market financial system and the public financial system. In case of the first dimension, the market financial system enables to transfer the surplus funds to the most promising deficit units and by this contributes to the economic growth. In the second one – the public financial system enables us to gather funds that can be used to finance public goods, social services and social benefits, promoting and sustaining the economic growth. The controlling function enables us to monitor the flow of funds in the economy regarding their effective usage. The interactions between the distinguished functions are multidimensional and their efficient realization determines the development of the entire economy.

Another approach distinguished six core functions performed by the financial system. According to this, the financial system provides mechanism for (Bodie and Merton, 2000, p. 24-32):

1) the transfer of economic resources through time, across borders and among industries,
2) the risk management,
3) the clearing and settlements of payments to facilitate trade,
4) the pooling of resources (aggregating wealth into larger masses of capital and subdividing ownership in various enterprises),
5) the financial decisions made on the price information,
6) dealing with the incentive problems created by the asymmetric information or the agency relationships.

By analyzing the above listed functions, it can be noticed that they are mainly realized by the financial markets that constitute the most important part of the financial system. The core role of the financial markets is to transfer the spare funds from the surplus units (households and institutions) to the deficit units (mainly corporations and governments) in the process of transforming the savings into investment. Thus, the financial markets attract and allocate savings ((1) investment and (2) financing function), set interest rates and prices of financial assets ((3) pricing function), facilitate transactions ((4) payment function) and (5) risk management (more about financial market functions see in: Dębski, p. 16-17; Rose and Marquis, 2009, p. 6; Socha, 2003, p. 22-24). To simplify further analysis, these five functions of the financial markets can be regarded as the core ones for the entire financial system, as due to them the economic development can be enhanced.

However to achieve this goal the financial markets must be characterized by several important qualities, such as: (1) reliability, (2) transparency, (3) efficiency, (4) liquidity, (5) integrity and (6) innovativeness (Al-Kaber, 2010, p. 128; Socha, 2003, p. 20-21). Reliability is connected with the way in which the information is provided by the issuers of the financial securities to the investors in the financial markets. Transparency is defined as the way in which the transactions are concluded and information about them is disseminated. The financial markets can be efficient in one of the three basic dimensions: (1) the efficiency of allocation (the capital is transferred to finance the best investment projects), (2) the efficiency of transactions (sale-purchase operations can be realized at the lowest level of transaction costs) and (3) the efficiency of information (all markets participants have the same access to the important information influencing the valuation of the financial instruments) (see more about market efficiency in: p. Ehrhardt and Brigham, 2009, p. 290–294; Czekaj, Woś and Żarnowski, 2001, p. 30; Damodaran, 2001, p. 143-145; Socha, 2003, p. 20-21). Liquidity of the financial markets is defined as the possibility to undertake sale-purchase transactions at

any time, at the set price and without additional transaction costs. Integrity of the financial markets results from the relations between the financial institutions supervising the activity of the financial markets, creating the conditions for their development and operating in these markets. Nowadays, an important feature of the financial markets is its innovativeness reflected in the number of new financial developments applied in the markets.
Summarizing, the common characteristics of both the financial system and financial markets that have been recently observed are: the increased process of globalization and the rapid growth of financial innovations. Thus, the latter problem should be carefully analyzed as the financial innovations are blamed for the latest global financial crisis (see more about the consequences of the financial innovations from the financial crisis perspective in: Gemzik-Salwach, 2009; Henderson and Pearson, 2009; Jenkinson, Penalver and Vause, 2008; Lumpkin, 2010; Mullineux, 2010).

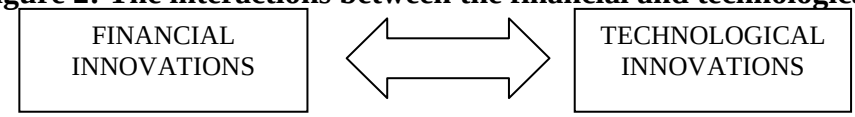
The definition and origin of financial innovations

The role of innovations in the economic development is indisputable. The general definition of innovations explains that they appear when new ideas, solutions and instruments are implemented in order to change the conditions of business entity and to improve its situation. The application of innovations increases the competitiveness of a business entity and creates value for its owners (compare: Dabic, Cvijanovic and Gonzalez-Loureiro, 2011, p. 196; Grudzewski, Hejduk, Sankowska and Wańtuchowicz, 2010, p. 116). The sustainable growth of the modern business entity is impossible without the proper innovation management accompanied by the knowledge, information, reputation and trust management.
At the beginning, the term "innovation" was used to describe the changes in the technological solutions, creating new combinations of productive means, generating the above-the-average rates of return and thus enhancing the dynamic development of the overall economy (Targalski, 2006, p. 7). The traditional approach to technological innovations, introduced by J. Schumpeter, distinguish the following groups of innovations: (1) new products, (2) new methods of production, (3) opening new markets, (4) new sources of supply of raw materials, (5) new organization forms and business structures and (6) new methods of management (Dabic et al, 2011, p. 196). Based on this approach, the OECD methodology was developed focusing on four groups of innovations: (1) product, (2) process, (3) marketing and (4) business organization (OECD, 2005, p. 48). The new developments in these four categories are treated as innovations, if they are perceived as new for the entity implementing them, which means that these solutions can be already known and applied in other entities or organizations (Anderloni and Bongini, 2009, p. 41).
When the term "innovation" is defined, one can try to find the reasons for implementing new developments. The sources of innovations can be analyzed from two perspectives, described either by the demand theory or by the supply theory of innovation.
According to the demand theory, the innovations are created as the response to the demand of business entities that want to acquire competitive advantage in their business environment (this type of new developments are called the demand-driven innovations). However, this demand can be influenced either by the internal needs of the business entity aiming at improvement in its activity or by the changes in its environment requiring the proper adjustment in its business strategy.
The second approach stresses the role of the supply side, as innovations are firstly created by the innovation providers and then they are implemented in the business entities (the end-users

of innovations). This category of new solutions is called the supply-driven innovations and they are achieved as a result of the process consisting of three phases: (1) the creativity phase (invention), (2) the innovation phase and (3) the diffusion phase (realized either by imitation or by commercialization of innovative solutions) (see more in: Dabic et al, 2011, p. 196 -200). The presented approaches to the theory of technological innovations can be adopted to the theory of financial innovations; however, the specific features of the latter must be taken into account (for the comparison of technological and financial innovations see more in: Stradomski, 2006, p. 40).

The financial innovations are not a new phenomenon, as they have been accompanying the technological innovations from the very beginning (Michalopoulos, Leaven and Levine, 2009, p. 2-5). It is commonly known that financial and technical innovations are bound together and they evolve together over a time (see figure 2). As on the one side, the financial innovations provide mechanism to finance innovative technological projects when traditional sources of funds are unavailable due to high investment risk. And on the other hand, the technological and economic progress resulting in the higher complexity of business processes and new types of risk forces the financial system and financial markets to adopt to the changes, to be modernized according to the new requirements of the business entities and to the challenges of the modern world. This leads to the conclusion that without financial innovations, the technological and economic development would slow down and the wealth of nations would be lower. At the same time, the application of the financial innovations would be limited without the demand arising from the technical progress.

Figure 2: The interactions between the financial and technological innovations



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The financial innovations have had a long history of evolution. We can simplify it and say that any financial instruments (besides traditional shares and straight bonds), any financial institutions (besides traditional banks) and any financial markets (besides the traditional markets for the straight bonds and shares), for a certain period of time, can be classified as financial innovations. In the 17th and the 18th century the new financial instruments – debt contracts together with high liquid markets were introduced to gather capital required to finance the oceanic expedition and trading voyage. Then, in the 19th century the investment banks together with the new accounting methods were established to evaluate the profitability of railroad companies and to provide them sources of funds. Next, in the 20th century, the private equity companies emerged to analyze and finance high-tech investment project. At the beginning of the 21st century, the new form of investment companies are evolving - the pharmaceutical corporations analyzing and funding the bio-tech innovative solutions (see more about the evolution of the financial innovations in: Michalopoulos, Leaven and Levine, 2009). These are only a few examples of the new financial developments and their evolution, proving to be essential for the technological and economic progress.

Thus, financial innovations are not an entirely new issue. However their importance has increased recently, as since the mid-1990's the acceleration in the pace and range of financial innovations has been observed (Llewellyn, 2009, p. 1). In order to start the analysis of the role of the financial innovations in the modern financial system, one must begin with their definition. As there are no unified definitions of the financial innovations, as in the case of the technological ones, the systematization of this term is required. In most of the applied definitions, the financial innovations are presented in the narrow meaning, as mainly the product innovations are described (some of the most popular definition of financial innovations are presented in: Al-Kaber, 2010, p.135-136; Anderloni and Bongini, 2009, p. 41-43; Fabozzi and Modigliani, 2003, p. 27-28; Frame and White, 2009, p. 3). By the analysis of these definitions, the main features of the product financial innovations can be listed as follows:

1) they can be entirely new solutions or just traditional instruments in which new elements of construction have been introduced improving their liquidity and increasing the number of their potential applications as they are better suited to the circumstances of the time,
2) they can be used as substitutes to the traditional financial instruments improving the financial situation of the business entities using them,
3) they can not be easily assigned to one particular segment of the financial market,
4) they can be used to hedge against the intensive volatility of the market parameters,
5) they can be used in a form of complex instruments including several simple, traditional financial instruments,
6) they can be used in a form of new financial processes or techniques or new strategies that primary use these new products,

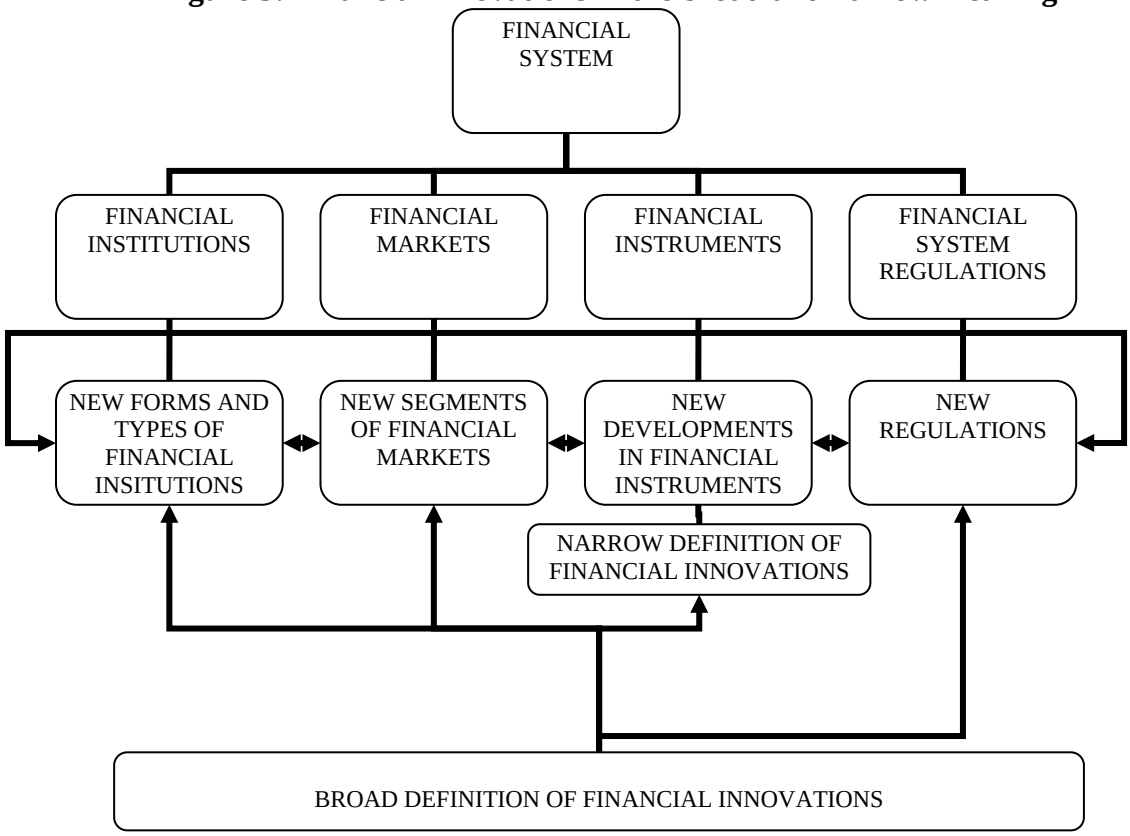
It is worth adding that if any financial instruments other than traditional shares and straight bonds, can be regarded as the financial innovations, these new developments can be divided into two categories: (1) equity-linked innovations and (2) debt-linked innovations.

Other popular approach to the financial innovations definition states that they can be categorized as: (1) the product innovations, (2) the process innovations and (3) the risk-shifting innovations (Llewellyn, 2009, p. 4). The first category – the product innovations - includes new financial instruments, contracts, techniques and markets. The next group – the process innovations are connected with improvements in the processes of securities distribution, transaction payments or assets valuation. On the other hand, the risk-shifting innovations are created by the separation or combination of various individual instruments in order to obtain new instruments with different risk characteristics. In this last group of financial innovations, there are distinguished two categories: (1) the instrument innovations and (2) the post-contract innovations (Llewellyn, 2009, p. 5). In case of the first type, a new instrument is designed and created with a purpose to achieve a particular set of characteristics (so they can be described as the ex-ante innovations). In the second type of innovations – the risk characteristics is changed after the original instrument is used (so they can be defined as the ex-post innovations).

These are the most popular approaches towards the definition of the financial innovations presented in the financial literature. However, the new definition of the financial innovations can be developed based on the definition of the financial system. This broad definition can describe financial innovations as changes in the functioning and the new solutions and developments in: (1) financial markets, (2) financial institutions, (3) financial instruments and

(4) regulations connected with their activity (see fig. 3). The relationship between these groups of financial innovations is multidimensional and can be described as the spiral of innovations (compare: Gubler, 2010, p. 1-49). This means that the new financial institutions create the new financial instruments (products and services) that are traded in the new financial markets and these new solutions require shortly the new regulations. Changes in the market conditions together with the changes in the legal environment lead to the formation of new instruments and then foundation of the new markets and institutions specializing in these new developments.

Figure 3: Financial innovations in the broad and narrow meaning



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Thus, to summarize the conclusion – the term "financial innovations" can be applied in two meanings (see figure 3):

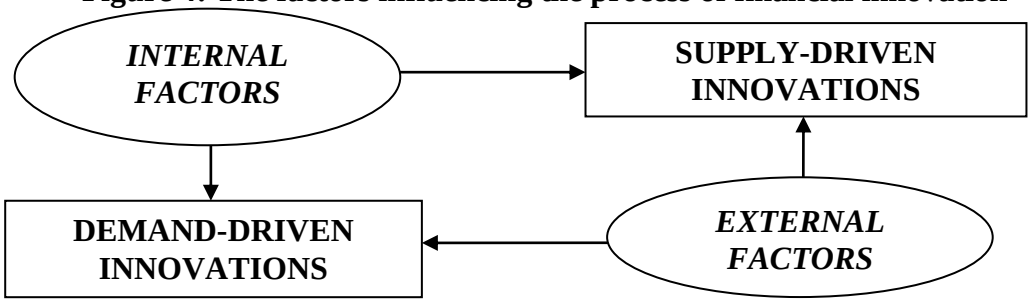
1) according to the narrow approach, the financial innovations are defined as any new developments in financial instruments (entirely new instruments, combination of traditional instruments, modification of traditional instruments, new application of existing instruments, etc.),
2) according to the broad approach, the financial innovations include any new developments in any elements of the financial system (markets, institutions, instruments and regulations).

In addition, the word "new" means that these innovations are perceived as novelties for the entity implementing them, not necessary objectively new for other participants of the financial system.
As the term "financial innovation" is clearly defined, one should focus on the factors influencing the evolution of the new financial developments. We can distinguish two situations in which the financial innovations are created and implemented. Firstly - the financial innovations are applied when the traditional financial solutions are no longer available. And secondly – when the costs connected with the introduction of the financial developments are lower than the costs connected with the usage of the old, traditional solutions (Pantalone and Welch, 1987, p. 33-35).
The demand-side theory of the financial innovations indicates that the main reasons for the new developments are the imperfections of the financial market, mainly the asymmetric information, agency costs and transaction costs (see Fabozzi and Modigliani, 2003, p. 28). These imperfections create demand for the solutions that enable the market participants to reduce their negative consequences. As an example of the responsive financial innovations, the new solutions in the payments systems and instruments can be given, aiming at the reduction of the transaction costs. Another example which can be presented is the one in which the new developments in financing instruments were introduced to increase the availability of the sources of funds and to give more flexibility in designing cash flows. Yet another reason for creating and implementing financial innovations is connected with the unfavorable tax regulations, forcing the market participants to search for the solutions enabling them to avoid paying too high taxes – for example by using defensive innovations (e.g. new investment instruments in a form of structured products) one can reduce or postpone the tax payment. The increased volatility of the market parameters also enhances different entities to look for a new solutions enabling them to reduce the level of risk. New regulations may also force the market participants to use the new developments in financial management, accountancy or financial reporting – e.g. adaptive innovations in the form of new systems of financial reporting. Summarizing, the financial innovations should be created as a response to the market participants' needs aiming at meeting their individual goals (the demand-driven financial innovations).
Simultaneously, since the beginning of 1980's the intense activity of the financial institutions creating new financial developments has been observed, being the subject of the analysis of the supply-side theory of financial innovations. These new developments are created by the financial institutions in order to increase their competitive advantage. A large number of the financial innovations are offered to the clients – these are mainly aggressive innovations in various fields of the financial activity – new investment, savings, financing and payment instruments and tools (the supply-driven financial innovations).
The new developments in the financial institutions are also implemented in order to enhance their results, to protect their market situation or to improve their financial condition. These solutions are called protective innovations and they may be used either in the investment decisions or in the risk management process.
There are many factors influencing the increased activity of the financial institutions in creating and implementing financial innovations. Globalization and disintermediation of the financial markets, increased volatility of the market parameters, deregulation and liberalization of the capital flows and the dynamic development of the communication technologies are listed as the most important ones. Other factors that have impact on the

potential of the financial institutions to create new solutions include: intense competition among financial institutions, short-term perspective on the financial results, searching for the new sources of revenues (besides interest revenues) and increasing importance of the risk management process (more about the financial innovation drivers see in: Anderloni and Bongini, 2009, p. 42; Fabozzi and Modigliani, 2003, p. 27; Llewellyn, 2009, p. 7; Socha, 2003, p. 25-30; Tarczyński and Zwolankowski, 1999, p. 53). It is often stressed that the financial innovations are created to find more efficient way to redistribute risk among market participants.

Summing up, despite the differences between the demand and supply theory in explaining the main motives of using innovations, we can distinguish two groups of factors influencing the process of creating and implementing financial innovations in the financial system. The first group includes the internal factors arising from the needs and goals, decisions and changes in the management style of the financial system participants (both financial institutions and other entities). The second group covers the external factors resulting from the market imperfections, the changes in the business environment and the challenges of the modern economy (see figure 4).

Figure 4: The factors influencing the process of financial innovation



Source: Own elaboration

Regardless the differences in sources of financial innovations, the process of their creation and implementation is quite similar. A huge number of financial innovations observed in the modern financial system are the consequence of the relatively rare patent protection procedures compared to the technological innovations. Due to this situation the diffusion of the financial innovations is quite fast. At the beginning the new developments are introduced in the less regulated international market and then, after they have been positively verified they are implemented into more supervised domestic market. Financial innovations that have not succeeded are withdrawn from the market, and after some time their modifications are implemented. The successful financial innovations can be easily imitated by the competitors in the market, so the new financial developments that are introduced by different financial institutions may be quite similar. Thus, the process of creating and implementing financial innovations is quicker, less complicated and cheaper than the similar process in case of the technological innovations. The speed of financial innovations diffusion in the global financial system is enhanced by the dynamic development of new communication and information technologies.

Another problem, widely discussed in the literature, is connected with the results of the applied financial innovations, as they can be ambiguous . The sustainable innovations help the

financial system to fulfill its core functions at lower costs and higher efficiency. But not all of the new developments have this positive influence on the financial system. Some of them have unexpected and undesirable side-effects which lead to instability of the financial system and to increased level of the financial risk. Thus, the harmful financial innovations should be thoroughly controlled and eliminated by the adequate actions of the regulatory institutions (see more in: Anderloni and Bongini, 2009, p. 43; Lumpkin, 2010, p. 92-94). In addition, the effects of the financial innovations can be analyzed regarding their time perspective. The short-term innovations provide a temporary benefits for their users, simultaneously incurring negative effects for other market participants. On the other hand, the long-term innovations improve the efficiency of the financial system in the general terms.

Classification and functions of the financial innovations

As there is no unified definition of financial innovations, there are also various approaches to their classifications and their functions.

Based on the presented analysis of the financial innovations definitions and the mechanism of their creation and implementation, it can be observed that the financial innovations are not a homogenous group of new financial developments. Therefore, the systematization of their classification would be reasonable. The financial innovations can be classified according to various criteria, that have been already discussed in section 2. The most important criteria of the financial innovations classification include: (1) sources of innovations, (2) factors influencing the process of creation and implementation of innovations, (3) the motives of using the financial innovations, (4) the elements of the financial system where the innovations occur, (5) the types of innovations, (6) the effect of the financial innovation application, (7) the moment of creation and (8) the underlying assets (in case of instrument innovations) (see table 1).

Table 1: Classification of the financial innovations

Criteria	Types of financial innovations
Sources of innovations	Supply-driven innovations Demand-driven innovations
Factors of innovations	External factors driven innovations Internal factors driven innovations
Motives of innovations	Adaptive innovations Aggressive innovations Defensive innovations Protective innovations Responsive innovations
Elements of the financial system	Financial market innovations Financial institutions innovations Financial instruments innovations Financial regulations innovations
Types of innovations	Product innovations Process innovations Risk-shifting innovations
Effect of innovations	Sustainable innovations Harmful innovations

Moment of creation	Ex-ante innovations Ex-post innovations
Underlying assets	Debt-linked innovations Equity-linked innovations

Source: Own elaboration

The presented criteria of classification are not mutually exclusive. This means that each of the financial innovations can be categorized to various groups of financial innovations according to the chosen criteria.

Another important issue is related to the classification of the financial innovations functions, as different approaches to this problem are applied.

According to the Economic Council of Canada financial innovations can be classified into three broad categories regarding their functions: (1) market-broadening instruments, (2) risk management instruments and (3) arbitraging instruments and processes (see Al-Kaber, 2010, p. 137; Fabozzi and Modigliani, 2003, p. 27). The first category of financial innovations increases the liquidity of the financial markets, improves the availability of funds to deficit units and ensures access to new investment opportunities to surplus units. The second category of financial innovations enables to reallocate financial risk to those market participants who are less adverse to it or better prepared to handle with it. The last category of financial innovations gives the opportunity for the market participants to benefit from differences in costs and returns between markets.

Another classification of the financial innovations based on their functions has been elaborated by the Bank for International Settlements. According to this classification the financial innovations are divided into five groups: (1) price-risk transferring, (2) credit-risk transferring, (3) liquidity-generating, (4) credit-generating and (5) equity-generating instruments (see Fabozzi and Modigliani, 2003, p. 27). The first group of financial innovations provide market participants with more efficient means for dealing with price or exchange rate risk. Credit-risk instruments are used to reallocate the risk of default. Liquidity generating instruments can have three different consequences: they increase the liquidity of the market, they enable deficit units to look for additional sources of funds and they allow market participants to avoid unfavorable law regulations. Credit-generating instruments increase the amount of debt funds available to the deficit units and finally, while the access to the additional sources of equity capital is provided by the use of the equity-generating instruments.

The methodology of BIS was developed and extended - according to this modified approach, the financial innovations can play the following roles (Llewellyn, 2009, p. 5-7):

1) risk transfer - risk reduction or protection against all types of market risk: price risk, exchange risk, interest rate risk or credit risk (e.g. by the use of derivatives, securitization or collateralization process),
2) risk pricing - the risks that are embodied in a financial instrument can be stripped out, priced, held and traded separately from other risks of this instrument (e.g. by the transactions in secondary markets for CDOs or ABSs),
3) liquidity enhancement - increasing liquidity of the assets or instruments (e.g. by the securitization process the loans can traded in the secondary markets and the assets structure of the lending institutions can be improved),

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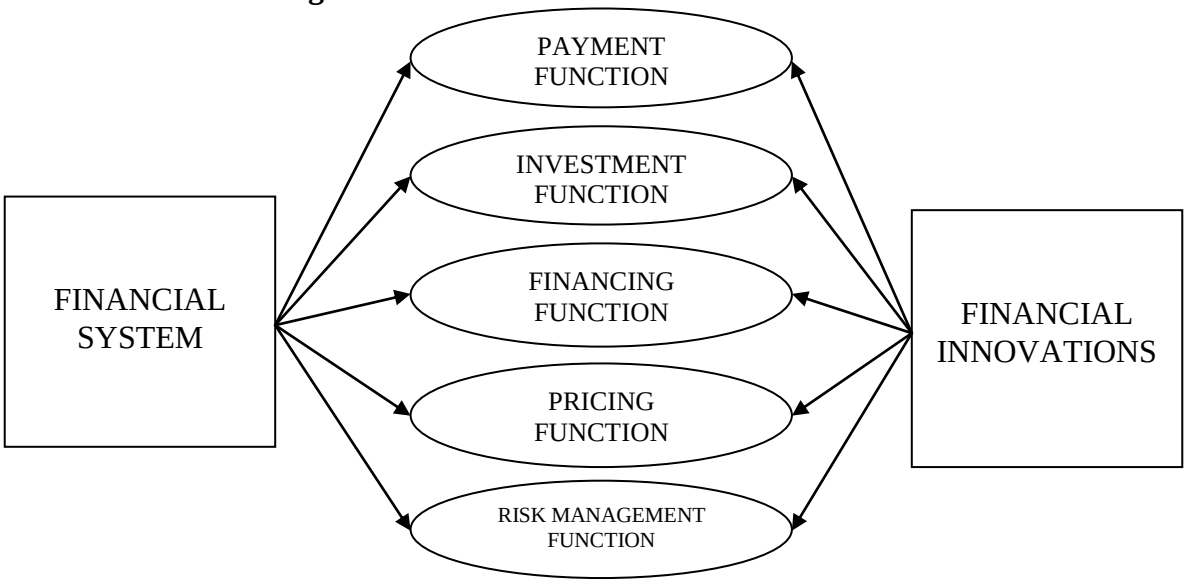
4) credit-generation enhancement - widening the access to the credit markets or increasing the credit capacity both for the borrowers and for the creditors (e.g. by the usage of CDOs or CDSs),
5) equity generation - increasing the assess to the equity financing together with the higher flexibility of the capital structure (e.g. by the usage of debt-equity swaps or convertibles),
6) insurance - widening the possibilities to insure risk in return for the payment of a premium (e.g. credit risk can be insured by the issue of CDS),
7) asset and liability management - widen the scope for managing assets and liabilities (e.g. securitization, CDs, CDOs),
8) funding of financial institutions - widening the sources of financial institutions funding (e.g. securitization enables to diversify the sources of funds used by the financial institutions to finance their activity).

This classification is quite complex, which may lead to the problems in its practical application. Thus, to avoid this type of problems and simultaneously take into account the assumptions that the financial innovations should enhance the efficiency of the financial system in fulfilling its core functions, the functions of the financial innovations can be classified in the same way as the functions of the financial system. According to this proposition, the functions of the financial innovations can be described as follows: (1) payment function (increasing the liquidity of the financial system), (2) investment function (increasing the variety of investment opportunities better adjusted to the risk-return profile of the investor), (3) financing function (increasing the availability to the sources of funds – either equity or debt capital, both for longer and shorter periods), (4) pricing function (improving the process of assets valuation and risk pricing by the elaborated statistical methods) and (5) risk management function (increasing the possibilities of transferring risk between system participants) – see figure 5.

Figure 5: Functions of the financial innovations



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Regardless the differences in the classification of the financial innovations functions, the two main problems should be considered while analyzing the impact of the financial innovations on the financial system – the potential changes in its efficiency and stability (Llewellyn, 2009, p. 23). The sustainable (true) financial innovations should bring benefits in reducing the negative elements of the financial system by: decreasing level of risk, closing the information gap, lowering the transaction cost and minimizing the tax payments. Simultaneously, they should enhance the positive elements of the financial system by: maintaining its stability, increasing its efficiency in performing its core functions, providing services and instruments better adjusted to the system participants needs and goals. The harmful innovations have the adverse impact on the financial system and the entire economy, so they should be avoided.

Conclusions

The modern financial system is characterized by high pace of innovations that can occur in any of its elements: markets, institutions, instruments and regulations. The financial innovations observed in the financial system can be classified according to various criteria, indicating their heterogeneity. Despite the differences in the applied classifications, the theory of financial innovations is mainly focused on their effects upon the financial system.

The sustainable financial innovations are required, as they enhance the efficiency of the financial system and by this they can improve the economic growth and increase the social wealth. However, some of the financial innovations can have some negative side-effects upon the financial system, offering benefits to the single participants and simultaneously being harmful to others. Thus, the efficient usage of particular financial innovation requires an extensive knowledge about its way of functioning and a thorough analysis of its consequences.

As this survey indicates, the problem of financial innovations and their role in the financial system is highly complex and can be an important and interesting subject for further research, both theoretical and empirical.

References

Al-Kaber, M. (2010). *Rynki finansowe*, Białystok: Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku.

Anderloni, L., Bongini, P. (2009). Is Financial Innovation Still a Relevant Issue? In: L. Anderloni, D. T. Llewellyn, R. H. Schmidt (ed.), *Financial Innovation in Retail and Corporate Banking*, Cheltenham: Edward Elgar.

Bodie, Z., Merton, R. C. (2000). *Finance*. Upper Saddle River: Prentice Hall.

Czekaj, J., Woś, M., Żarnowski, J. (2001). *Efektywność giełdowego rynku akcji w Polsce. Z perspektywy dziesięciolecia*. Warszawa: PWN.

Dabic, M., Cvijanovic, V., Gonzalez-Loureiro, M. (2011). Keynesian, Post-Keynesian Versus Schumpeterian, Neo-Schumpeterian. An Integrated Approach to the Innovation Theory. *Management Decision*, *49*(2), 195-207.

Damodaran, A. (2001). *Corporate Finance. Theory and Practice*. Hoboken: John Wiley & Sons.

Dębski, W. (2005). *Rynek finansowy i jego mechanizmy. Podstawy teorii i praktyki*. Warszawa: PWN.

Ehrhardt, M. C., Brigham, E. F. (2009). *Corporate Finance. A Focused Approach.* Mason: South-Western, CENGAGE Learning.
Fabozzi, F. J., Modigliani, F. (2003). *Capital Markets. Institutions and Instruments*. Upper Saddle River: Pearson Education International.
Frame, W. S., White, L. J. (2009). *Technological Change, Financial Innovation, and Diffusion in Banking* (Working Paper 2009-10). Atlanta: Federal Reserve Bank of Atlanta.
Gemzik-Salwach, A. (2009). Innowacje finansowe jako przyczyna kryzysu na rynkach finansowych. *e-Finanse 5*(3), 1-11. Obtained from http://www.e-finanse.com/artykuly/121.pdf on 15.01.2011.
Gubler, Z. J. (2010). *Instruments, Institutions and the Modern Process of Financial Innovation*. Obtained from http://ssrn.com/abstract= 1608409.
Grudzewski, W. M., Hejduk, I. K., Sankowska, A., Wańtuchowicz, M. (2010). *Sustainability w biznesie czyli przedsiębiorstwo przyszłości. Zmiany paradygmatów i koncepcji zarządzania*. Warszawa: Poltext.
Henderson, B. J., Pearson, N. D. (2009). *The Dark Side of Financial Innovation*. Obtained from http://ssrn.com/abstract= 1342654.
Jenkinson, N., Penalver, A., Vause, N. (2008). Financial Innovation: What Have We Learnt? *Bank of England, Quarterly Bulletin*, Nr 3, p. 330-338.
Llewellyn, D. T. (2009). Financial Innovation and the Economics of Banking and the Financial System. In: L. Anderloni, D. T. Llewellyn, R. H. Schmidt, *Financial Innovation in Retail and Corporate Banking*. Cheltenham: Edward Elgar.
Lumpkin, S. A. (2010). Regulatory Issues Related to Financial Innovation. *OECD Journal: Financial Market Trends*, *2009*(2), 91-121.
Michalopoulos, S., Leaven, L., Levine, R. (2009). *Financial Innovation and Endogenous Growth*. National Bureau of Economic Research, Working Paper 15356, Cambridge, September, p. 1-33.
Mullineux, A. W. (2010). Financial Innovation and Social Welfare. *Journal of Financial Regulation and Compliance, 18*(3), 243-256.
OECD. (2005). *Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data*. 3rd ed., Eurostat.
Pantalone, C. C., Welch, J. B. (1987). Innovative Financing. How New Financial Strategies Have Reshaped American Business. *Financial Executive*, Nr 4, 33-35.
Pietrzak, B., Polański, Z., Woźniak, B. (2008). *System finansowy w Polsce.* Vol 1. Warszawa: PWN.
Rose, P. S., Marquis, M. H. (2009). *Money Market and Capital Market, Financial Institutions and Instruments in a Global Marketplace*. New York: McGraw Hill.
Socha, J. (2003). *Rynek papierów wartościowych w Polsce*. Warszawa: OLYMPUS.
Stradomski, M. (2006). *Innowacje finansowe w kreowaniu wartości przedsiębiorstwa*. Poznań: AE w Poznaniu, Grafika.
Tarczyński, W., Zwolankowski, M. (1999). *Inżynieria finansowa*. Warszawa: Placet.
Targalski, J. (2006). Innowacyjność – przyczyna i skutek przedsiębiorczości. *Zeszyty Naukowe nr 730/2006*, 1-5.