

Permanency or Continuity? A Relation between Innovation and Technological Development

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*"So much of what we call management consists
in making it difficult for people to work."*

Peter F. Drucker

Abstract

The role of innovation is diversely estimated by enterprises. A group of them invest in this field as they have recognized the opportunities inherent in innovation. It is clear for such enterprises that continuous change and innovation may be one of the most important means to preserve competitiveness. Others solely wish to adapt to the continuously changing environment in order to retain their market position and avoid significant damages. Change is continuous and technological development has a crucial role in it. Dialectic of permanency and continuity, therefore, may result in a key factor for both the management and the entire enterprises.

Keywords: innovation, technology, competitiveness, enterprises

Innovation as a factor influencing competitiveness

Permanency or change? Enterprises wishing to establish a successful market presence might always face this question when pursuing their business. There are well-established practices or previously introduced structural models which seem efficient; nevertheless, change may become necessary if required by the situation. Change is a corollary of our everyday lives. As biological beings and also as members of close-knit or loose-knit communities we are both part and subject of changes and creators of changes. Conscious changes, subject to the motives of changes, the recognition of the right direction

of and the consideration of the complex impacts of changes, may result in either positive development or adverse changes from the nature's and the society's perspective. Peter Drucker, in its essay *Management Challenges for the 21st Century [1999]*, dedicates important chapters to the management of changes. He reckons that overcoming resistance to change is not an up-to-date issue recently, as opposed to previous years (20-25 years ago) when it was the most relevant matter. Inevitability of changes has been accepted by everybody. Nonetheless, everyone desire to have the changes deferred as much as possible. Changes have become normal in our rapidly changing world and no institution is capable of surviving tomorrow without making changes. Only leaders of changes will be able to actually do something more than simply adapt to the changes. As **Saul Alinsky** said: Any revolutionary change must be preceded by a passive, affirmative, non-challenging attitude toward change among the mass of our people. They must feel so frustrated, so defeated, so lost, so futureless in the prevailing system that they are willing to let go of the past and change the future. The possibility of change carries in itself continuous reformation. Such reforming capacity may extend to products, services, technology, marketing, process organization as well as management and structural methods or organizational culture. The monitoring, taking over and application of the latest, most effective achievements of scientific-technological development is indispensable for enterprises not only to maintain further growth, but also to preserve achievements. Enterprises always need to endeavor to develop new, more economic production methods and new, up-to-date and competitive products, open up new favorable markets, apply new, efficient organizational and management methods, that is, to become innovative. By their innovative and profitable operation these companies may also contribute to improve the competitiveness of the national economy. A country's economic performance is ultimately determined by the fact to which extent it is capable of developing the inner resources of its individuals [**Eric Hoffer**]. The most important problem of undertakings is the fact that they need to operate in an increasingly complex and dynamically changing environment [**Perlaki, 2002**]. It is vital to decide whether invention, new ideas, creativity or technological innovation is the determining factor of enterprises' innovation activity. The scientific-technical revolution of our era fundamentally determines the operation of manufacturing enterprises. This relation to science is widely considered so characteristic and relevant that it is often included in the

definition of innovation. However, the notion of innovation would be unreasonably narrowed, if it were limited solely to the application of scientific achievements. For instance, entering a new market is deemed innovation for the enterprise, even if it is not related to new scientific achievements; moreover, new products are not even needed by the enterprise either. On the other hand, it is unquestionable that innovation is indeed, in many ways, linked to scientific-technical achievements. Relations between scientific organizations and enterprises are initiated bilaterally. Scientific organizations seek enterprises in order to utilize their achievements in practice, but enterprises may also turn to scientific organizations to scientifically support their innovation problems. Therefore, corporate leaders of innovation process often have multifaceted relations to science.

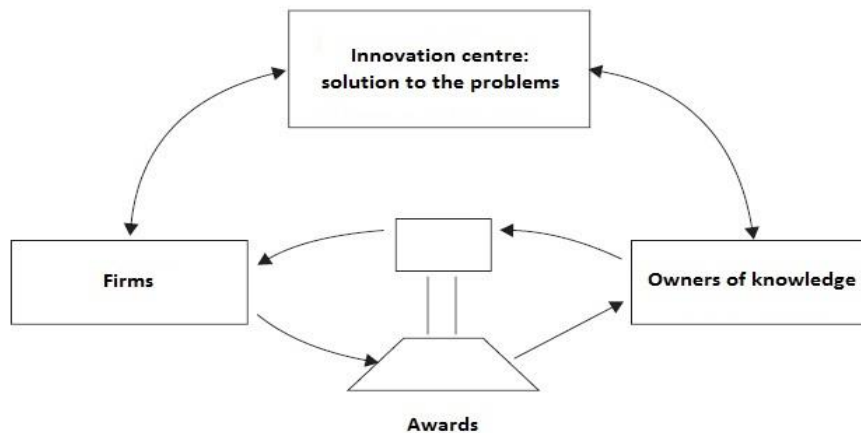


Figure 1: Ideas from outside the company

Source: Csath, M – Versenyképesség-menedzsment

Technological development - the key to innovation

The sources of innovation are such factors, phenomenon, interests, goals that aim to inspire enterprises to think about innovation. Economic theories generally link innovation to technological development, economic growth, entrepreneurial activity and government support. This is argued in the context of influences on corporate innovative decisions, corporate strategies and chances. These concepts put focus on the role of creativity too. According to mainstream economic theory, technological development is all the root of economic growth that explains both the development in economic processes and business cycle by constantly inspired brand new techniques that fluctuates periodically. One of the theories that is based on the periodic

fluctuation of technical development is called the Kondratyev cycle that is a basic concept for the innovation and development theory of Schumpeter. According to Schumpeter, in general, new techniques are associated with new energy resources or materials. He argues that innovation is linked to creative destruction. According to this concept, development makes economic imbalance expand and brakes continuity. Continuity brake is due to creative entrepreneurs, who are a product of innovation. They are simultaneously enhancing and setting back development by innovations, such as new methods, products, resources, corporations, markets. **Martin and Dodgson [1997]**, in their business cycle analysis, mention a paradigm shift in technological development. These shifts are linked to specific products and create key industrial sectors that then enhance development. Beside key industrial sectors though, career sectors have emerged. These sectors are knowledge bases for key industries. This macroeconomic view on innovation argues that economic recession is an era of adaptation to future development. Veblen, instead of technological development, emphasizes the power of ideas and creativity. As an American economist and sociologist, **Veblen** the power of development is innovation originated from human instinct and motivation. **H.G. Wells** said that history of mankind is the history of ideas. According to **Albert Einstein** 'the true sign of intelligence is not knowledge but imagination'. The creative intelligence-had work ratio is often debated in connection with successful innovations. Creativity is no more than original and great ideas and the ability to create brand new concepts. It is widely accepted that businesses should create an innovative and creative environment, support innovative ideas and employ innovative workforce. **Levitt [2002]** argues that creativity is overrated; ideas are valued according to creativity instead of practicality. New ideas cannot be valued without taking into account risk, cost, and the possibility to put them into practice. According to Levitt, businesses need stability and rigidity to operate successfully, stability is the most important for risk taking. **Amabile** and his colleagues **[2002]** analyzed creativity in a given timeframe and concluded that setting a deadline not only be able to encourage creativity, but discourage it. Managers have to set an optimal timeframe for creative personnel during an innovative project implementation. **Peter Drucker [2002]** innovation is enhanced by seven sources: the unexpected, the incongruity, innovation based on process need, changes in industry structure or market structure, demographics, changes in perception, mood and meaning, new knowledge. Having set a desired target can creativity, fantasy and functional inspiration play an important role. Drucker claims that, as creativity is conceptual and perceptual, successful innovators use both their

right and left brains. When it comes to successful innovations and discoveries the role of the unexpected is often argued. However **Pasteur** claims that *'in the field of observation, chance favors only the prepared mind'*. Hungarian businesses inherited obsolete technology in every sector. Thus it is of high importance to give a good estimate of the current stage of our technological development, as well as our adaptation to new demands in the information society. According to studies based on corporate and national competitiveness, the employed technology and management play a key role in corporate efficiency. **Porter [1990]** claims that in order to preserve competitiveness innovation capacity is of high importance. Beside perfect quality and competitive prices early acquiring of the necessary knowledge for further technological or product development, earlier than other competitors, is important. New technology is one of the most important, if not the most important, source of competitiveness. **Chiesa-Coughlan-Voss [1996]** developed a comprehensive model to demonstrate the links between competitiveness and technical innovation processes (Figure 2). The model shows four core processes such as concept generation, product development, process innovation, and technology acquisition. Supporting these core processes are three enabling processes: the deployment of human and financial resources, the effective use of appropriate systems and tools, and senior management leadership and direction. The outcome from these core and enabling processes is performance in the marketplace.

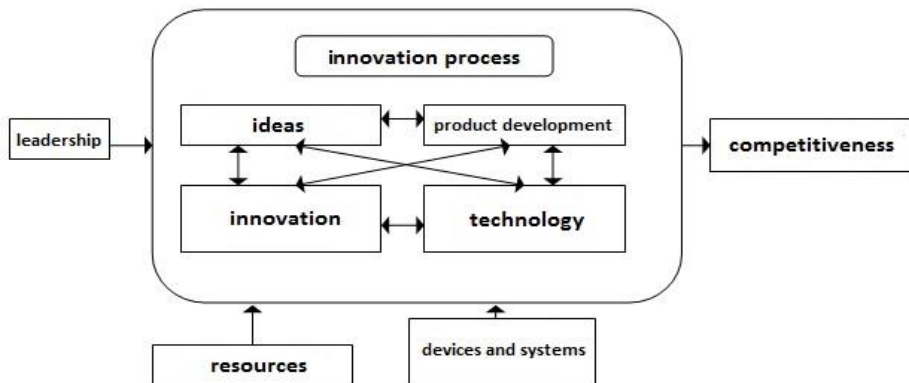


Figure 2: Technological shift and corporate efficiency according to Chiesa-Coughlan-Voss

Source: Kiss, J – Pandurics, A – Lapid, K: Innováció és versenyképesség

Nowadays technological innovation and technology management are strategic factors. Technology management is no longer a set of laboratory instruments and its management. Corporate R&D is responsible for the creation of new technology, information and solutions, as management is responsible for combining approaches to best enhance the acquisition, adaptation and maintenance of knowledge. The term of technology management is linked to technical innovations, and is to enhance corporate strategy. Technology management is a cross functional activity that uses technology to make the corporation successful and efficient [Pataki, 2005]. Cross functionality means that activities are beyond functional corporate boundaries. Technology management activities occur not only when it comes to innovation but strategy. Technology management linked to innovation is well-provided with a set of tools, such as technology scanning or road mapping that is essential for corporations that build on technological advancements. To another view, that takes macroeconomic factors of technology development and government preference into consideration. Technology management is an economic activity that focuses on technology development and distribution via corporate and governmental agencies [Inzelt, 1998].

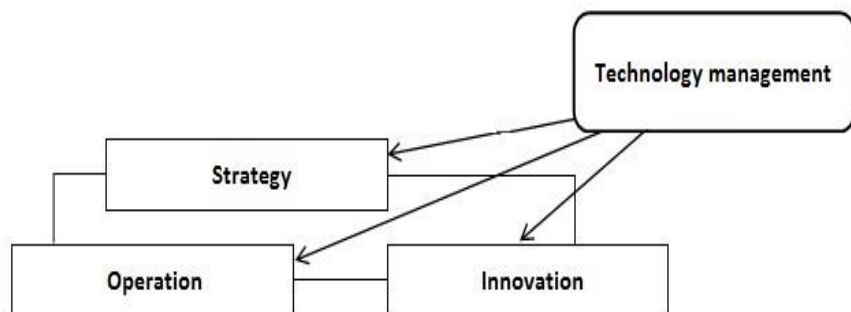


Figure 3: Main field of implementation of technology management
Source: Buzás, N: Innovációmenedzsment a gyakorlatban/own chart/

A non-technology corporate approach is clearly impossible [Steele, 1989]. Not only cannot corporations exist without technology, but any other business that carries out business activity. Technology management is needed not only in the business sector but as well as in

the governmental and non-profit sectors. To be able to meet human needs, the appropriate method and tools are essential. If any work is carried out, technology is employed – either recognizing it or not. The role of technology and its relations to other corporate elements is illustrated in the figure of *Leavitt [1964]* and *Vracking [1993]*. Technology is the core and vital element of corporate success. It is related to every other element, while having an effect on and effected by them, thus cannot be discussed separately.

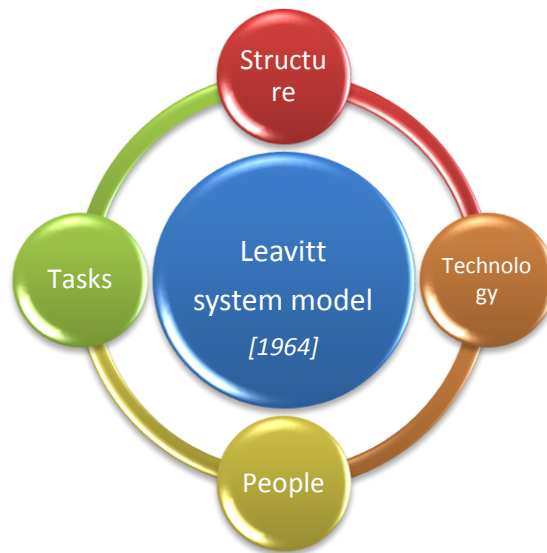


Figure 4: Leavitt system model

Source: Buzás Norbert: Innovációmenedzsment a gyakorlatban/own chart/

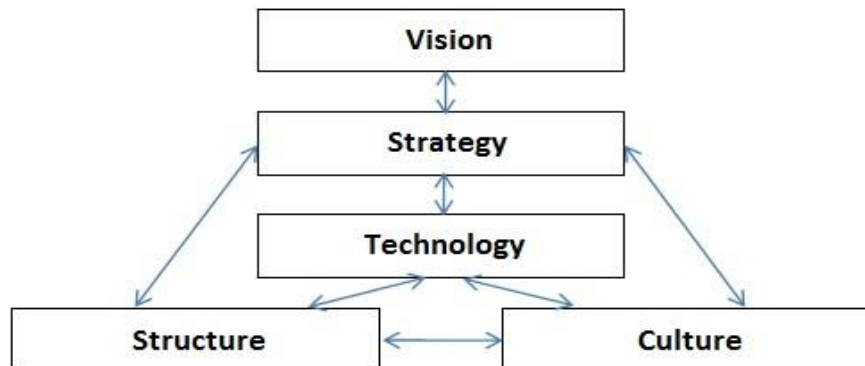


Figure 5: Vracking's model on technology at corporate management

Source: Buzás Norbert: Innovációmenedzsment a gyakorlatban/own chart/

Purpose of analysis

My utmost objective is to prove that innovation processes are indeed principally generated by technological development. Permanency or continuity? It may result in a key issue for Hungarian enterprises as well, since without sufficient technological background Hungarian enterprises could not maintain their competitiveness either. How innovative are these firms? How much innovation awareness or search for innovation does incite innovation in enterprises? To what extent is innovative thinking represented by executives of enterprises? The results of the INNOTARS research program offer answers to these questions. Hungarian enterprises' innovation activity is also mostly determined by technological development and spending on this ambit is also relevant. This observation is supported by the national research project which is purported to examine the factors affecting and accompanying innovation at Hungarian small and medium sized enterprises. During the research we collected data from the enterprises via questionnaire surveys and interviews. As technology is in constant change and one of the most significant challenges enterprises have to face is to operate in the constantly changing environment, thus, rapid technology sourcing may be the quickest response on the part of enterprises. Pursuant to the evolutionary or neo-Schumpeterian approach, capitalist economy constantly develops and selectively adapts new and better technologies; the enterprises, however, have distinct abilities to build or adapt new technologies and they further vary as to how they manage to profit from them [*Nelson, 1991*]. *Grossman* and *Helpman* [1991] considered directly technical evolution, knowledge accumulation and utilization as major underlying drivers of economic development. However, under *Thirwall* [2002] it is important to take a critical approach in respect of the new economic growth theories as they tend to neglect the importance of demand-side factors; it is however noteworthy that the issues of technical change and the flow of knowledge slowly become part of mainstream economics.

Figure 5 demonstrates graphically the hypothesis of my study. It is my observation that with respect to small and medium sized enterprises in Hungary, the development of technology affects more the level of innovation than other factors, such as, e.g. innovative thinking or commitment to changes.

The connection between innovative thinking, creativity, technological development and the level of innovation

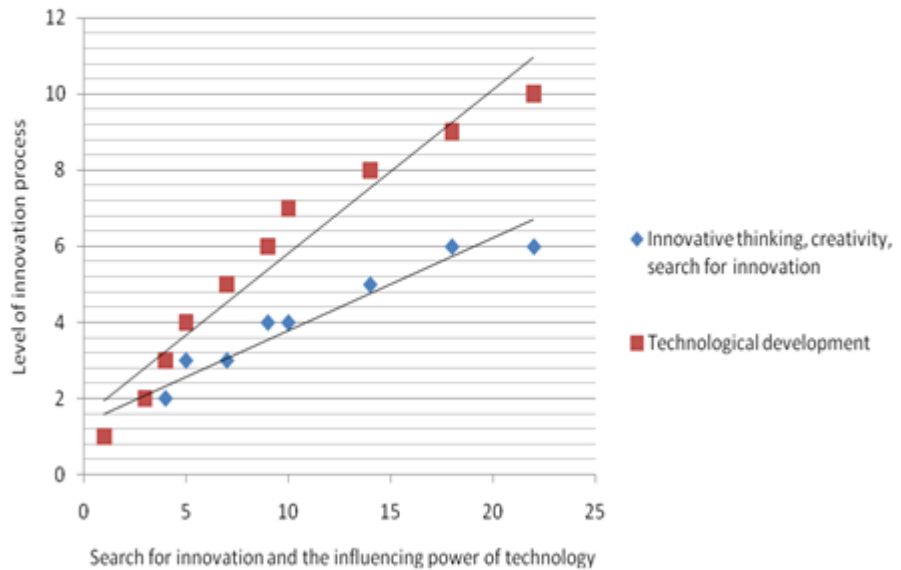


Figure 6: Impact of innovative thinking, creativity and search for innovation^{***} and technological development on innovation processes of enterprises
/own compilation/

The executives of most enterprises do not regard innovation as a possible means of development; but rather as a necessity to subsist and satisfy customers' demands. As among environmental conditions technological development is the fastest to change, the innovation processes of these enterprises are mostly determined by the development of technology.

Type of innovation	Number of answers	Proportion in percentage (814=100 %)
Product	158	19,41%
Technology	249	30,59%
Process	36	4,42%
Marketing	64	7,86%
Organization	83	10,20%
Other	54	6,63%

Schedule 1: Innovation types at the enterprises examined

Source: INNOTARS research program¹

The results of Schedule 1 arise from the questionnaire survey of the research. In the questionnaire survey information was obtained from 814 enterprises throughout the whole country. It is to be noticed that at the majority of enterprises (249) technological innovation took place, which is followed by product innovation representing one fifth of the enterprises examined. Therefore, this dominant position of technological innovation cannot be questioned; nevertheless, it also logically raises the issue why it is the most determining innovation type with respect to enterprises. The explanation can be found in the interview survey of the research. In the research program 85 in-depth interviews were prepared with entrepreneurs. In these interviews we principally focused on understanding what the background of innovation processes is. One question related to the methodology of crisis management. It is noticeable from the survey that most enterprises tried to mitigate the impacts of the crisis by entering new markets. Moreover, the improvement of efficiency, cost cut, the introduction of new products and services also resulted in a decisive means of crisis management. However, all these may only be achieved by simultaneous technological development.

*** recognition of the importance of innovation by executives of companies, knowledge of the opportunities in innovation

¹ Examination of the factors affecting and accompanying innovation in national small and medium sized enterprises, research leader: Prof. Dr. Magdolna Csath – Kodolányi János University – head of department, university teacher, the project was implemented with the support of the National Office for Research and Technology

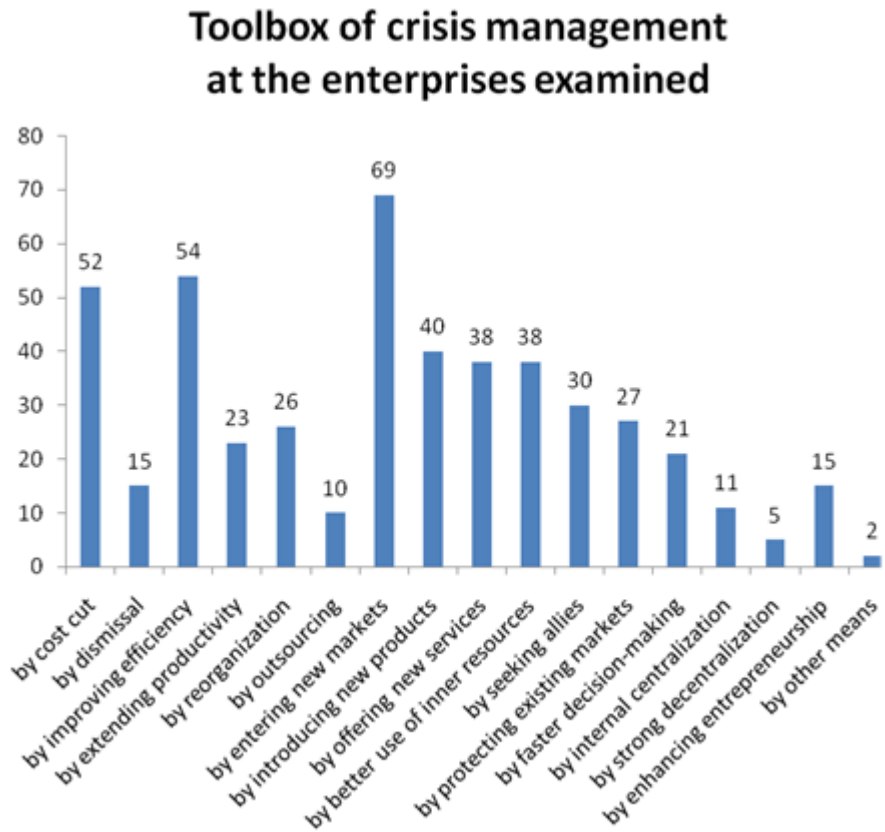


Figure 7: Toolbox of crisis management at the enterprises examined
Source: INNOTARS research program

Attention is further drawn to the importance of technology by the sources of competitiveness of enterprises. Most entrepreneurs consider quality, efficiency and novelty as key factors of competitiveness and uphold such opinion with respect to the future as well. Quality products can only be produced by appropriate technology and proper production processes.

	Today	In the future
quality	70	62
price	40	29
novelty	42	44
additional services	39	37
efficiency	46	44
cheapness	14	14
excellent process planning	37	32

Schedule 2: Key sources of competitiveness at the examined enterprises
Source: INNOTARS research program²

Similar answers were by the enterprises in another section, where enterprises were asked which factors usually motivate/help technological innovation within an enterprise. Most frequent answers highlighted struggle to subsist, efficiency, quality and gaining competitive advantage as key factors. All these answers resemble the observations made above in the course of this analysis. A large number of the enterprises participating in the interview survey did not claim national or EU aids to finance innovation processes. Nevertheless, those who did, mostly claimed aids for building constructions, asset or machinery supply, other technological developments, trainings, development of the ISO system and job maintenance. The largest proportion is represented again by technological development. Technological development also ranked highest with respect to innovations not related to products and services. Information technology developments (e.g. new hardware and software supply) as well as other technological developments played an important role in such innovations. However, the management has to face certain problems arising upon the constant change. In addition to examining factors helping innovation, factors preventing innovation were also analyzed in the interview survey. In the vast majority of enterprises, risk aversion or fear of changes may prevent new innovation processes to be developed. The more changes an enterprise makes, the more resistance it may

² Examination of the factors affecting and accompanying innovation in national small and medium sized enterprises, research leader: Prof. Dr. Magdolna Csath – Kodolányi János University – head of department, university teacher, the project was implemented with the support of the National Office for Research and Technology

probably face. Upon reviewing the results, the question can be answered whether it is rather permanency or continuity which enterprises need in their lives. Enterprises do not have an option in this respect. Continuity follows enterprises as far as they operate, since their economic environment is constantly changing, which is further enhanced by the accelerated technical technological development. However, permanency is necessary in ambits such as innovation, constant tracing of novelties or openness to novelties. Most enterprises cannot obviously create brand new technologies, thus, the majority may only take over or apply technological elements which are already available. Technological development may be regarded as continuity whilst adaptation to such development and constant innovation may result in as permanency in enterprises' lives. Such enterprise development theories need to be applied which take into account both continuous operation (to improve short term efficiency) and non-continuous changes in order to provide better opportunities for long term improvement among changing circumstances. To achieve the first goal, the enterprise's ongoing business activity is of importance, whilst innovation is highly topical when attaining the second objective. Simple and stable conditions, which allow specialization and facilitate planning, support short term efficiency. On the other hand, innovation requires and also leads to changes and wider scope of activities when inciting and forming new ideas. Flexibility and comprehensiveness are both required to establish favorable conditions also in the initial phase of the creative process, but also when discovering those new fields necessary to solve corporate problems. Efficiency and innovation are supplementary elements of the development of enterprises; however, solely one can prevail at a relevant moment. Permanency or continuity? Well, the one and only answer to this question is probably that both permanency and continuity are necessary for the successful operation of enterprises.

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