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**THE APPLICATION OF LIFE-CYCLE COSTING
(LCC) IN THE PLANNING OF INNOVATION
PROJECTS**

Findings of Doctoral Thesis

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Győr
January, 2011.

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1. THE MAIN FOCUS AND RESEARCH FIELDS OF THE DOCTORAL THESIS

The main focus of the thesis is forecasting the efficiency and the success of innovation projects by the help of life-cycle costing. There are still lots of unanswered questions in the field of business innovation and there is a constant change in the general opinion about it. Successful innovation may be the source of future profits, but a false R&D decision may have a deep negative effect on the future and on the situation of the business.

The business process of the converting of the innovative idea into a real profit-making product is a very lengthy process. The length of the business cycle increases the level of risk and uncertainty; this is why I suggest the implementation of methods, which make the risk manageable up to a certain level and make the planning of the process viable.. This suggested method is life-cycle costing.

According to the Federal Energy Management Bureau,¹ life-cycle costing is a cost controlling method, which is not only able to measure short-term profitability and return, but also summarizes the costs and revenues of the product for the whole life-cycle – starting with research and ending with the scrapping of production facilities.

¹ Fuller, S. – Petersen, S. (1995) Life-Cycle Costing Manual for the Federal Energy Management Program, Government Printing Office, Washington

The method is well-known and widely accepted. For example the BSI recommends its application since 2008 for the impact assessment and for the modeling of the financial and environmental future of buildings and constructed assets.² There are some countries, where the application of the method is a legal requirement for the planning of governmental projects. For example in Canada it is used for choosing the floor coverings in schools, public buildings and urban parks and areas.³

2. THE PROCESS OF RESEARCH AND LITERATURE REVIEW

The main aim of the research was to build up a business life-cycle model based on the methods of life-cycle costing that increases the forecasting certainty of the financial and market success of the innovation projects.

In the research:

- The literature review gives the theoretical background of the model.
- The research of business data supports the broadening of the model by including not only monetary items, but also out-of-balance-sheet elements.
- The personal surveys are to discover practical dimensions, which may increase the efficiency of the method and measure the way of possible applications of it.

As the result of the research I have defined a business life-cycle model, that is based on the basic assumptions of life-cycle costing known from the literature; and may further improve the efficiency of the planning of innovation projects.

I have started the research in 2007 using financial reports of the 10-year period between 1998 and 2007. The analysis of business data was followed by a questionnaire survey and group interviews. As the result of the dissertation workshop in February, 2010 the scope of the research got smaller and the database got updated. The new range of the research is based on the financial reports of the 10-year period between 2000 and 2009.

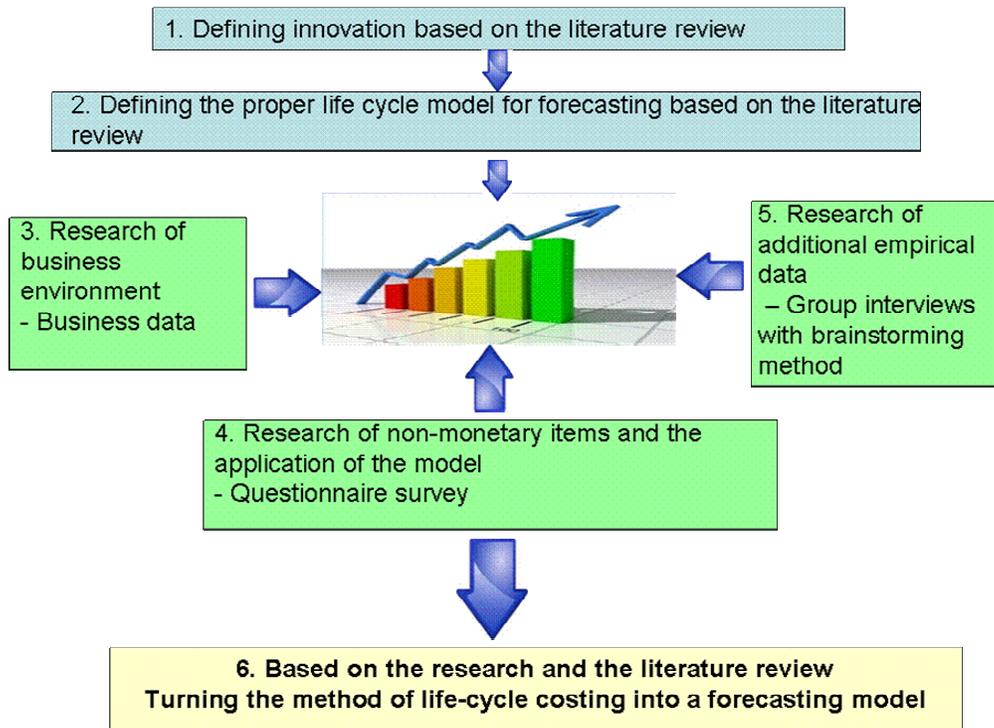
² BS ISO 15686-5:2008

³ Bishop, Jeff (2002) A Life-Cycle Cost Analysis for Floor Coverings in School Facilities, Institute of Inspection, Vancouver

The first step of the research was to make up an own definition for innovation projects and establish a business life-cycle model based on the summary of the literature review. **The novelty of the model lies in it's flow-chart structure, while the traditional methods all use linear and concentric cycle (cyclical chart) graph layouts.**

I have based my research questions of this flow-chart and established the hypothesis using those questions. As the result of the research, I have integrated the findings into the model with the aim of increasing the efficiency of business decisions. The process of the research is described in Fig.1.

Fig. 1: The Process of the Research



Source: Own work

3. THEORETICAL BACKGROUND AND LITERATURE REVIEW

The aim of the literature review was to summarize the most important publications covering the topic and to define the necessary theoretical background for the research.

In the literature review I was looking into the following questions:

1. Finding a definition for my business life-cycle method, based on the definition of life-cycle costing.
2. Defining the most optimal model for my own business life-cycle method, based on the life-cycle models.
3. Defining what business innovation means in my model, based on the definitions of innovation.
4. Defining such particularities of the innovations, which may help the research, and may refine the efficiency of the model.

I have divided the literature review into two major parts:

1. Reviewing life-cycle methods with the aim of establishing an own model for the business life-cycle method
2. Reviewing innovation with the aim of putting together an own definition for innovation projects.

3.1. THE REVIEW OF LIFE-CYCLE METHODS AND MODELS

Life-cycle costing is a long-term planning method that supports the planning of costs in every phase of the product life-cycle. Using the findings of the literature review I have defined my own business life-cycle model, which includes not only the costs, but also the benefits of every phase. That is why the method is able to forecast the future success of innovative projects.

There are several definitions for life-cycle costing. Some regard it as a simple cost calculation method; others describe it as a decisions support tool. There are three major challenges related to the model: (1) the uncertainty of long-term planning, (2) the impact of experience on the quality of planning and (3) the possible effects of out-of-plan future results.

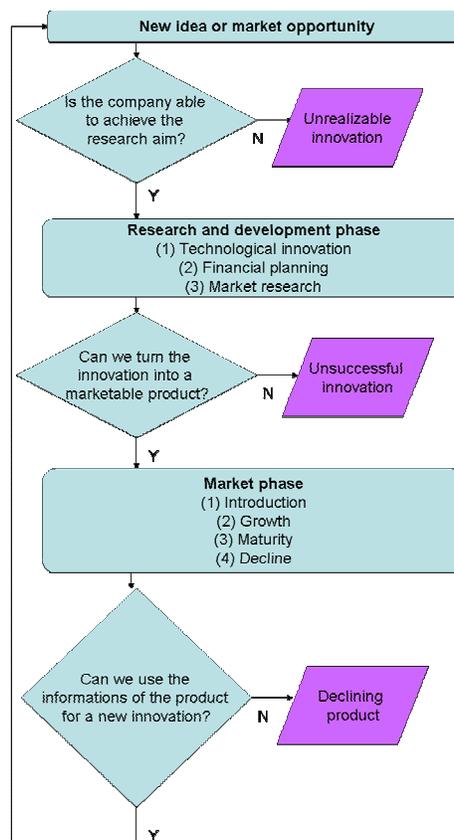
During the research I have observed not only costing methods, but also life-cycle methods of other academic fields. Based on the literature review I have made two major groups of those methods: (1) the methods using the traditional linear graph model and (2) the

methods using a cyclical chart to describe life-cycle phases. The vast majority of the methods belong to the first group.

Based on the literature review I have also established that the life-cycle models of marketing science are perfectly applicable for the analysis of business life cycles, since they describe the business and its environment, which is why they support decisions based on reality.

Using the observations of the literature review I have defined a model that may be the most optimal one for my business life-cycle method. It is based on the methods of marketing and controlling science, but has a very different approach. Since the aim of the research is to establish a forecasting and decision support process, the model is not a linear or cyclical graph, but a flow-chart. (Fig. 2.)

Fig.2: Own Business Life-Cycle Model



Source: Own work

The model consists of four phases that reflect the different planning and decision situations: (1) the phase of ideas, (2) the phase of research and development, (3) the

market phase and (4) the learning phase. The aim of the research is to add special elements to the model that would increase the efficiency of forecasting success and support the decision making in every part of the process.

3.2. ANALYZING INNOVATION DECISIONS

The main focus of the literature review of innovation was to make a summary and set up a definition for innovation projects of my own model. What is more, I have also listed the special fields of innovation for emphasized attention in my further research. Innovation became a strategic priority only in the 1900s, before that it was regarded as a basic function like production or transport. During the literature review I have found two basic approaches to define innovation: the approach to observe innovation (1) as an economy function or the approach to regard innovation (2) as an organization like function.

The main parts of the research were the following:

1. Innovation as a business function
2. The sources of innovation
3. The channels of new innovative products
4. The role of innovation in business and in the economy
5. What makes a research successful? In the literature review I have found three different ways to define success: (1) financial success, (2) marketing success and (3) strategic benefits.
6. The importance of innovation milieu

Based on the literature review I have defined innovation as follows:

(1) Innovation means the process of searching for newer and better solutions for products, services, methods or decision strategies.

(2) The innovative process itself is a pre-defined project, with clear technological and financial aims, and its planning contains a high level of uncertainty, with an unforeseeable future result.

(3) We can also define innovation as a long-term high-risk investment: the higher the uncertainty, the higher the potential profits of the new product.

(4) Successful innovation creates value added- it creates something new that has a more optimal answer to the market than anything else before - and not only in the sense of profitability and finance.

4. RESEARCH METHODOLOGY

When introducing the research, I have to mention that the field of the research got redefined after the dissertation workshop with different aspects and key topics. The reasons for that were the effects of the economic crisis and the over-diversified questions of the original dissertation.

I have started gathering business data in the last months of 2007 from annual financial reports. The scope of the research was to observe if the life-cycle costing methods were useful in the practice to forecast innovation. Based on the data of the past ten years I was able to describe clear trends. However, the annual reports of 2008 have changed everything.

In my case the economic crisis had a very deep effect on the whole plan and content of the research process. It came out that the importance of the key factors have changed and there are significant effects that we have underestimated in the past. What is more, it is not only true for the practice, but also for the publications in the topic. For example, we have witnessed a shift in the opinion about cash-flow, about financing and about the question of the planning methods based on the myth of sustainable development.

Why could it happen? The original research had a rather long range of data of ten years, so it was not only a snapshot of business reality. The literature review included only high quality works. The answer is best expressed with the words of Alan Greenspan: „The whole intellectual edifice... collapsed... since the data inputted to risk management models generally covered only the past two decades, a period of euphoria.”⁴

The other reason to redefine the research focus was that the original research was too diversified and included too many non-measurable items, which was also noted by the opponents.

⁴ Greenspan, Alan (2008) Congress Hearing 2008.10.23.

The new research focus was defined as follows:

- (1) The basic aim is to turn the original life-cycle costing method into a decision support model that increases the certainty of the planning process.**
- (2) As there are millions of companies and thousands of industries in the world, the research cannot cover all of them. The research group contains global companies that have a strong influence on the world economy and also on other companies.**
- (3) The aim of the doctoral research is to look into the topic in detail using a high-quality theoretic background and pose the questions that will shape business in the near future. Of course, the research is not able to give exact answers, since a PhD dissertation will never be able to compete with a high-budget survey of a consulting company like BCG, but it is still able to discuss topics on an academic level.**

The main difference between the newly defined and the original research topic is that the final version contains the maximum of measurable items and the minimum of non-measurable elements. The main part of the research is the analysis of secondary company data using my own pointer index ratios. This was supplemented by the questionnaire survey and by the experiences of the personal interviews made by the “brainstorming” method, giving additional information to the findings.

The major steps of the research were the following:

- Preliminary personal interviews to define the research fields (2006 – 2007)
- Business data analysis of the past 10 years (2007)
- Questionnaire survey of persons with business background (December, 2009)
- Personal interviews to test the findings of the previous parts (December, 2009 – January, 2010)
- Updating the business databank to the years of 2000-2009 (2010)

4.1. ANALYSIS OF SECONDARY DATA

From the beginning of the data recording I have realized that only those companies would have properly analyzable data, which is valid on the long run, where

comparability plays a significant role. Those are the companies registered on international stock exchanges.

The major requirements for the sample were reliability, comprehensiveness and comparability. That is why the research includes international companies

- (1) which report in an accepted accounting standard,
- (2) where we can make a comparison with the other companies in the sector and with the industry average,
- (3) where we have past audited data going back to several years and
- (4) which have the sufficient data for the research and analysis.

The method of data collection

- (1) Getting in touch with companies – about 100 firms included – for collecting annual reports, management reports and investor information
- (2) US SEC database – annual reports (10-K), quarterly results
- (3) Sector analysis of leading management consulting companies – Boston Consulting Group, Vanguard, etc.

The sectors included in the research are the following

Group 1: Importance of innovation in the sector

- (1) Major role – High-tech industries
- (2) Significant role - Automotive
- (3) Minor role – Energy (oil companies)

Group 2: The relationship with customers

- (4) Luxury goods
- (5) Non-cyclical companies
- (6) Industries defined by trends and fashion

Following the dissertation workshop in 2010, I have added an extra group of entities to the database: to analyze the relation between investor opinion and innovation I have also included the most innovative companies in the research. I used the annual ranking of Business Week and BCG for the years between 2009-2007 and I have chosen the top 20 of every list for the research. There are many companies that were already included in the

original research, but some firms were only added to this special field of observation. There are also two privately owned companies (Tata Motors, Reliance Industries) that do not have the data needed for the previous research questions.

At last, I have also defined a third aspect of observation and have chosen companies mostly from the previous two research fields for the analysis. The aim of this special research was to measure the role of the leading innovator, which is why I have sampled companies that had the necessary data available. For the subjectivity of this aspect – where we cannot express many items in numerical terms – my main criteria was to find companies with positive public adjudicate and where the most possible information was available.

In the additional groups I have included companies, where the influence of the personal factor was well-defined: (1) „cult brand” companies, (2) financial institutes, and (3) companies of financial scandals.

4.2. QUESTIONNAIRE SURVEY

Following the research of company data I have carried out a questionnaire survey. **The main focus of it was to control and upgrade the findings of the secondary data research.** That is why I considered all of the results of the previous tested researches as statements; and on the questionnaire the responders evaluated on a scale of five to agree or disagree with them.

The secondary focus of the questionnaire survey was to be able to express the point of view of decision-makers about innovation and business environment. The question was to establish a link between their opinion and the findings of the research. I have named it as an outstandingly significant part of the research, since the financial crisis of 2008-2009 has basically changed the approach and opinion about many fields of the business.

The survey was carried out in November, 2009 and in the final version of the dissertation, only the most important questions got included.

The questionnaires included business terms, which is why only the ones with business and financial background were able to understand and fill out the document.

The requirements for the ones included in the questionnaire survey:

- **A minimum of 3 years working experience in business enterprises.**
- **BA or MSc. in business administration or engineering**
- **Basic knowledge of innovation function**

I have asked between 370 to 400 persons to fill out the questionnaire, but the exact number is unknown because of the snowball research methodology. All together I have received 234 questionnaires, out of which 189 got approved in the first control process. **Finally, there were 127 pieces that met all of the requirements and were used in the statistics.**

4.3. PERSONAL SURVEY

In the personal survey I have asked about the items that needed supplementary data or were still unclear.

Those were the following questions:

- Did the economic crisis change the approach to innovation?
- Does the financial situation have a strong effect on the innovation strategy?
- Does the economic outlook have a strong effect on the innovation strategy?
- How does the technological background have an impact on innovation?
- What is the relationship between innovation and investor opinions?
- Is innovation a source of danger?
- Is there a relation between the company image and the investor opinions?
- Is there a relationship between financial success and successful innovation? How can we analyze it?
- Can we apply the life-cycle methods in practice?
- Is there a life-cycle approach to business decisions?

I have carried out the research among my acquaintances, including only those persons who had enough working experience to discuss the questions above. I have used personal and group interviews depending on the preferences of the people included in the research. I do find group interviews very useful, because that way I could also gather information from people who were unwilling to take part in a one-to-one personal interview. The interviews took place in December, 2009 and January, 2010 with 29 people all together.

5. HYPOTHESIS OF THE RESEARCH

The research aims at adding new elements to the basic model of life-cycle costing to make forecasting more precise and support decision making in every phase of the life cycle.

During the life-cycle phases I was looking into the following parts in detail:

- (1) Is the company able to carry out the research?
- (2) Can we turn the successful innovation into a marketable product?
- (3) Can we use the information gathered during the life-cycle of the product for further innovation projects?

I have made the analysis focusing on financial success and I have to mention that financial success does not mean technological success or marketing success in every case. My method is only able to forecast financial success and other methods are needed to analyze marketing or technological success.

During the research I have listed the elements that may help the process of financial forecasting and planning. I have analyzed companies to be able to describe their innovation strategy in detail and to be able to name the key factors that make an innovation successful.

Question 1: The economy is in constant change, which business cycle motivates innovation most.

H1: There is a relationship between economical expectations and the motivation for innovation: in the extremely high and extremely low phases of the economy cycles the companies are more ready for new researches.

Result: Hypothesis accepted.

Question 2: Are there cyclical changes in company innovation strategies and is it influenced by the innovation cycles of the sectors?

H2: Company innovation shows the same cyclical changes as the business cycles. There is a relationship between the innovation cycles of the sector and the companies.

Result: Hypothesis partly accepted.

Question 3: How can we define the link between the commitment for innovation and increasing profit producing capability?

H3: Innovation is the basis of future profits: the companies spending more on research may be able to earn higher profits. Based on the amount of investment in innovation we can forecast profits.

Result: Hypothesis accepted with alterations.

Question 4: Is it true that companies in better financial situation spend more on the innovation? Do the free capital resources and the strong financial background play an important role in motivating innovation?

H4: In the case of companies with significant capital; the available monetary resources assist the innovation. The companies with a high level of free capital are more ready to spend on innovation.

Result: Hypothesis rejected.

Question 5: Is there a connection between major innovation projects and investor opinion?

H5: Innovative companies have positive investor opinions and may show extraordinary increase in share prices.

Result: Hypothesis accepted.

Question 6: How can we describe the role of the personality of leading innovator in the success of the research projects?

H6: Although, we cannot express it in numerical terms, the company management, the personality of the leading innovator, and the motivated shareholders strongly influence the success of research and development and the life-cycle phases of the company.

Result: Hypothesis partly accepted.

Question 7: How can we describe the connection between the efficiency of variability management and the success of innovation?

H7: The success of every company is basically influenced by the attitude of the management towards changes. The companies that have a more open approach to changes may be more successful than the ones that reject paradigm shifts.

Result: Hypothesis accepted.

Question 8: How can we use the knowledge of false innovation projects?

H8: Companies win important information from the experience of unsuccessful innovation decisions and it can be used efficiently to influence the future of the company.

Result: Hypothesis accepted.

6. THE FINAL BUSINESS LIFE-CYCLE MODEL

The final model of business life-cycle model, defined as the result of this research assists designing not only the costs, but also the revenues, the investor opinion, and the non-monetary items that may influence the success of innovation projects.

The definition of innovation projects is included in the previous chapter of literature review.

Based on the research and the literature review, the following elements are to be considered when making an innovation decision:

1. Innovation planning: How to form the budget for the innovation and when is the status of the economy and the company optimal to start the project

Statements of the literature review:

- For research and development decisions, companies always start with ranking the projects for feasibility. The requirements are resources and financial background.⁵

Findings of the research:

- T 1.1. Technology-based industries, where the success of the company depends primarily on the continuous development; tend to speed up innovation when the economy is on the decline.
- T 1.2. If the financial crisis forces market leaders to cut production, the competitors will aggressively increase their innovation budget to exploit the opportunity to take over their market share.
- T1.3. In case of the companies, which are not in tech-based industries, there is no proven link between innovation budgets and business cycles.

⁵ Zäpfel, Günther (1989) Taktisches Produktions-Management, Johannes-Kepler-Universität Verlag, Linz pp.77

- T1.4. The companies offering special personalized services tend to cut their innovation budget in case of regression.
- T2.1. Tech-based sectors show constantly increasing innovation budgets, while other industries show cyclical changes in it.
- T2.2. The length and range of cycles is different for every type of industry.
- T2.3. There are no proven innovation cycles connected to the sectors, because every company shows different fluctuations.

2. How can we plan costs and revenues in the market period?

Statements of the literature review:

- According to Fuller, life-cycle means the period between the planning and the scrapping. We have to analyze the costs and benefits for each phase of the cycle, including net sales, extraordinary items and other income..⁶
- The length of useful life is always a question.⁷
- We can safely assume that with the passing of time we will have more knowledge of the product and so we will be able to minimize costs.⁸
- The constant changes in business and the shortening life-cycle of products increases the level of uncertainty.⁹
- The shortening life-cycle of products has a negative effect on profits: in 1996 the average profit rate of products was 16% , in 2006 only 10%¹⁰
- Research and production costs are on the rise. To get an IRR of 15% we had to reach 70% more sales in 2006 than we needed in 1996. ¹¹
- The contribution margin is on the decline and development costs are on the rise. For example, pharmaceutical companies had a 30% increase of research cost and 10% decline in contribution between 1996 and 2006. ¹²
- It takes less time to get into the phase of maturity: in 1996 a new drug needed 10 years to reach that phase, in 2006 only 6 years.¹³

⁶ Fuller, Siegelinde (2006) Life-Cycle Cost Analysis (LCCA). National Institute of Building Sciences, Charleston

⁷ Gözte, Uwe (2004) Kostenrechnung und Kostenmanagement. Springer-Verlag GmbH, Berlin

⁸ Gözte, Uwe (2004) Kostenrechnung und Kostenmanagement. Springer-Verlag GmbH, Berlin

⁹ Lawyer, Peter (2007) Payback: Making Innovation Count in Uncertain Times, In: IN VIVO, Vol. 25, No. 1., 2007 január, pp. 51-57.

¹⁰ Lawyer, Peter (2007) Payback: Making Innovation Count in Uncertain Times, In: IN VIVO, Vol. 25, No. 1., 2007 január, pp. 51-57.

¹¹ Lawyer, Peter (2007) Payback: Making Innovation Count in Uncertain Times, In: IN VIVO, Vol. 25, No. 1., 2007 január, pp. 51-57.

¹² Lawyer, Peter (2007) Payback: Making Innovation Count in Uncertain Times, In: IN VIVO, Vol. 25, No. 1., 2007 január, pp. 51-57.

- There are three different types of production costs: output-, input-, and process-oriented.¹⁴

Findings of the research:

- T3.1. There is no proven link between the volume of innovation budget and profitability. The companies spending more on research are not always the companies earning extra operating profits.
- T3.2. Although, innovation is the source of future benefits, we cannot plan the revenues of a new project with an expected rate of return. From the trends we can see that there is no sector-specific relationship between the volume of innovation budget and profitability.
- T3.3. There is an average research and development index for each sector, which is a very good basis for planning.
- T3.4. There is an average gross profit margin for each sector, which is a very good basis for planning.

3. What is the relationship between success of innovation, the strategy of financing and the level of free capital of the company.

Statements of the literature review:

- In each phase of the life-cycle there are different success factors. For new technologies, the ownership of the innovation is the key value driver in the beginning. In the phase of growth market share, production capacity and financial resources create value. In the phase of maturity and decline, the quality of service and cost efficiency is the important value drivers.¹⁵

Findings of the research:

- T4. There is no proven link between the success of innovation, the strategy of financing and the level of free capital of the company.

4. How can we forecast the changes in share prices and investor opinion in relation to new innovation projects?

Statements of the literature review:

¹³ Lawyer, Peter (2007) Payback: Making Innovation Count in Uncertain Times, In: IN VIVO, Vol. 25, No. 1., 2007 január, pp. 51-57.

¹⁴ Hoitisch, Hans-Jörg (1993) Produktionswirtschaft, Vahlen Verlag, München pp.55-56

¹⁵ Meffert, Heribert – Bolz, Joachim (1997) Internationales Marketing-Management, Kohlhammer, Stuttgart pp.164-165

- The benefit of leading innovation is the reward to get to the market first and earn extra profit. This opportunity ends with the competitors becoming able to copy the product. New innovation always creates new market chances.¹⁶
- In investment projects the future cash-flows are always uncertain. They are dependent on (1) the level of increasing of market demand and (2) the possibility of increasing production capacity.¹⁷
- There is a difference between company risk and project risk. Company risk comes from the features of the entity and the general situation of the sector. Project risk is very different: it comes from the dangers of the new investment decision. The financial risk of investment projects depend on the business environment, its dangers and opportunities.¹⁸

Findings of the research:

- T5.1. The investor opinion about innovation is positive, innovative companies generate extra returns in the stock exchange.
- T5.2 Revolutionary innovations may result in unexpectedly sharp increase in share prices.

5. How can we measure the impact of non-monetary items on the success of innovation?

Statements of the literature review:

- The life-cycle phase of the sector will influence the life-cycle of the new product.¹⁹
- In most part of the publications they nominate the individual entrepreneur, or the owner of a contrivance as the source of the innovation. But in reality innovation comes seldom from a genius but from good designed research.²⁰
- Leading innovators are not always the most successful companies, since the followers tend to win the market share instead of them.²¹
- Company culture and strategy plays an important role in the process of innovation. Competitors surely will be able to copy our new products sooner or later, both in

¹⁶ Rekettye, Gábor (1994): Nemzetközi marketing, Janus Pannonius Tudományegyetem, Pécs, pp. 186.

¹⁷ Kruschwitz, Lutz (2000) Investitionsrechnung, R. Oldenburg Verlag, München pp.297-305

¹⁸ Brealey, Richard A. – Myers, Stewart C. – Marcus, Allan J. (2001) Fundamentals of Corporate Finance, McGraw-Hill Primis Custom Publishing, Phoenix pp. 8-9, pp.422-423., pp. 469-480.

¹⁹ Taylor, Alex (2008) GM: Death of the American Dream, CNN Money, 2008.11.25.

²⁰ Drucker, Peter F. (1985) The Discipline of Innovation, In: The Innovative Enterprise, 2002 August, pp. 95-103.

²¹ Henderson, Bruce D. (1974): Die Erfahrungskurve in der Unternehmensstrategie, Springer, Frankfurt pp.19

technology, efficiency and price. But they will never be able to imitate our company culture. That is what makes us unique and different.²²

- Most of the companies tend to forget that successful innovation stems from the maturity of the organization.²³

Findings of the research:

- T6.1. Those companies which have a reputation that is strongly linked to the leading innovator, or manager, will always endure negative or positive changes in the public opinion because of those persons.
- T6.2. The lack of well-known leading innovator does not mean the lack of success.
- T7.1. The relationship of the managers and leading innovators to the entity itself will basically influence business success.
- T7.2. The companies more open to technological and business changes and to paradigm shifts will surely be more successful.

6. How can we use the findings of false innovation decisions?

Statements of the literature review:

- Unexpected situations lead to out-of-ordinary decisions and they may be the source of new innovation.²⁴
- Discovering and rethinking misconceptions also may result in new innovations.²⁵

Findings of the research:

- T8.1. The information from false decisions may be used in future innovation decisions.
- T8.2. Mostly, decision-makers are unable to learn from their past failures, although they could gather special information from it, which might minimize the uncertainty of the future.

7. Additional information regarding business approach

- Decision-makers are strongly influenced by the experience of the past economic crisis.
- According to the research, decision-makers are well aware of the importance of the influence of the regional environment.

²² Porter, Michael E. (1996): What is Strategy? In: Harvard Business Review, 1996 November/December, pp. 58-79.

²³ Pervaiz, K. Ahmed (1998): Culture and climate for innovation, In: European Journal of Innovation Management, Vol. 1., 1998/1. pp. 30-43.

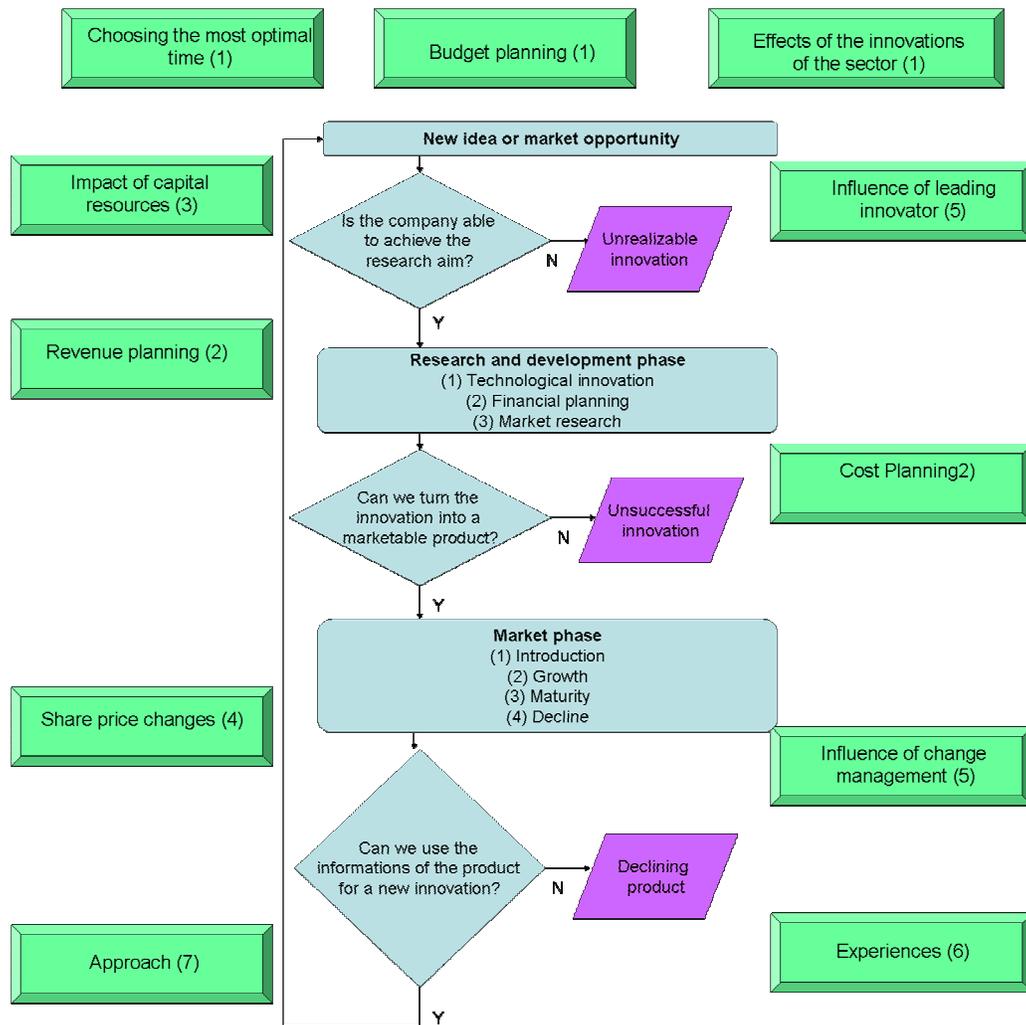
²⁴ Drucker, Peter F. (1985) The Discipline of Innovation, In: The Innovative Enterprise, 2002 August, pp. 95-103.

²⁵ Drucker, Peter F. (1985) The Discipline of Innovation, In: The Innovative Enterprise, 2002 August, pp. 95-103.

- Operative decisions are mostly based on short-term data.

The following chart is a summary of the findings for the business life-cycle model:

Fig. 3.: The Complete Business Life-Cycle Model for Innovation Projects



Source: Own work

7. POSSIBLE FUTURE RESEARCH FIELDS

In the near future, I am planning to get into a more detailed research about the fluctuations of **stock exchange rates**, using longer data ranges and analyzing the deeper impacts of business cycles. The second most important question is the **impact of taxation on innovation**, the role of innovation tax incentives in the location of new research centers. As the part of this

research it may be also significant to look into the following question: do international companies relocate service centers after the expiry of the those incentives or does the **local regional environment** have a retaining power that is able to compensate for the loss of tax credit? The third opportunity for future research is the **setting up of a complex financial ratio system for innovation**, that is able to measure and compare the efficiency of innovation using financial data..

8. PUBLICATIONS AND CONFERENCES

8.1. CONFERENCE PRESENTATIONS IN HUNGARIAN

- 1) Zsellér Orsolya (2005) A Shareholder Value Management új kihívásai: a marketing kommunikáció szerepe a vállalatértékelésben, a PARMALAT – botrány, ami megváltoztatta az információba vetett hitet. (0-16 ppt diakép) Előadás a Dunaújvárosi Főiskola „Tudás – etika – felelősség” c. konferencia „Pénzügy” szekciójában, Dunaújváros 2005. november 21-25.
- 2) Katona Ferenc – Vinkler Béláné – Zsellér Orsolya (2005) Globalizáció – fejlődés – kockázatok (0-13 ppt diakép) Előadás az MTA VEAB által szervezett „Fenntartható fejlődés, fenntartható társadalom és integráció” c. tudományos konferencia 4. szekciójában, 14. Komáromi Napok, 2005. április 28.
- 3) Zsellér Orsolya (2006) Az innováció szerepe a vidéki térségek versenyképességében. (0-18 ppt diakép) Előadás az EMTE Sapientia Egyetem által szervezett „CORK +10, Vidéki térségek – megújuló szerepek” című konferencián, Csíkszereda, 2006. október 15-19.
- 4) Zsellér Orsolya (2006) Innovációs költségek tervezése és vizsgálata. (0-12 ppt diakép) Előadás a Dunaújvárosi Főiskola által rendezett „Közgazdaságtudományi, Vezetés- és Vállalkozástudományi konferencia „Pénzügyi és számviteli folyamatok a gazdaságban” szekciójában. Dunaújváros 2006. november 16.
- 5) Zsellér Orsolya (2006) Az innováció szerepe a vállalat értékelésében – értékalapú innovációs stratégiák. (0-16 ppt diakép) „Közgazdaságtudományi, Vezetés- és Vállalkozástudományi konferencia „Értékelemzés feladatai a gazdaságban” szekciójában. Dunaújváros 2006. november 16.
- 6) Zsellér Orsolya (2006) Költségsökkentés a mezőgazdaságban az alternatív energia alkalmazásával. (0-18 ppt diakép) Előadás a Károly Róbert Főiskola által a X. Nemzetközi Agrárökonómiai Napok alkalmából rendezett konferencia „Biomassza és bioenergetika” szekciójában, Gyöngyös 2006. március 30.
- 7) Zsellér Orsolya (2006) Az életciklus költségelemzés alkalmazása mezőgazdasági vállalkozások esetében. (0-14 ppt diakép) Előadás a Károly Róbert Főiskola által a X. Nemzetközi Agrárökonómiai Napok alkalmából rendezett konferencia „Mezőgazdasági számvitel és agrárstatisztika” szekciójában, Gyöngyös 2006. március 31.
- 8) Zsellér Orsolya – Horváthné Fábíán Myrtil (2006) Fenntartható várostervezés költségkontrolling módszerek segítségével. (0-17 ppt diakép) Előadás az MTA VEAB által szervezett „Városterzési Egyenlőtlenségek Európában”. c. konferencia 4. szekciójában, 15. Komáromi Napok, Komárom, 2006. április 26.
- 9) Zsellér Orsolya (2006) Off-shoring és költséghatékonyság. (0-19 ppt diakép) Előadás a Veszprémi Egyetem által szervezett Pannon Gazdaságtudományi Konferencia B. „Nemzetközi Gazdasági és Pénzügyi Folyamatok szekciójában, Veszprém 2006. június 2.
- 10) Zsellér Orsolya (2006) A Reilly-féle gravitációs modell alkalmazása a telephely-választási döntéseknél. (0-12 ppt diakép) Előadás a „Bevásárlóközpontok jelene és jövője” c. nemzetközi konferencia 2. Bevásárlóközpontok üzemeltetési kérdései c. szekciójában. Selye János Egyetem, Révkomárom, Szlovákia, 2006. november 9.
- 11) Zsellér Orsolya (2008) Fogyasztói kultúra és marketingkommunikáció (0-14 ppt diakép) Előadás az „Értékek és normák interdiszciplináris megközelítésben” c. Konferencia 5. Értékek és normák a gazdaságban szekciójában, Budapest 2008. szeptember 22-23.
- 12) Zsellér Orsolya Veronika – Bankó Borbála (2009) Stabilitás vagy stagnálás – problémák, vagy kihívások. (0-16 ppt diakép). Előadás „A Világméretű pénzügyi és hitelpiaci válság és Magyarország” c. konferencia 3. szekciójában, 18. Komáromi Napok, MTA VEAB, Komárom 2009. április 27.

13) Zsellér Orsolya Veronika (2010) A marketing és az innováció, mint a regionális politika alapelemei – a regionális környezet hatása az üzleti vállalkozások fejlődésére. (0-18 ppt diakép) Előadás a „Politikai régió – régiópolitika” c. konferencián, Győr, 2010. március 5.

8.2. CONFERENCE PRESENTATIONS IN FOREIGN LANGUAGE

14) Zsellér Orsolya (2005) Governmental advertising projects for alternative energy resources as an investment in the future, (0-8 ppt Presentation) 'Átalakulási Folyamatok Közép-Európában' Conference 1. Section of 'Versenyképesség az új európai gazdasági térben', Organised by the Széchenyi István Egyetem Jog- és Társadalomtudományi Kara Multidiszciplináris Társadalomtudományi Doktori Iskola, Győr 2-3rd December 2005

15) Orsolya Zsellér (2006) Marketing Costs and Efficiency in Heritage Tourism: The Activity of Heritage Funds. (0-15 ppt Presentation) 'Tourism as a Meeting Ground of Cultures' Conference, Organised by The Kodolányi János University College, Székesfehérvár and the October 6 University, Giza, Egypt, Siófok 4-6th September, 2006

16) Gyulaffy Béláné dr - Orsolya Zsellér (2006) Castles and stately homes as symbols of the Hungarian culture. (0-27 ppt) 'Tourism as a Meeting Ground of Cultures' Conference, Organised by The Kodolányi János University College, Székesfehérvár and the October 6 University, Giza, Egypt, Siófok, 4-6th September, 2006

17) Orsolya Veronika Zsellér (2010) The Changing Business Environment and Innovation. (0-12 ppt) IBS Scientific Workshop, Budapest, 26th November 2010

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19) Zsellér Orsolya (2005) A Shareholder Value Management új kihívásai: a marketing kommunikáció szerepe a vállalatértékelésben, a PARMALAT – botrány, ami megváltoztatta az információba vetett hitet (643-649. o.) In: dr. Buza Antal (szerk.) „A Dunaújvárosi Főiskola Közleményei XXVII/II” ., Dunaújvárosi Főiskola, Dunaújváros 2006. ISSN: 1586-8567

20) Katona Ferenc – Vinkler Béláné – Zsellér Orsolya (2005) Globalizáció – fejlődés – kockázatok. (156-163. o.) In: Beszteri B.– Szabó P. (szerk.): „Fenntartható fejlődés, fenntartható társadalom és integráció” c. tanulmánykötet , KJF–MTA VEAB, Székesfehérvár, 2005. ISBN 963-9558-48-6

21) Zsellér Orsolya (2006) Az innováció szerepe a vidéki térségek versenyképességében. In: EMTE Sapientia Egyetem „CORK + 10, Vidéki térségek – megújuló szerepek” konferencia CD kiadványában, Csíkszereda, 2006. november

22) Zsellér Orsolya (2006) Költségcsökkentés a mezőgazdaságban az alternatív energia alkalmazásával. Gyöngyös, In: Király Zsolt – Lakatos Márk – Rajnai Renáta (szerk.) a Károly Róbert Főiskola által a „X. Nemzetközi Agrárökonómiai Napok” alkalmából rendezett konferencia összefoglalójában és CD kiadványában, Food and Agriculture Organization of the United Nations és Károly Róbert Főiskola Gyöngyös 2006 március. ISBN 963-229-623-0

23) Zsellér Orsolya (2006) Az életciklus költségelemzés alkalmazása mezőgazdasági vállalkozások esetében. In: Király Zsolt – Lakatos Márk – Rajnai Renáta (szerk.) a Károly Róbert Főiskola által a „X. Nemzetközi Agrárökonómiai Napok” alkalmából rendezett konferencia összefoglalójában és CD kiadványában, Food and Agriculture Organization of the United Nations és Károly Róbert Főiskola Gyöngyös 2006 március. ISBN 963-229-623-0

24) Zsellér Orsolya – Horváthné Fábián Myrtil (2006) Fenntartható várostervezés költségkontrolling módszerek segítségével, In: Józsa László - Rechnitzer János - Varsányi Judit - Beszteri Béla(szerk.) „Versenyképesség és regionalitás - Megújulási válság és leküzdése” c. konferencia kiadvány, Veszprém-Győr, 2006. április, ISBN: 963 7385 80

25) Zsellér Orsolya (2006) Innovációs költségek tervezése és vizsgálata. (520-528. o) In: Dunaújvárosi Főiskola Konferencia Közleményei XXVIII./II. Dunaújvárosi Főiskola, Dunaújváros 2006. november . ISSN: 1586-8567

26) Zsellér Orsolya (2006) Az innováció szerepe a vállalat értékelésében – értékalapú innovációs stratégiák. (286-295. o.) In: Dunaújvárosi Főiskola Konferencia Közleményei XXVIII./II. Dunaújvárosi Főiskola, Dunaújváros 2006. november . ISSN: 1586-8567

- 27) Zsellér Orsolya (2006) Off-shoring és költséghatékonyság. (B/2. fejezet kiegészítés: technikai hiba miatt kimaradt cikk) In: Szentes Balázs (szerk.) „Tudás és versenyképesség pannon szemmel” c. konferenciakötet, Pannon Egyetemi Kiadó, Veszprém 2006. ISBN: 963-9696-03-X
- 28) Zsellér Orsolya (2006) A Reilly-féle gravitációs modell alkalmazása a telephelyválasztási döntéseknél. In: Sikos T. Tamás (szerk.) „Bevásárlóközpontok jelene és jövője” (296-307. o.) Selye János Egyetem Kutatóintézete, Komárom 2007. ISBN: 978-80-9234-33-2
- 29) Zsellér Orsolya (2007) Nemzetközi számviteli és beszámolási szabványok: az IFRS és a US-GAAP. Főiskolai jegyzet.(0-94.o.) Dunaujvárosi Főiskola, Dunaujváros, 2007. május
- 30) Zsellér Orsolya (2007) Adózás Magyarországon és az Európai Unióban. Főiskolai jegyzet. (0-97.o.) Dunaujvárosi Főiskola, Dunaujváros, 2007. május
- 31) Zsellér Orsolya (2007) Értékalapú pénzügyi menedzsment. Főiskolai jegyzet.(0-78.o.) Dunaujvárosi Főiskola, Dunaujváros, 2007. szeptember
- 32) Zsellér Orsolya (2008) Fogyasztói kultúra és marketingkommunikáció. In: S. Nagy Katalin és Orbán Annamária (szerk.) „Értékek és normák interdiszciplináris megközelítésben” (649-658.o), Gondolat Kiadó, Budapest 2008. ISBN:978-963-693-028-8
- 33) Zsellér Orsolya Veronika – Bankó Borbála (2009) Stabilitás vagy stagnálás – problémák, vagy kihívások. In: Majoros P. – Zimler T. (szerk.) „Az MTA Veszprémi Területi Bizottság-, Jog- és Társadalomtudományi Szakbizottság által 2009. április 27-én, Komáromban rendezett tudományos konferencia előadásai” c. konferencia kiadvány. MTA VEAB, Veszprém 2009.
- 34) Zsellér Orsolya Veronika (2010) A marketing és az innováció, mint a regionális politika alapelemei – a regionális környezet hatása az üzleti vállalkozások fejlődésére. (315-321.o.) In: Benkő Péter (szerk.) „Politikai régió – régiópolitika” c. konferenciakötet, Deák Kiadó, Budapest, 2010. március, ISBN: 978-963-88797-0-7

8.4. PUBLICATIONS IN FOREIGN LANGUAGE

- 35) Zsellér Orsolya (2005) Governmental advertising projects for alternative energy resources as an investment in the future, In: Rechnitzer János (szerk.) Széchenyi István Egyetem Jog- és Gazdaságtudományi Kar Évkönyv, Győr 2006. ISSN: 1787-9698
- 36) Orsolya Zsellér (2006) Marketing Costs and Efficiency in Heritage Tourism: The Activity of Heritage Funds. In: ‘Tourism as a Meeting Ground of Cultures’ Conference CD, Kodolányi János University College, Székesfehérvár, October 2006.
- 37) Gyulaffy Béláné dr - Orsolya Zsellér (2006) Castles and stately homes as symbols of the Hungarian culture. In: ‘Tourism as a Meeting Ground of Cultures’ Conference CD, Kodolányi János University College, Székesfehérvár, October 2006.