

DAWID SZUTOWSKI



Innovation and Market Value:

the Case of Tourism Enterprises

Difin

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Introduction

In contemporary economics only one thing is constant – constant change [Gunday et al., 2011]. The notion of change relates directly to innovation. The very nature of innovation constitutes combining existing factors in a new, changed way. Since the early stage of the scientific investigation of innovation research has focused mainly on the solutions actually implemented [Schumpeter 1939]. Yet it is only through implementation that the benefits of innovation may materialise. The task is not simple. The process of obtaining the gains is complex as innovation may pass through different stages. Thus for almost half-century the scientific community has considered innovation to be a complex process and not just a simple occurrence [Myers and Marquis 1969]. Innovation pushes progress forward. Thus previous scientific investigation limited the concept of innovation to implementations which generate positive effects [Nelson and Winter 1982]. The above scientific considerations still hold today [Moss Kanter 2006].

Innovation is of crucial importance for tourism companies, which cover accommodation for visitors, food and beverage serving activities, passenger transportation, travel agencies and other reservation activities, cultural activities, sports and recreational activities and retail trade of country-specific tourism characteristic goods [UNWTO 2010]. It provides them with competitive advantage and hence the firms with market power gain more from innovation [Tirole 1995]. A firm's innovation interacts with the environment. It delivers diverse benefits to the consumers in the form of new products and lower prices which in turn impact positively on the company [Shiller 2006]. In the context of tourism the ongoing scientific discussion on innovation seems not to have achieved any definite conclusions yet.

The implementation of innovation in tourism enterprises leads to the achievement of diverse ends. From this point of view the measurement of the effects of innovation is of vital importance. There are a number of financial measures covering substantially different fields. The most comprehensive amongst them is a company's value. It covers all the aspects of a company's activity [Bodie

and Merton 2000]. However due to its importance and complexity numerous approaches to company value were created.

The basic distinction covers book and market value based approaches. The proponents of book value assume that the balance sheet yields a reliable estimate of the value of assets and equities. However numerous shortcomings emerge: the static character, dealing with historical figures, failing to include intangibles and treating all classes of accounts as having equal importance [Nunes 2003]. The market value based approach stands for the price that assets would fetch in the marketplace [Fabrozi and Drake 2009]. It uses actual data (actual prices, not estimations), includes the value of all of a business's operating assets and does not rely on explicit forecasts [Hitchner 2006]. The comprehensiveness and the up-to-date character of the market value-based approach determine its strong support in extant literature [Milburn 2008; Fabrozi and Drake 2009].

Tourism company market value (MV) represents the sum of claims of equity holders and creditors and it is composed of the market value of equity and the market value of debt [Damodaran 2012a]. In the context of measuring the effects of innovation on the market value, the market value of debt may be problematic. Not many companies issue publicly traded bonds and they are traded infrequently in comparison to common stock. For public companies the market value of equity changes frequently and is publicly available. Its change constitutes the best approximation of change in a company's market value resulting from innovation [Berk et al. 2014]. The extant literature delivers support for such an approach [Frykman and Tolleryd 2003; Damodaran 2012a]. For public tourism companies it materialises in the share prices [Appolloni et al. 2011]. In the light of the above discussion the market value of equity may be defined as the product of the number of shares outstanding and their current price. In a situation in which the number of shares remains constant the changes in their price represent the changes in the market value of equity [Grossman and Livingstone 2009; Damodaran 2012a].

For publicly traded tourism companies the market value of equity fluctuates due to new information hitting the market [Fama and French 2007]. The process of communication is essential in shaping stock prices. The vast majority of investors rely on publicly available information which increases the ranking of a company's announcements. Furthermore companies actively manage their communication policies and voluntarily disclose positive news expecting affirmative market reaction. Thus the role of innovation announcements is critical for two reasons: their ability to shape stock prices and their voluntary disclosure and accessibility. In the extant literature the approach consisting of analysing

the impact of publicly available announcements on the market value of equity is strongly advocated and widely used in empirical research [Pauwels et al. 2004; Sharma and Lacey 2004; Sorescu, Shankar and Kushwaha 2007; Hanssens, Rust and Srivastava 2009].

The relationship between innovation and the market value of tourism enterprises may be explained based on the fundamental economic rule that higher returns involve higher risk [Hay and Morris 1979]. Most empirical findings advocate that innovation indeed stimulates growth in market value as investors seem to be optimistic about the news concerning innovation [Sorescu 2012]. However there are a few studies, also in the context of tourism, indicating the opposite [Zach, Krizaj and McTier 2015]. It suggests the existence of a number of unsuccessful innovation announcements for which the market judges the risk to outweigh the benefit which results in the decrease in the market value of equity. The previous research delivered the important conclusion that innovation is an important predictor of changes in market value of equity [Hall 1998]. However substantial research gaps remain.

The relationship between innovation and market value is not straightforward. Numerous variables determine the magnitude of market value fluctuations. In the context of tourism the previous research covered the type of innovation but failed to deliver consistent indications on the magnitude of the effects generated by particular types [Nicolau and Santa-Maria 2013a; Zach, Krizaj and McTier 2015]. In the context of services there were no definitive clues to the predictors of market value. According to the author's knowledge, only two pieces of research included more than three predictors [Meng, Zhang and Wei 2015; Dotzel, Shankar and Berry 2013]. In the light of the results of previous studies it seems that the sets of predictors were insufficient to precisely represent the relationship as the research delivered different conclusions. The definitive set of predictors of changes in market value is still to be developed.

Most of the previous research studying the impact of innovation announcements on the market value of equity focused on the manufacturing sector [Ehie and Olibe 2010]. The relatively small number of studies in the service sector resulted in little scientific coverage of its specificities. It concerns especially tourism as the main scientific teaching seemed to neglect it [Hjalager 2002]. The existing scientific evidence covering exactly the impact of innovation announcements on the market value of equity of tourism enterprises is small [Nicolau and Santa-Maria 2013a; Zach, Krizaj and McTier 2015]. Also the research devoted to innovation concentrated on the high-tech industries, which left the low-tech ones examined to a relatively small extent. The impact of innovation on low-tech

service companies such as tourism companies is largely uncharted. The scientific gap is especially important considering the importance of tourism in the economy of the European Union.

Europe is the most visited region in the world with international tourist arrivals reaching 582 million and receipts at euro 383 billion [UNWTO 2016a]. The receipts are estimated to maintain a constant growth of approximately 3% per year until 2025 [UNWTO 2016b; World Travel and Tourism Council 2016]. The direct contribution of travel and tourism to the GDP of European Union constituted 3,5% in 2015 and the total contribution was significantly higher and was 9,6%. Travel and tourism supported directly almost 14 million jobs which represented 3,6% of total employment. The total contribution was even greater and surpassed 36 million jobs, which constituted 9,1% of total employment. In terms of investment travel and tourism brought about 4,8% of the total investment in European Union [World Travel and Tourism Council 2016].

In the light of the ongoing scientific discussion important research gaps remain. First, the effects of innovation announcements on the market value of equity of tourism enterprises were not clearly proved. Second, there are no definitive clues as to the predictors of the changes in the market value of equity. A comprehensive study attempting to represent this complex relationship is still missing. Thus inclusive research building on a sound theoretical background and depicting the impact of innovation on the market value in tourism is of vital theoretical and practical importance.

Based on the above considerations the research problem is expressed in the following question: what is the relationship between innovation announcements and the market value of equity of tourism enterprises?

The main objective of the research is to measure the short- and long-term impact of innovation announcements on the market value of equity of tourism enterprises. To complement the main objective the following supplementary objectives were formulated:

1. Building a sound theoretical background by the identification of the position of innovation in economic theories.
2. Conceptualisation of innovation with special regard to innovation in tourism.
3. Critical assessment of the existing approaches to company value and indication of the most appropriate approach from the point of view of the impact of innovation.
4. Synthesis of the extant research on the impact of innovation on the market value of enterprises in the service sector with a particular focus on tourism.

5. Creation of a model representing the relationship between innovation announcements and the market value of equity of tourism enterprises.
6. Verification of the predictors of the changes in the market value of equity of tourism enterprises resulting from innovation announcements.

The analytical framework of the present research draws on the current scientific discussion of the efficiency of capital markets. It seems that nowadays the assumption that the stock prices always fully reflect all available information cannot be adopted without in-depth consideration. In this research the theoretical foundation included five modifications: lack of the absolute investor rationality, long-time adjustments of the initial reaction, existence of insider information, presence of the momentum effect and different efficiency levels of capital markets [Fama and French 2007; Kaestner 2006; Stockl 2014; Carhart 1997; Kristoufka and Vosvrda 2012].

In order to construct the sound theoretical representation of the relationship studied the systematic model-building procedure was adopted. It covered the synthesis of the existing scientific evidence on the subject and the addition of the theoretically related predictors of the market value of equity being the author's propositions. The comprehensive construction of the author's model connects innovation-level variables, firm-level innovation-related variables, interaction and second-order effects and control variables. The model covers such predictors of changes in market value of equity such as: patent, CSR, type, degree of novelty, source, stage and communication of innovation and R&D intensity and the innovativeness of the implementing company. It includes also the second-order effect of R&D intensity and the interaction effect between innovativeness and R&D intensity. The control variables include industry, size, volume, total cash dividend, operational experience, leverage, return on equity and growth.

Taking into account the research gaps in extant literature and the adopted theoretical background and in order to fulfil the above objectives the empirical study examined the changes in the market value of equity resulting from the innovation announcements of tourism enterprises. The examination was based on the author's model representing the relationship. Its first part concerned the general impact of innovation announcements while the second focused on the predictors of market value of equity. In respect of the model the following groups of hypotheses were formulated:

1. The impact of innovation announcements.
 - H1. There is a positive relationship between innovation announcements and the market value of equity of tourism enterprises.

- H2. The impact of innovation announcements on the market value of equity of tourism enterprises is immediately and fully incorporated in stock prices.
- H3. No information leakage and dissemination occur in the period preceding the announcement.
- H4. The positive change in the market value of equity resulting from the successful innovation announcement is bigger in absolute value than the negative change resulting from the unsuccessful one.
- 2. Prediction of the impact of innovation announcements.
 - H5. Innovation-related company-level variables predict the changes in the market value of equity above and beyond the effect of the control variables.
 - H6. Innovation-level variables predict the changes in the market value of equity above and beyond the effect of the control and innovation-related company-level variables.
 - H7. Interaction and second-order effects predict the changes in the market value of equity above and beyond the effect of the control, innovation-related company-level and innovation-level variables.
- 3. Innovation-level predictors.
 - H8-1. There is a positive effect of patents on the changes in the market value of equity resulting from innovation announcements.
 - H8-2. Innovation's CSR elements contribute positively to the changes in the market value of equity resulting from innovation announcements.
 - H8-3. The effect of product innovation on the changes in the market value of equity resulting from innovation announcements is greater than that of other innovation types.
 - H8-4. A positive relationship exists between the innovation's degree of novelty and the changes in the market value of equity resulting from innovation announcements.
 - H8-5. The effect of innovation developed in-house on the changes in the market value of equity resulting from innovation announcements is smaller than that of innovation from other sources.
 - H8-6. A positive relationship exists between the innovation stage and the changes in the market value of equity resulting from innovation announcements.
 - H8-7. The effect of the first innovation announcement on changes in the market value of equity is greater than that of the second and further announcements.

4. Firm-level innovation-related predictors.
 - H9-1. The stronger the firm's R&D intensity the greater the change in the market value of equity resulting from innovation announcements.
 - H9-2. A firm's innovativeness is positively related to the changes in the market value of equity resulting from innovation announcements.
5. Interaction and second-order effects.
 - H10-1. There is an interaction effect between R&D intensity and innovativeness in the context of the changes in the market value of equity resulting from innovation announcements.
 - H10-2. There is a negative effect of the squared R&D intensity on the changes in the market value of equity resulting from innovation announcements.

The empirical study examined the impact of innovation announcements on the market value of equity of tourism enterprises according to the author's own analytical framework. The subjects of the analysis were the changes in the market value of equity resulting from the innovation announcements of tourism enterprises. The time frame ranged between February 2011 and February 2016. The spatial scope covered the 28 European Union member states. The announcements released for the total of 111 tourism companies listed on the most important stock exchanges in Europe were analysed. The precise content analysis of the 9.000 innovation announcements allowed the assessment of their substantial value in the light of the present research. Sample size was calculated based on three approaches: the power of the chosen methods to detect abnormal changes in market value of equity, applicability of the model verification methods and the ability to generalize results. The representative sample included 398 observations.

The research is built on the literature on innovation driven and Neo-Schumpeterian economics. It includes classical and recent publications on the efficiency of capital markets and the approaches to company value. It employs the previous research on the relationship between innovation and market value in services with special regard to tourism. The empirical research exploits such diverse sources of information on innovation as: Factiva, Eikon, ProQuest and Amadeus databases. The data on the changes in market value of equity was obtained through stock exchange databases. Any missing data was filled in the direct contact with companies.

The empirical research covered the short- and long-term effects of innovation announcements which required the precise selection of the research methods. In

the short-term investigation the event-study method was employed. In the long term the research relied on the buy-and-hold abnormal returns method. The selected methods were widely used to determine the impact of announcements on the changes in market value. The short-term cumulative abnormal returns were used amongst others by Sood and Tellis [2009] and Rao, Chandy and Prabhu [2003]. The long-term buy-and-hold abnormal returns were employed by Sorescu, Chandy and Prabhu [2007]. In order to calculate the changes in the market value of equity the research employed the concept of abnormal returns. In the light of previous considerations if the number of shares is constant in the period, the changes in share price become the right proxy for the changes in market value of equity.

In the event-study the expected returns were calculated with the use of a Carhart four-factor model to account for the momentum effect [1997]. Furthermore the abnormal returns were standardised which led to more powerful tests [Dodd and Warner 1983]. The length of the event windows (the periods in which the changes in the market value of equity were analysed) was determined based on the significance of a single days' abnormal returns. The firms' BHARs were calculated against the main stock index. The length of the periods under investigation was adopted based on the previous research. The statistical significance of the changes in the market value of equity was verified with the use of the Z-test [MacKinlay 1997] and two groups difference of means test [Cowan and Sergeant 2001].

The empirical research resulted in the calculation of the equal number of changes in the market value of equity in the short and long term which called for the selection of the data analysis methods. In order to capture the patterns emerging from the data the changes in the market value of equity were described with use of such statistical measures as: central tendency, dispersion, skewness and peakedness. The author's model and the significance of single predictors of changes in the market value of equity were tested through the joint application of response surface regression and hierarchical regression.

This research builds on the theoretical background of innovation and market value. It introduces the author's model and tests it empirically. The book is divided into five chapters. Figure 1.

The first chapter discusses the evolution of the approaches to innovation in the world. The investigation constitutes the basis for introducing the definition of innovation for the purpose of the present book. It sets innovation in the framework of economic theories. It analyses innovation in the service sector and scrutinizes the research on innovation in tourism.

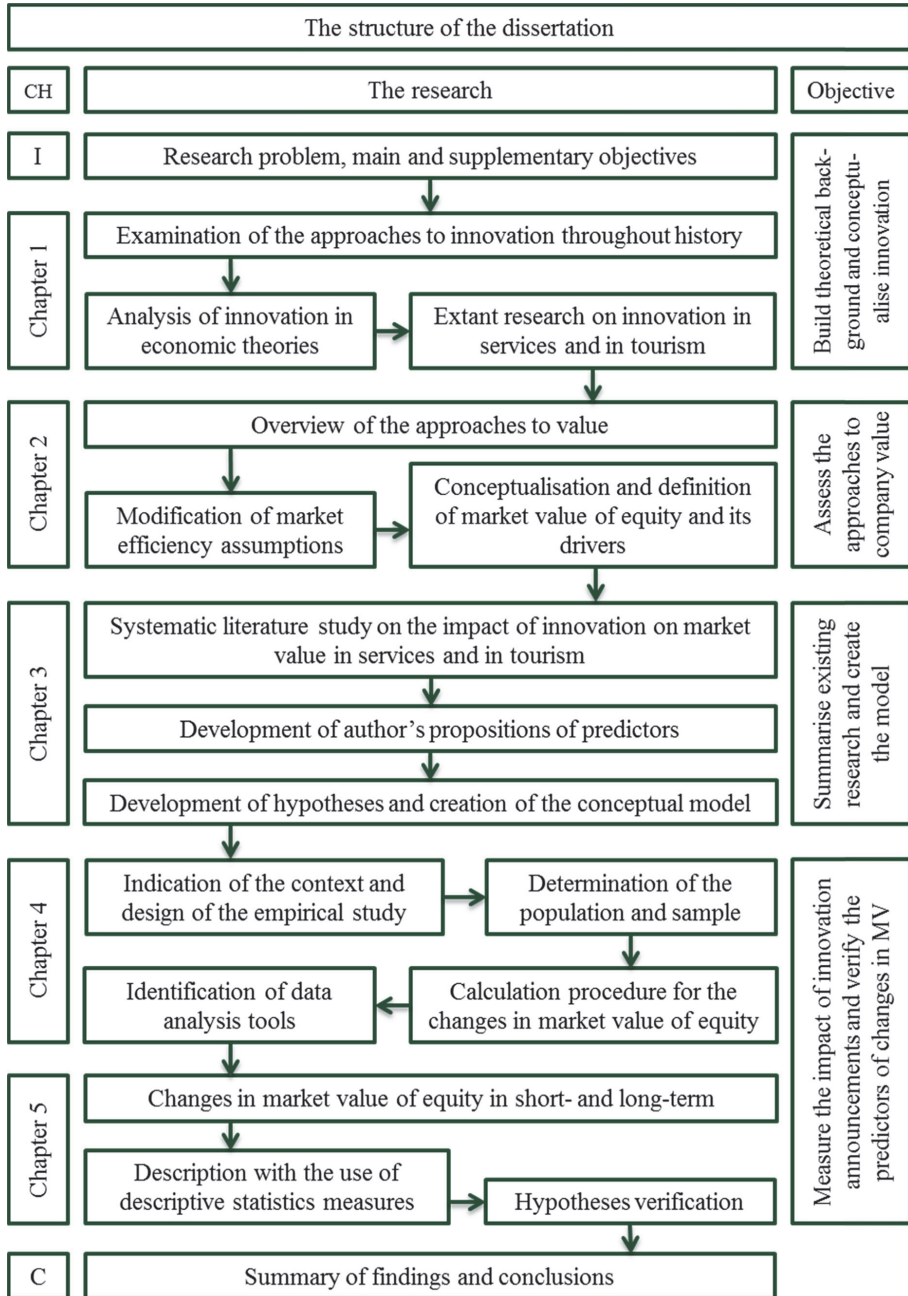


Figure 1. The structure of the book

Source: own development

The second chapter delivers an overview of the approaches to valuation which allows the selection of the most conceptually adequate from the point of view of the present research. It examines the modifications of the market efficiency assumptions. The chapter includes the definition of the market value of equity and terminates with an overview of the factors driving it.

The third chapter concentrates on linking innovation and the market value of tourism enterprises. It presents the systematic model-building procedure and brings details on the strategy of the literature study. It introduces and discusses the predictors of the market value of equity in the context of this research. It presents the author's model and the development of the research hypotheses.

Chapter four focuses on the methods used in the empirical research. It provides details on the data collection methods and the research techniques used to answer the research questions. The chapter considers the context and design of the empirical study, describes the population and the variables and delineates the data analysis methods.

Chapter five presents the results and a discussion of the empirical investigation. It demonstrates the changes in the market value of equity as well as their statistical significance. It summarises and describes the data with the use of descriptive statistical measures. The chapter provides the results of the hypotheses testing performed with the use of hierarchical regression.

The book terminates with conclusions. Supplementary information is to be found in the Appendix.

The benefits of the research reported here are diverse. It contributed to the current scientific discussion on innovation in services and in particular in tourism. It assessed the current research in the field and conceptualised innovation in the context of tourism. Furthermore the study added to the scientific dialogue on the efficiency of capital markets by providing theoretical considerations and unsupportive empirical evidence. The research introduced the author's model representing the relationship between innovation announcements and the market value of equity of tourism enterprises. Thus it attempted to fulfil the important research gap in respect of the predictors of changes in market value. The model was tested empirically using the analytical framework designed particularly for the present research. Finally it allowed verifying the impact of innovation announcements on the market value of equity of tourism enterprises. The research attempted to fulfil the existing research gap concerning the relationship between innovation announcements and the market value of equity of tourism enterprises and theoretically related variables.

Chapter 1

Theory of innovation

Introduction

Innovation has strategic importance in the capitalist economy [Kuznets 1954]. It is of the essence for all organisations operating in rapidly changing, contemporary economics. The importance of innovation was recognised by such Nobel Prize laureates as Simon Kuznets, who stated that innovation has the “strategic importance in the evolution of a capitalist economy” [1954, p. 259], Jean Tirole [1995], who tied together the company’s competitive positioning and innovation and Robert Shiller who introduced the notion of innovation in the context of behavioural economics [2006]. Innovation is seen as an indispensable component of competitiveness rooted in organizational products/services, processes and structures. It is one of the essential instruments of providing the company with a competitive edge, entering new markets, increasing the market share and growing [Gunday et al. 2011].

The research on innovation has been conducted around the world since the early works of Joseph Schumpeter. The state of knowledge concerning innovation is constantly growing. However as Drucker states: “we cannot yet develop a theory of innovation. But we already know enough to know when, where and how one looks systematically for innovative opportunities and how one judges the chances for their success or the risks of their failure. We know enough to develop, though still only in outline form, the practice of innovation” [Drucker 1985, p. 30]. Furthermore, Kotler and Trias indicate the lack of a complex, unified and widely accepted theory of innovation [2013]. At the same time authors postulate the necessity of further research.

From the point of view of the present research it is crucial to determine precisely the concept of innovation and develop its definition. The purpose of the

present chapter is to summarise the knowledge on innovation, innovation in the service sector and innovation in tourism. The chapter builds on literature studies.

First, the evolution of the approaches to innovation in the world will be presented. It will constitute the basis for introducing the definition of innovation. Second, the most important economic theories referring to innovation will be analysed. It will allow the establishment of a sound theoretical background for the present research. Third, the emphasis will be put on the innovation in services. Fourth, the scientific aspects taught on innovation in tourism will be scrutinized. It will allow a deepening of the considerations on innovation in the context of the present research.

1.1. The evolution of the approaches to innovation

The notion of innovation originates from the Latin “*innovatio*” which means renewal, alteration [Latin Dictionary 2015]. The verb “*innovare*” stands for “alter, renew, make an innovation in” [Latin Dictionary 2015]. The definition of innovation delivered by the Oxford Dictionary covers “a new method, idea, product etc.”, and “the action or process of innovating” [2015].

However, since its introduction into the theory of economics in 1930 by Joseph Schumpeter the notion of innovation has constantly evolved. From the point of view of the present research it is important to study its evolution throughout history to capture the historical regularities and understand the ambiguous nature of innovation. The holistic approach proposed in the present sub-chapter leads to the formulation of the definition of innovation. The worldwide international scientific dialogue on innovation is presented.

The very beginning

At the beginning of the scientific examination of innovation researchers emphasized their effects in the macro scale [Kuznets 1966]. The distinction between innovation and invention was set [Schumpeter 1939]. No consensus was achieved concerning imitations: they were perceived either as a force diminishing the competitive advantage of the innovator or as the driver of growth.

Joseph Schumpeter was one of the first economists to introduce a scientific approach to innovation. He explored the cyclical evolution of the capitalist world. The author assumed that the process of building the economy relies on business cycles and that each new phase of economic development surpasses its predecessor.

Schumpeter indicated that innovation is the element which contributes to the start of a new business cycle [Schumpeter 1939]. According to the author innovation stands for one of the following [Schumpeter 1932; Schumpeter 1939]:

1. The launch of a new or significantly changed product.
2. The application of a new method of production which was not yet used in the industry.
3. The opening of a new market.
4. The acquiring of a new source of supply of raw materials and semi -manufactured goods.
5. The introduction of a new structure of industry, e.g. the creation of a monopoly.

Moreover in the “Business cycles” the author defined innovation simply as “the setting up of a new production function” which “covers the case of a new commodity as well as those of a new form of organization such as a merger, of the opening up of new markets and so on” [Schumpeter 1939, p. 84]. Thus it was required for an innovation to be implemented in business practice. Furthermore, Schumpeter stated that “production in the economic sense is nothing but combining productive services. We may express the same thing by saying that innovation combines factors in a new way” [Schumpeter 1939, p. 84]. Therefore the author often referred to innovation with the use of the notion of “new combinations” [Schumpeter 1939, p. 84]. It occurs that innovation was perceived to originate from the internal structures of major companies.

Twenty years after the breakthrough works of Schumpeter another important scientist – Simon Kuznets, contributed to the knowledge of innovation [Nobel-prize.org 2014]. In his general approach to innovation Kuznets recalled Schumpeter but defined innovation as “material changes in the production function” [1954, p. 106]. The author claimed innovation to have “strategic importance in the evolution of a capitalist economy” [Kuznets 1954, p. 106]. Yet in later works Kuznets introduced the notion of epochal innovation and analysed the economic growth of nations through epochs. Kuznets stated that each epoch starts with a major, unique innovation [Kuznets 1966] which spreads to a substantial part of the world and constitutes a dominant source of sustained growth.

The 60s and 70s

The fruitful scientific investigation on innovation in the 60s and 70s introduced some new ideas. The authors generally admitted that not only breakthrough

advances but also small improvement may constitute innovation [Hollander 1965]. Such an approach contradicted the previous achievements. It still holds today especially in the low-tech industries. Moreover innovation started to be perceived as a continuous process instead of a time stamp [Myers and Marquis 1969], which is still valid at present. In this context innovation was defined as series of actions consisting of solving problems [Whitfield 1979] and contributing to the overall company success [Kotler 1967].

A comprehensive framework consisting of the characteristics of the company and its environment was introduced. The role of new relationships and the importance of the environment in which the company operates were emphasized [Hagen 1962]. In this light the stimulating effect of international relations was introduced [Harman 1971]. The diffusion process was analysed and it was ascertained that different firms differ in their imitation abilities [Johnston 1966]. The considerations are especially timely today in the European Union where the free trade policy applies.

The extensive character of innovation emerged. The field of innovation was extended and innovation began to cover different aspects of human existence [Freeman 1974]. In the similar vein the notion of uncertainty in relation to innovation projects occurred [Allen 1967]. It was noticed that the investment in innovation results in higher risk and higher potential returns.

The 80s and 90s

The productive scientific dialogue on innovation performed in the 60s and 70s was followed by even more dynamic discussion in the 80s and 90s. First the achievements of the previous period were recognized. It was presumed that most innovations are minority upgrades [Rothwell and Gardiner 1990; Porter 1990] and that they occur continuously [Freeman 1990]. The inseparability of uncertainty in relation to product innovation projects was re-examined and ascertained [Nelson and Winter 1982]. Second new ideas emerged. The idea of innovation as a response to market needs was established [Romer 1990] and the social aspects of innovation started to displace the technical [Drucker 1985]. Researchers required that the effects of innovation should affect positively both economic and social spheres [Nelson and Winter 1982]. It is especially timely nowadays in the context of today's trend that seems to favour socially responsible solutions.

On the one hand only the first implementation was treated as truly innovative [Porter 1985]. On the other hand the benefits of further implementations were examined [Mansfield, Schwartz and Wagner 1990]. The idea was especially

important for low-tech industries where patenting is rare and most innovation is relatively easy to imitate.

The new millennium

The new millennium abounded in new ideas concerning innovation. In line with the achievements of the previous periods, the perception of innovation as a process was widely accepted in the scientific community [Griffin and Moorhead 2011]. It was ascertained that a series of minor upgrades may be much more profitable than the occasional breakthrough innovation [Tidd, Bessant and Pavitt 2005; Kumar 2004]. The new millennium is also the period in which the ecological aspects complement the social and economical [Arundel and Kemp 2010; Kemp 2010].

Innovation was treated as a tool of differentiation in the highly competitive environment [Porter 2006; Porter 2008; Bregheh, Rowley and Sambrook 2009]. The emergence of an innovation driven economy grounded in Schumpeter's ideas, resulted in the acceptance of innovation as one of the most important factors of productivity growth [Tidd, Bessant and Pavitt 2005]. As a result different approaches to measuring innovation were developed [Harmancioglu, Droge and Calantone 2009; Boston Consulting Group 2010]. In this light the lifecycle of innovation was established [Griffin 2001] and a generic process of product development and commercialisation was introduced [Rafinejad 2007]. In order to recognize its comprehensive character the approaches to innovation were based on multidimensional frameworks.

The last concept developed in the period analysed was open innovation. It is based on interaction with different companies which possess the necessary competences to develop innovation. Open innovation relies on using inflows and outflows of knowledge (internal, and external ideas) to improve a firm's innovation activities [Cheng and Huizingh 2014]. It is opposed to closed innovation activities such as firm-specific R&D [Lee, Kim and Kim 2012]. This strategic tool offers companies a possibility to exploit new opportunities at low cost and risk levels [Chesbrough 2003]. In the context of open technology innovation Lee, Kim and Kim emphasize its crucial importance in shaping companies' market values [2012].

It occurs that the evolution of the approaches to innovation ranged from noticing the importance of change to the comprehensive description of its characteristics. Researchers concluded that innovation should affect positively both economic and social spheres. Treating innovation as a time stamp gave place to perceiving it as a continuous process. Innovation confined to new ideas implemented in business practice.

Summary – evolutionary patterns

The analysis of the historical evolution of the approaches to innovation was vital in the context of the present research. On the one hand, new concepts occurred and displaced the old. On the other hand, contemporary authors refer often to the classical approaches of the 30s. The definition of innovation proposed below is based on the conclusions about the similarities and differences between the evolution in the world.

To conclude the evolution of the approaches presented in the sub-chapter, a tabular form was created. In order to create the comparison between the evolution of approaches to innovation in the world the analysis was based on the method used by Powell and Renner [2003]. One category, e.g. “minor upgrades”, may be important in more than one period. Also between-period differences may occur (e.g. “minor upgrades” category represents the recognition of the role of minor upgrades in the beginning of the investigation of innovation and their total acceptance in the 60s and 70s), and these are indicated in the comments. The precise data is delivered in Table 1.

Table 1. The evolution of the approach to innovation in the world. The key concepts

Period	The key concepts
The beginning	Change – noticing the importance of change Macro scale – concentration on the macro scale Invention – formalised approach covering distinction between innovation and invention, Implementation – obligation of implementation in business practice, Sources – sources of innovation (R&D)
60' and 70'	Environment – noticing the importance of the environment Diffusion and imitation – analysing the processes of diffusion and imitation Process – allowing the treatment of innovation as a process Minor upgrades – acceptance of minor upgrades Relationships – stressing the role of relationships and international context; Uncertainty – introduction of the concept of uncertainty, Field extension – focus on different aspects of human existence,
80' and 90'	Minor upgrades – acceptance of minor upgrades Process – allowing the treatment of innovation as a process Social – noticing the social aspects of innovation Market – treating innovation inter alia as the response to market needs Effects – focus on positive change caused by innovation Diffusion and imitation – bringing more focus to the concept of diffusion Uncertainty – exploring further the concept of uncertainty, Low-tech – distance from the high-tech aspects of innovation

New millennium	Process – allowing the treatment of innovation as a process Minor upgrades – acceptance of the role of minor upgrades Market – treating innovation inter alia as the response to market needs Social, economic, environmental – inclusion of economic, social and environmental aspects Uncertainty – developing further the concept of uncertainty Knowledge – allowing the treatment of innovation as new knowledge Stages – division into development and commercialisation stages Cooperation – stressing the importance of academia and business cooperation Competition – presenting innovation in the context of competitive struggle, Field extension – approaching different perspectives
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Source: own development

Scientific teaching evolved through time and the focus was set on different categories in different periods. However there seems to be a scientific consensus that innovation consists of both breakthrough changes and minority upgrades. Also the implementation of innovation in the business practice is a widespread requirement. Additionally innovation is treated as a process. Besides the researchers accepted innovation as being the first implementation in the company instead of being the first implementation at all. The acceptance of imitation is due to the tremendous role of diffusion for economics. It is stated that the cooperation between academia and business may be fruitful, especially in the innovation's development stage. Furthermore it seems that the scientific community requires that innovation results in positive changes in social, economic and environmental aspects. However the effects of innovation are often uncertain due to the interplay between incurred costs and potential effects (especially in the case of innovation, the success of which depends on consumer reaction).

As a result of the above discussion the definition of innovation in the present research was established. For the purpose of the present research, the definition of innovation was formulated as follows:

“innovation is a process of implementing positive
and new ideas into business practice”.

In the present research the term covers breakthrough (radical) innovations, novelties at the company level and incremental (minority) upgrades. Furthermore it is assumed that the innovation process may be multi-staged. Even though the effects of innovation are presumed to be economically, socially and/or environmentally positive, their determination ex ante is problematic due to the interplay between investment incurred and uncertain outcomes.

The present sub-chapter aimed at establishing the definition of innovation based on the historical evolution of the approaches to innovation. However the reasoning needs to be developed further. The researchers built their approaches to innovation in the context of the different economic theories. In the next chapter the most important economic theories covering the field of innovation will be presented.

1.2. Innovation in economic theory

The present research focuses on innovation thus it is essential to place the phenomenon amongst existing economic theories. Understanding of innovation requires a firm conceptual background. The phenomenon may be fully understood only when the theoretical framework is well established. According to the Oxford Dictionary theory stands for “a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained” [Oxford Dictionary 2015]. Also in the context of the theory of innovation Nelson and Winter described theory as: “a reasonable coherent intellectual framework which integrates existing knowledge, and enables predictions to go beyond the particulars of what actually has been observed” [1977, p. 215]. In this chapter the most prominent economic theories covering innovation will be presented.

In the review two distinctive but interconnected perspectives were adopted. The first covers firms, strategic business units and programmes. The second focuses on sectors or whole economies. The distinction between micro and macro scale is based on the work of Li and Atuahene-Gima [2001]. In the context of the present research a complete approach is necessary in order to understand the internal and external forces driving the process of innovation and its effects.

1.2.1. Firm/strategic business unit/programme level

The most prominent economic theories covering the field of innovation at company level include: (1) the adoption and diffusion theory which states that firms may adopt innovation from other organisations; (2) diffusion of knowledge which emphasises the role of the knowledge, (3) resource based view which emphasises the role of resources in achieving competitive advantage through innovation. Furthermore the economic theories referring to innovation at company level cover: (4) sunk costs, which focuses on the incurred spending, (5) supply

and demand which indicates that innovation occurs as a response to market needs, (6) organisational structure, which depicts the importance of intra-firm cohesiveness, (7) agency theory, which states that agent/principal conflicts need to be well managed in order not to hinder innovation, and (8) game theory, which accounts for the interactions between the participants of the game.

Adoption and diffusion theory

According to the adoption and diffusion theory firms may not only innovate but also adopt innovative solutions developed in other companies. Johnston was one of the first researchers to examine the idea. From the author's point of view the term of innovation refers not only to the first implementation but also to when "the innovation or an alteration spreads into other firms, industries and countries" [Johnston 1966, p. 160].

The innovator develops the new solution using his/her own resources and capabilities. It is ascertained that the innovator bears most of the risk and in return he/she gains a competitive advantage. However the process of developing innovation is risky. The diffusion process may harm the profitability of innovation projects in the innovator's company. Due to the copying of the new solutions by other firms their profitability also increases and the competitive advantage based on the novelty dilutes [Bukowski, Szpor and Śniegocki 2012]. From the point of view of the imitator the adoption of new solutions is cost-effective as there are no costs of development. However the imitator risks losing the competitive position due to the delayed implementation. Nevertheless diffusion seems to depend on the potential profits stemming from innovation, and its ability to generate a monopoly [Ciborowski 2012].

The ubiquitous character of innovation makes it difficult to establish the distinction between invention, innovation and diffusion. It is due to the fact that innovation is a continuous process and imitation may occur at every phase of its development [Lundvall 2010]. Moreover, according to Madej [1972], diffusion may occur in two different perspectives horizontal (from one enterprise to another) and vertical (from the primary research into practice).

The process of diffusion is conditioned by a series of factors. The more discontinuous the innovation, the more difficult is its adoption. Also the more the innovation "fits" existing knowledge and consumer habits, design, manufacturing practices, etc., the easier it is to implement [Harmancioglu, Droge and Calantone 2009]. It appears that radical organisational change may not be easily implemented without the complex staff training and the operating conditions

adjustment. At the same time the determinants of the likelihood of the adoption of innovation are moderated by two variables – the type of organisation and the scope (strength of influence) of the innovation [Damanpour 1991].

Diffusion of knowledge

In the innovation process firms use both: resources and learning. The first covers tangible and intangible assets that underpin capabilities. The second includes the change in the knowledge foundation on which capabilities rest [Smith 2006].

The diffusion of new knowledge is the central part of innovation. It is due to the fact that organisational learning and knowledge creation underpin the innovation capabilities of organisations, but also that innovation stimulates the increase in knowledge [Lam 2006]. The theory focuses not only on the creation of knowledge but also on its diffusion across companies.

Firms adopting innovation learn from and build the new knowledge on it. The diffusion process causes the social and economic impact of innovation. It is a natural part of the innovation process besides learning, imitation and feedback effects. Moreover adapting innovation to different environments by different companies results in improvements in the original innovation [Hall 2006]. Therefore the process of diffusion is crucial not only for the macroeconomic effects of innovation, but also for its further development. Also the feedback and the experience of users may stimulate improvements to the original innovation in the diffusion process.

Resource-based-view

For the resource-based view (RBV) the internal factors are key to the firms' conduct. Therefore learning the right combination of resources is essential for innovativeness. In the investigations based on the resources based view innovation is treated mostly as a response to market changes. However in order to respond efficiently to a volatile market there is a need for the right combination of resources [Harmancioglu, Droge and Calantone 2009].

The intellectual foundation of the resource-based theory stems from the late 1950s and the work of Penrose [1959]. At the heart of the concept lie the resources which are valuable and difficult to imitate. Barney defines resources after Daft¹ as: “all assets, capabilities, organisational processes, company attributes,

¹ Daft, R., 1983, *Organisational theory and design*, Cengage Learning, New York.

information, knowledge, etc., which are controlled by a firm that enable it to conceive of and implement strategies that improve its efficiency and effectiveness” [Barney 1991, p. 99]. The advantages of first-mover companies cover access to distribution channels, development of a positive reputation and goodwill. In order to experience first-mover advantage a firm must differ in resources from the other firms in the sector [Barney 1991].

There is an interplay between resources and innovation. On the one hand adequate resources enable innovation. On the other innovation causes changes within a sector and defines which abilities and skills are crucial. Therefore firms must adapt to the changed environment by modifying their resource base [Barney 1986]. The commercial introduction of GSP at the turn of the millennium forced transport companies to adjust their business models and technical equipment.

Resources are important in the context of innovation. First, they allow the organisation to purchase innovations from other entities. Second, they allow the introduction of innovation by exploring the actual needs and responding to them with the new ideas. Third, significant resources allow companies to bear the potential costs of failure [Damanpour 1991]. The resources of technical knowledge also have a positive impact on innovation as they facilitate the understanding, development and implementation of the new technical ideas.

Sunk costs

The notion of “sunk costs” represents the resources spent on the creation of competitive advantage, entering new markets, repositioning production in the value chain, etc.. Exogenous and endogenous sunk costs may be distinguished. Exogenous sunk costs are determined by the industry equilibrium and represent the outlay required for the minimum efficient scale – the set-up costs [Sutton 1992; 1998]. The set-up costs must be incurred in order to operate a business. According to Sutton the most obvious cases of endogenous sunk costs are advertising and R&D. Both may be considered sunk costs “incurred with a view of enhancing consumers’ willingness-to-pay for the firm’s product” [1992, p. 8].

First, a firm individually determines the R&D initiatives and incurs some costs. Second, the level of profits generated from the implementation of innovation depends on the responsiveness of the firm’s clients. Third, if profits outweigh the incurred costs the firm is more likely to invest further in R&D [Sutton 1992]. Nevertheless the level of exogenous and endogenous costs (and their relation to the benefits of implementing a new solution) determines the innovative behaviour of a firm.

Furthermore the incentive to invest in innovation is lessened unless a type of protection tool is introduced, e.g. patents [OECD and Eurostat 2005]. Otherwise the costs may be incurred for nothing. It is especially important in industries where the products are fairly readily imitable (e.g. tourism). In R&D intensive industries patent protection is of secondary importance as imitation is complicated and costly.

Supply and demand

Marketing theories also offer a reference to innovation. They indicate the relationship between innovation and customer reaction and the market exchange between sellers and buyers.

Firms struggle to match their products to the demand due to the heterogeneous nature of both the supply and demand sides. Product differentiation may be as important as the development of new products. The process of matching the demand and supply side often results in innovation [Hunt 1983]. The innovation may cover the image of the product, its social characteristics and its objective characteristics. In order to exploit fully market demand the firms should implement innovation in all fields covered by the marketing responsibility. A good example to schematise the innovation projects is to organise them around the precise framework, as e.g. 4 P [Perreault and McCarthy 2005].

Organisational structure

The organisational structure may affect the efficiency of the innovation activities. The analysis of the impact of the organisational structure on a company's innovation includes organisational forms, organisational processes, boundaries and relationships [Lam 2006].

Two main organisational forms may be distinguished: rigid and flexible. The first one is more suitable for stable conditions whilst the second adapts better to the conditions of vital change and innovation. The responsiveness of the flexible form is reflected through new ways of adapting to a volatile environment. Furthermore the internal cohesiveness of an organisation, which is reflected in the integration of the whole staff in innovation activities, is one of the factors affecting a firm's innovativeness. Their facility in assisting internal cooperation supports creativity. Also a firm's external networks influence the direction and rate of their innovative activities [Trott 2008]. Shared interpretative schemes, developed to filter the multitude of external stimuli, enable an organisation's ability to interpret and process information in a purposeful way, promote collective

problem solving and organisational learning and therefore enhance the potential for adaptation and innovation. However the interpretative schemes may hinder the decision-making process and block organisational change by creating “blind spots” [Lam 2006, p. 124]. Hence the result of organisational learning on innovation is still uncertain.

Agency theory

Agency theory focuses on the situation in which principals (e.g. shareholders) and agents (e.g. executives) interact. Potential conflicts arise when the goals of principals and agents are contradictory or when both parties have different attitudes towards risk. Furthermore, in the context of innovation, the agency framework is especially valuable when contracting problems are difficult i.e. when there is a substantial outcome doubt. It is visible in the case of new product developments [Eisenhardt 1989].

Diffusely-held firms are less innovative than firms with a high concentration of management in such fields related to innovation as: patent activity, decisions to grow by acquisition or internal development and the timing of long-term investment spending [Francis and Smith 1995]. Shareholders’ monitoring and concentrated ownership are effective in preventing the high contracting and agency costs associated with innovation.

Furthermore the conflicts between agents and principals hinder innovation due to the high contracting costs associated with promoting innovative activity. In consequence firms avoid the design of incentive contracts which may be effective in stimulating innovation activity [Holmstrom 1989]. Moreover empirical research suggests a greater reliance on short-term bonus plans based on current earnings rather than on long-term investments. Such a situation discourages managers from investing in innovation in favour of projects offering an immediate return [Gaver and Gaver 1993].

Game theory

Game theory may be described as: “a mathematical modelling of strategic interaction amongst independent agents” [Baniak and Dubina 2012, p. 178]. The game theory delivers a framework which encompasses not only costs and benefits but also diverse interactions between the participants. In the context of innovation three different games are important: the intra-organisational game which involves innovator, project manager and resources’ administrator (it is played at the firm or strategic business unit level); the inter-organisational game which

involves competitors, partners and customers; the meta-organisational game which involves social planner and innovative entrepreneurs.

At the intra-organisational level innovativeness may be stimulated through fixed bonus fees and innovation profit share [Dubina 2010]. In the competitive environment a firm must adopt an adequate innovation strategy. It must take into consideration its own condition and its market status in the industry [Chen, Cheng and Shao 2007]. Furthermore the aggregate innovator (all the innovative firms) interacts with the government which in turn may destimulate innovative behaviour by negligence [Boldrint and Levine 2005].

1.2.2. Sector/economy level

The most important economic theories referring to innovation at the sector/economy level include: (1) competitive positioning which focuses on innovation as a response to competitors' actions; (2) uncertainty which emphasises the unpredictability of the results of innovation projects; (3) system theory which depicts the interplay between various institutions. Moreover economic theories covering innovation at the sector/economy level comprise (4) industrial organisation which concentrates on the structure of the market, (5) the evolutionary approach which treats innovation as a process in which many actors are involved and (6) behavioural economics which often indicates the irrationality of the actors'.

Competitive positioning

Companies may adopt two kinds of approaches – proactive and reactive. In the first firms innovate to attain a strategic market position and a competitive advantage in relation to their competitors. In the second companies react to other companies' actions [Tirole 1995]. Thus innovation is the way of maintaining market share and defending the competitive position.

The competitive advantage is at the heart of firm's performance. Introducing a successful technological innovation may allow a firm to enhance differentiation and lower costs at the same time. Only the first firm to introduce a new technology achieves the competitive advantage. Once competitors also introduce the imitations the advantage is lost [Porter 1985]. Much innovation is mundane and incremental rather than radical and depends more on a cumulation of minor insights than on a technological breakthrough [Porter 1990].

It seems that innovation and advanced technology are not enough to make an industry attractive. Low-tech, mundane industry with high entry barriers, high

switching costs and price-insensitive buyers is far more profitable than “sexy industries” (internet technologies, software, etc.) which attract competitors [Porter 2008, p. 22].

Uncertainty

The decision to innovate is impeded by the unpredictability of results. Uncertainty may prevent the implementation of significant changes despite the increasing pressure to seek new markets, introduce new products and technologies, etc. Also, it may hinder the obtaining of external funding [Rosenberg 1994]. Uncertainty is the inseparable element of every innovation project and it determines the innovative behaviour.

Innovation is marked by a significant uncertainty – inability to predict the effects of the research and development process [Drucker 1985]. In consequence decisions need to be made in a sequential way – vital information becomes available at some point of the process but is not available at the beginning [Rosenberg 1994].

Fast progress is characterised by a certain wastefulness of resources but may offer a first mover advantage. The sequential progress (which usually is slower) causes the resources to be less wasted (knowledge from one study is acquired before launching another) but the changes of gaining the first mover advantage are little [Rothwell 1985].

When an invention occurs it usually is very primitive. Its performance is usually relatively poor compared to existing technology and to its future performance. Furthermore the costs of the use of the invention are usually high [Rosenberg 1994]. The speed at which the invention transforms into innovation and diffuses depends on the actual and expected performance and cost reduction.

Innovation as system

The system approach relies on the interplay of institutions and their interaction in creating, diffusing and applying innovation. In this approach the diffusion of ideas, skills, information, knowledge and signals is of key importance. The system consists of relationships and elements that interact in the production, use and diffusion of new knowledge. A national innovation system “includes all parts and aspects of the economic structure and the institutional set up affecting learning as well as searching and exploring – the production system, the marketing system and the system of finance present themselves as sub-systems in which learning takes place” [Lundvall 2010, p. 13].

The role of universities varies between countries however their basic role in the innovation process consists of training staff and delivering research findings in the basic sciences. The financial institutions determine which projects are feasible and which not. The way companies are governed and controlled determines the efficiency of innovation projects. Government may fund not only the universities and research centres but also R&D in private firms as the business R&D entities supercede those of the university and government due to the practical knowledge they posed [Nelson and Rosenberg 1993]. Besides that the firms that operate internationally transmit new solutions between countries. The corporate social responsibility principles spread faster through foreign direct investment than through administrative decisions in particular countries.

Innovation requires the whole system in order to operate. The suppliers usually make the improvements in the components. The buyers may impact on the design of the final product. The process equipment suppliers impact on the firm's processes [Nelson and Rosenberg 1993].

Industrial organisation

Industrial organisation theory focuses on the structure of the firm and the structure of the market. As Teece states: "the formal and informal structures of firms and their external linkages have an important bearing on the rate and direction of innovation" [1996, p. 193]. On one hand the new conditions cause the need for new solutions. On the other the new solutions may affect the structure of the industry. Therefore there is an interplay between the industrial organisation and innovation [Porter 1980].

The organisation of the sector determines the nature of innovation developed by a company. Monopolies are in a fortunate situation. Therefore they focus on incremental innovation as breakthrough is unnecessary and carries additional risk. In order to attract consumers the un-favoured firms need to implement breakthrough innovation. Such firms cannot gain from incremental innovation and are subjected to strong pressure for a radical one [Farrell and Klemperer 2007]. The solutions that shifted the destination image from the tourism industry to the tourists such as social media were developed in small start-ups [Hjalager 2013].

Furthermore, the strategy of a firm should be formulated in relation to its environment [Porter 1980]. The relevant environment is broad, however what remains of key importance is the industry in which the company operates. In this context firms affect each other by implementing innovation.

Evolutionary approach

In the context of the evolutionary approach innovation occurs systematically with time as different organisations generate partial advancements [Nelson and Winter 1982]. Technical advance is a force behind a variety of economic phenomena: patterns of international trade, competition, growth in productivity, etc.

The general selection model of innovation activities may encompass four elements: (1) the nature of the benefits and costs weighted by an organisation deciding to adopt or not to adopt an innovation, (2) the influence of customers and regulatory preferences on what is profitable, (3) the relation between expansion or contraction of an organisation and its profits, (4) the mechanisms of learning about the successful innovation of other organisations and the factors facilitating or deterring imitations [Nelson and Winter 1982]. The interactions between the four elements and their evolution through time determine the innovation behaviour. Customer preference at one moment of time may determine the future paths of product/service development [Griffin and Moorhead 2011].

Most of the economic models assume a certain equilibrium. In this context innovation appears to be the destabilising force as it offers an advantage to the implementing company. Moreover Nelson and Winter evoke Williamson [1972]² and state that past innovativeness may lead to firm's market domination and blockade entry. However in such a situation the firm's incentive to innovate decreases dramatically.

Behavioural economics

Contrary to traditional economic theories behaviourists allow the irrationality of individuals and institutions. One of the main principles of behavioural economics is that frames of reference heavily affect human actions [Shiller 2006]. The empirical evidence suggests that the levels of rationality vary amongst the actors. Generally the higher the individual is in the hierarchy, the higher his/her rationality. However it refers mostly to the value-rational type of hierarchy (where the specialisation and knowledge are important), and not the rational-legal authority – bureaucratic hierarchy [Miner 2006].

Rational agents maximize profits. At the same time innovation is essential to organisational effectiveness. However not all of the agents act rationally and

² Williamson, O., 1972, *Dominant Firms and the Monopoly Problems: Market Failure Considerations*, Harvard Law Review, no. 85, pp. 1512–1531.

promote innovation. It is especially the case in bureaucratic organisations which stifle creativity and innovation [Miner 2006].

On one hand, individuals tend to overestimate or underestimate the opportunities. In the context of innovation especially the “wishful thinking bias” is important. Individuals tend to disregard the important risks [Shiller 2006]. On the other, the irrationality of behaviours is minimised when the “default option” (which is most frequently chosen) prepared by responsible institutions is the most rational, a precise plan is set and the system (e.g. tax system) is maximally simple [Shiller 2006].

Summary – economics of innovation

In the context of the present research it was necessary to establish the theoretical background concerning innovation. The overview of the economic theories referring to innovation was essential because it allowed the determination of the forces at firm and sector level which drive the process of innovation and its effects.

Based on the overview several conclusions may be drawn. The structure of the market (e.g. lack of monopoly) may stimulate innovativeness. The competitive position of a company (e.g. worth defending) and the actions of the competitors (e.g. innovating to increase market share) are of key importance for the decision to innovate and for the shape of the innovation process. Moreover the interactions between private and public institutions facilitate the process of innovation (e.g. business/academia cooperation). Thus the company’s internal decisions on innovation may not be detached from the environment.

Furthermore changing market needs induce the within-firm development of new products and services. However a firm does not have to develop innovation on its own – it may adopt innovation from other companies. Also the necessary knowledge may be acquired (e.g. through staff employment). Therefore the process of innovation may become complex by involving various actors.

Furthermore firm level was fundamental to the present research. At the company level the right combination of resources (both tangible and intangible) needs to be assured in order to conduct innovation projects. Firm must be able to bear exogenous and endogenous costs. In order to organise the innovation process a cohesive internal structure is important in which inter-organisational participants of the game act in favour of the common purpose and agents and principals share the same level of risk aversion.

Nevertheless the results of innovation projects are always marked with uncertainty (e.g. market reaction to innovation), which results *inter alia* from the irrationality of the actors involved. Therefore it seems that successful innovation undergoes a systematic evolution through the partial advancements of different actors.

Based on the above discussion the group of sector-level and firm-level factors creates a comprehensive framework for the analysis of innovation. It seems that the traditional approaches based on increasing the inputs in order to increase the outputs are insufficient to explain the economic phenomena in contemporary economics. It seems that the approach accounting for both internal and external factors and for their new combinations fills the gap. The economic phenomena seem to be explained by the introduction of new resources, knowledge, relations, actors and the innovative connections between them, which is the adaptation of the classical Schumpeterian approach. Even though a comprehensive theory of innovation does not yet exist, it seems that the advance in academic research has already given a firm anchor point for conducting different empirical research.

1.3. Innovation in the service sector

Nowadays the scientific focus on innovation in services increases as traditional boundaries between sectors fall, some services fuel the innovation process throughout the economy (innovation support, transfer and transmission between sectors) and service innovation represent the central drivers of economic growth [Lyons, Chatman and Joyce 2007]. However the research on innovation traditionally concentrated on manufacturing due to the low innovation frequency in services [Carlborg, Kindstrom and Kowalkowski 2013].

The general discussion on innovation delivered in the above sub-chapters needs to be deepened. In connection with the objectives of the present research it was fundamental to consider innovation particularly in services and to concentrate on its effects. Therefore the subchapter discusses the uniqueness of innovation in the service sector.

Consumers buy products for the functions they deliver [Stahel 1994]. In this context the ownership itself is of secondary importance. Innovation in services may be considered as a research field separated from innovation in manufacturing [Toivonen and Tuominen 2007]. However the proponents of service-dominant (S-D) logic oppose such an approach. Lusch and Nambisan state that “the distinction between “service innovation” and “product (goods) innovation” is no longer relevant since from the S-D perspective all product innovations are

service innovations (products being only a mechanism, medium, or vehicle for delivering service)” [2015, p. 5].

Innovation in services leads often to “new knowledge or use of knowledge to devise new applications” [OECD 2002, p. 48]. Moreover innovation does not have to be advanced from the technical point of view it may also be from the point of view of functionality. Compared to other services such as administration, law and accountancy services, telecommunication, media, health, education, logistics, after-sales service, etc., HORECA (hotels, restaurants and catering) seems to be in the middle of the innovation potential [Miles 2006].

In the context of the present research the comprehensive overview of innovation in services was necessary. The framework used in this chapter is based on the historical evolution of innovation in services. It is inspired by the work of Carlborg, Kindstrom and Kowalkowski [2013] who summarised prior research by clustering it into three evolutionary phases – formation phase (1986–2000), maturity phase (2001–2005) and multidimensional phase (2006–2016). Due to the time scale adopted by the authors in their framework the last phase terminates in 2010. However according to the present research in the period of 2011–2016 no different, consistent logic would have been observed and therefore the multidimensional phase will be extended up to 2016.

Due to the focus of the present research on the effects of innovation each phase was internally divided into: the dominant logic of the period and the recognised effects of innovation.

1.3.1. Formation phase (1986–2000)

The dominant logic of the phase

The period of formation was dominated by the demarcation of manufacturing and services. Authors concentrated on the distinctive features of the service sector and their impact on innovation.

The inseparability of production and consumption and the high involvement of human in the service process, result in the high degree of perishability. Services are intangible. They cannot be touched or viewed and the unused capacity cannot be stored for future use [Lievens, Moenaert and Jegers 1999]. In this light the protection of innovation is more difficult in services than in manufacturing [Chan, Go and Pine 1998].

The variation from one service to another, or variation in the same service from day-to-day is referred to as heterogeneity. It is impossible to eliminate the

differences in performance. Thus, it is difficult for clients to tell in advance what they will receive. In this context communication may be linked to service innovation success [Lievens, Moenaert and Jegers 1999].

In services frontline employees shape the quality of the company-consumer relationship. The contact personnel interact with clients to deliver services and receive feedback. Thus, the staff who work directly with consumers are a valuable source of innovation. Moreover the successful launch of a new service depends on the behaviour of the contact staff [Atuahene-Gima 1996].

In the early phase of the study of innovation in services researchers drew from the origins of innovation theory in which manufacturing was the primary driver of innovation. It was reflected in presenting technology as critical for innovation. The distinction between different types of innovation based on their requirement for the implementation of new technology was made [Chan, Go and Pine 1998]. In the similar vein the “reverse product cycle” was described. It builds on the spread of new technology from manufacturing to services and the following new product development caused by the generation of new services [Barras 1986].

Despite the demarcation logic and the technological bias the first attempts to construct a synthesis perspective occurred. Gallouj and Weinstein stated: “it did not seem to us appropriate to make an a priori distinction between innovation in service activities and innovation in manufacturing and to attempt to construct a specific “theory of innovation in services” [1997, p. 3]. The authors based their reasoning on Lancaster’s work in which products are defined as sets of characteristics³. In this light analysis of technological aspects of innovation tends to omit the characteristics and actual content of innovation.

The effects of innovation

The researchers in the formation phase concentrated mainly on the (1) financial performance effects. However they also conducted studies covering the effects of innovation on the (2) business processes and (3) competitiveness of the firms.

In the context of financial performance a set of reasons for developing new services was delivered. It covered, amongst others, increasing market value [Chaney and Devinney 1992], diminishing seasonal effects, supporting sales, and reducing risk by balancing the existing sales portfolio and stimulating the

³ Lancaster, K., 1966, *A New Approach to Consumer Theory*, Journal of Political Economy, no. 14, pp. 133–156.

use of spare capacity [Cowell 1988]. It was ascertained that the effects of innovation vary as service firms differ from one another. It was stated that service companies that innovate are more likely to experience growth in sales than the non-innovative [Hipp, Tether and Miles 2000].

In the context of business processes innovation in services led to the increase in service delivery capacity. The successful inter- and extra-project communication during innovation process increased the chances for the successful introduction of a new service and the general development of the company. Through innovation projects companies created knowledge about new innovation opportunities, customers, competitors, technologies and resources which helps to improve their operations [Lievens and Moenaert 2000].

In the context of competitiveness it was specified that a firm's ability to survive depends on innovation [Cowell 1988]. The development of new services that provide clients with improved experimental and functional quality was necessary to surpass the competitors [Bretani 1991]. Service companies may not rely on a stable range of services due to the fact, that with time, they become obsolete. New service development helps to minimise the effects of decline in the service lifecycle of existing services. "Change is a way of life for the innovative service organisation" [Cowell 1988, p. 297].

1.3.2. Maturity phase (2001–2005)

The dominant logic of the phase

The period of maturity was dominated by the focus on customers. Besides, from the point of view of a customer, the question of whether innovation derives from products or services, non-technological or technological elements, etc., is of secondary interest [Normann 2001]. Therefore the shift from demarcation to the synthesis approach was observed.

In the maturity phase two distinctive perspectives were proposed. The first one indicated that in order to develop new services a company must understand and rightly anticipate consumer needs. The proactive learning about consumers, observation of consumers in real life and involving consumers in new service development may permit its achievement [Matthing, Sanden and Edwardsson 2004]. The second perspective stated that the recognition of consumer needs might be problematic and expensive. It indicated that the most effective way is to transfer need-related aspects of service development to users by delivering a "toolkit for innovation" [Hippel 2001, p. 247]. In such a way customers handle

and share the development process freely. Further investigations on the role of customers in service innovation covered the validation of innovation by consumers at different stages [Abramovici, Bancel-Charensol 2004]; key elements of user involvement in innovation in services including objectives, stages, intensity and modes of involvement [Alam 2002]; the comparison between innovations developed by professional service developers and users themselves [Magnusson, Matthing and Kristensson 2003]. It appears that in the mature phase customers placed primary importance on research into innovation in service sector.

The maturity phase differed from the formation phase in the approach to technology. The researchers focused on non-technological innovation. As Hipp and Grupp state: “many innovations in the service sector use technological developments merely as a means of creating new and improving existing products and processes rather than just offering pure technological progress. Equally important are adequate methods in selling and marketing” [2005, p. 520].

The effects of innovation

In the context of the effects of innovation the maturity phase was a logical continuation of the formation phase. Researchers concentrated on the effects of innovation on (1) business processes. And they also studied further the effects on (2) relationships, and (3) financial performance.

For knowledge-intensive business services the improvement of business processes was the important priority [Wong and He 2005]. Innovation resulted in increased efficiency, productivity [Akamavi 2005] and flexibility [Wong and He 2005]. In this context two evolutionary stages: handling key actions in the new service development process and creating the environment favourable for continuous change were distinguished [De Jong and Vermeulen 2003]. It appeared that in the context of the business processes innovation lead to achieving good internal functional relations and exploiting economies of scale.

The effect of innovation on a firm’s relationship with customers may be found in several empirical analyses. The development of a responsive public service, that operates around the clock, impacted positively on customer satisfaction in short and long terms [Royston et al. 2003; Perks and Riihela 2004]. The effects of innovation extend to customer loyalty [Van Riel, Lemmink and Ouwersloot 2004]. The central role of customers in the maturity phase was further supported.

In the context of the effects of innovation on the financial performance it was stated that a new service adds substantial value to other services and products

and therefore improves it [Van Riel, Lemmink and Ouwersloot 2004]. The interplay between old and new services contributed to the achievement of positional advantage and a consequent gradual improvement of financial performance.

1.3.3. Multidimensional phase (2006–present)

The dominant logic of the phase

The evolution of the approaches to innovation in services resulted in an all-encompassing view. Innovation in services was approached from the multidimensional perspective of dynamic capabilities required to manage innovation efficiently. A group of six service innovation capabilities was indicated. It included: “signalling user needs and technological options; conceptualising; (un-)bundling; co-producing and orchestrating; scaling and stretching; and learning and adapting” [Hertog, van der Aa and Jong 2010, p. 490]. The successful service innovators out-performed other companies in at least some of the above capabilities.

Researchers in the multidimensional phase tended to use synthesis perspective to study technological and non-technological innovation. The synthesis perspective was often built on the broad Neo-Schumpeterian approach which defined innovation in the context of services as a change in the components or a change in the combination of components. Basing on the Neo-Schumpeterian approach Amara, Landry and Doloreux stated that “by integrating the demarcation approach into a new synthesis it allows the integration of technological and non-technological dimensions of innovation into a single perspective that is likely to shed new light on the multidimensional facets of innovation” [2009, p. 408]. Information and communication technologies were not necessarily drivers but often facilitators of innovation in services [Gago and Rubalcaba 2007]. Different kinds of innovation and different organisational actions interacted and stimulated innovation activity.

The focus was placed on the two-dimensional approach including system and market failures in service innovation. The system failures covered mainly the non-adaptation of the existing regulatory framework to the needs of service innovation. The market power failures included the disappearance of competition which in turn leads to diminishing the incentive to innovate [Rubalcaba, Gallego and Hertog 2010].

The determinants of six different forms of innovation implemented in service companies were included in a single econometric model. Despite the novelties in process the authors included new products, changes in the delivery method,

business strategy innovation, modification of managerial technique and modification of marketing strategies and concepts [Amara, Landry and Doloreux 2009].

Traditionally some of the characteristics of innovation in services were shared by the low-tech industries. However the distinction between high-tech and low-tech industries is nowadays difficult. Companies in all sectors insist strongly on innovation to remain competitive. Besides even traditionally low-tech firms created specialised research departments producing highly advanced outcomes [Tunzelmann and Acha 2006]. Furthermore networks, close relations with both suppliers and customers and outsourcing make the traditional boundaries disappear. Innovation penetrates smoothly between sectors.

The effects of innovation

In the multidimensional phase authors presented strongly diversified studies covering the effects of innovation on (1) capabilities, (2) relationships, (3) competitiveness, and (4) business process. It seems however that researchers focused most on the effects of innovation on a company's capabilities and relationships.

The effects of innovation on a firm's capabilities covered alterations in company culture and the firm's growth. It was ascertained that an innovation orientation paradigm needed to be implemented in all the fields of the company's activity (not just R&D) in order to result in significant advancements [Simpson, Siguaw and Enz 2006]. The employee and enterprise cultures supported the positive effects of innovation [Kaner and Karni 2007].

In the context of the effects of innovation on the relationships the researchers focused on the client-provider service co-creation which represented the interaction framework in service innovation. Service innovation may have a positive impact on the value creation of both clients and providers [Möller, Rajala and Westerlund 2008]. Also it increases the clients' strategic degree of freedom. The development of new services with clients increased their involvement with and loyalty to the company [Lyons, Chatman and Joyce 2007]. Moreover, the service innovation has the potential to off-load work from customers by introducing such things as smart services. In such a way customers may concentrate on their core competences [Shum and Watanabe 2007].

In the context of competition researchers demonstrated that service innovation is desired in most operations [Panesar and Markeset 2008]. It appeared that service innovation has the ability to create new markets. However, most of the innovation in services is incremental and only the breakthrough innovation has a market-creating potential [Berry et al. 2006].

In the multidimensional phase authors studied further the effects of innovation on business processes. In this light six dimensions of innovation strategy were introduced: product/service innovation, process innovation, leadership orientation, internal innovation source, external innovation source and investment that lead to better performance [Ciptono 2006]. Alterations in a firms' financial performance due to innovation were embodied in changes in sales, return on assets and net profit margin. It appeared that the multidimensional phase built on the achievements of the previous phases and introduced a multidimensional perspective. It recognized fully the complexity of innovation in services.

Summary – innovation in services

In the light of the present research it was indispensable to deepen the discussion on innovation by concentrating on the service sector. The present sub-chapter employed a comprehensive approach based on the historical evolution of innovation in services. The dominant logic and the resultant effects of innovation were studied. Innovation in services does not result solely from adapting the solutions developed in manufacturing. However, despite the growing spending on R&D in service companies, the adoption and adaptation processes are still important [Miles 2006]. Nevertheless innovation in services may be considered nowadays a research field separate from innovation in manufacturing.

The evolution of the approaches to innovation in services has evolved significantly during the last thirty years (from 1986). In the formation phase the researchers analysed the inseparability of production and the consumption of services and the high involvement of front-line staff which distinguished services from manufacturing. Furthermore manufacturing was considered more innovative which often resulted in the transfer of innovation from this sector to services. In the context of the effects of innovation researchers targeted: financial performance, business processes and competitiveness. Financial performance referred mainly to the increase in sales. However Chaney and Devinney [1992] signalled for the first time the positive relation between innovation and market value. In the maturity phase the researchers targeted the role of consumers in shaping innovation. The involvement of consumers took place in all phases of the innovation process from the concept definition to the implementation of the methods of evaluation. It was indicated that users themselves might develop innovation as efficiently as professional developers. Indirectly focusing on non-technological innovation caused such a situation. From the point of view of the effects of innovation researchers

targeted three fields: business process, relationships and financial performance. It was indicated that innovation impacts on productivity, efficiency, service quality and consumer satisfaction. Also it may allow the exploitation of economies of scale. In the multidimensional phase researchers' employed comprehensive approaches. The authors indicated that innovation management requires dynamic capabilities. A two-dimensional – system and market – analysis was proposed. The classifications of innovation covered its heterogeneity by covering new products and processes, changes in the delivery method, business strategy innovation, modification of managerial technique and modification of marketing strategies and concepts. Also it was mentioned that a distinction between high-tech and low-tech companies is nowadays difficult as most companies use advanced technologies on a daily basis. In the context of the effects of innovation the researchers covered four fields: capabilities, relationships, competitiveness and business process. The authors indicated that innovation results in changes in a company's culture, the firm's growth and firm-wide orientation. The client-provider service co-creation was analysed in the light of loyalty. The intensity of innovation infers that only breakthrough innovation has a market-creating potential. The study of literature demonstrated the multitude of approaches to innovation in services. It resulted from the lack of a widely accepted theoretical framework. Research addressed innovation in respect of the specific nature of the studies concerned. Evidently in each investigation the approach needs to be individually shaped to account for the uniqueness of the research.

1.4. Innovation in tourism companies

From the point of view of the present research innovation in tourism is of key importance. Most tourism companies belong to the service sector [Golembski 2007]. However they have their own specificity which may be transmitted to innovation. Therefore the discussion on innovation in services needs to be deepened to capture the particularities of innovation in tourism.

As Carvalho and Costa state: "tourism is currently one of the most promising industries in the world and there is an urgent need to better understand innovation in this sector" [2011, p. 23]. The innovativeness of tourism was underestimated for a long time which was reflected in the few studies in this field. However the spread of new information and communication technologies resulted in growing recognition of innovation in tourism by both practitioners and researchers [Decele 2006].

Tourism companies form heterogeneous group [Gołembski 2009]. The tourism industries selected cover accommodation for visitors, food and beverage activities, passenger transportation, travel agencies and other reservation activities [UNWTO 2010]. Tourism characteristic activities as determined by UNWTO cover: accommodation for visitors, food and beverage activities, railway passenger transport, road passenger transport, water passenger transport, air passenger transport, transport equipment rental, travel agencies and other reservation service activities, cultural activities, sports and recreational activities, retail trade of country-specific tourism characteristic goods and other country-specific tourism characteristic activities [2010].

A set of characteristics which distinguish tourism from other sectors in the context of innovation may be stated as follows: “tourism produces and sells product bundles instead of products (products being “experiences”) which are very intangible, products which cannot be stored (simultaneity of production and consumption), the consumption of tourism products involves the active participation of the customer (prosumer) and tourism production/marketing may involve large capital assets (airlines, hotel chains or car rental firms) or at the intermediate, distribution and final consumption stage may involve interaction personnel (e.g. travel agencies, restaurants, coaches, etc.)” [Weiermair 2004].

In the present research a holistic approach was proposed to study the particularities of innovation in tourism. It covered the evolution and the topical division of the research. One of the topics covers the effects of innovation which is in line with the present research. The evolution of the approaches to innovation in tourism was rather distinctive from the evolution of the approaches to innovation in services described in the previous chapter. According to Nagy the beginning of the investigation of innovation in tourism appeared in the 1980s and a considerable intensification of research occurred in the 2000s when the importance of the topic was fully recognised by both researchers and entrepreneurs [2012]. The author delineates the year 2000 as the crossover point between the early and late periods in the scientific investigation into innovation in tourism. Therefore two distinctive phases may be identified – initiation (before the year 2000), and maturity (after the year 2000) [Nagy 2000]. However, contrary to the situation in services, no further distinctive periods may be seen in the maturity phase.

The research on innovation in tourism after the year 2000 was not consistent. Different researchers focused on different topics. In the extensive review of innovation research in tourism Hjalager presented different trends followed by the research [Hjalager 2010]. In the present chapter the present division of the research conducted in the new millennium will be delivered.

The present chapter will be organised as follows. First the approaches to innovation in tourism that occurred in the initiation phase will be presented jointly. Second, the approaches to innovation in tourism that developed in the maturity phase will be presented, broken down into separate topics.

1.4.1. Initiation phase (1980–1999)

The early period of investigation of innovation in tourism was characterised by the lack of sound theoretical foundations. The authors presented different approaches to innovation in tourism and there was not any dominant logic.

In the initiation phase the authors emphasised that the development of tourism depends on the implementation of innovation which in turn stands for an ability to anticipate and respond to the changes in the international tourism marketplace [Poon 1988]. In the similar vein the researchers referred to the contribution of research to the new product development in tourism. The researchers indicated that live product tests are often the most cost-effective and appropriate use of research funding and time [Riley 1983].

Two typologies of innovation were introduced: at the enterprise level which covers: “process innovations, product innovations, transactions innovations, innovations of the distribution system, management innovations and innovations in the handling of information”, and at the meso- and macro-economic levels which include: “innovation in the market niche phase, regular innovations, architectural innovations and revolutionary innovations” [Hjalager 1994, p. 197]. In a later work Hjalager [1997] took into consideration the issue of sustainability. A typology of innovation connected to the environment was offered. It isolates “product innovations, classical process innovations, process innovations in information handling, management innovations and institutional innovations” [Hjalager 1997, p. 35]. It appeared that the majority of innovation was developed in other sectors and adopted by tourism companies.

It was demonstrated that the expansion of booking through the adoption of electronic media introduces new opportunities for tourism enterprises [Buhalis 1999]. In order to survive growing competition innovation is indispensable. Moreover the adoption of information technology tools (which were innovative at the time) delivers considerable benefits as the company’s presence in the virtual world results in increased demand [Buhalis 1999].

Innovation and creativity were isolated as one of the key elements of entrepreneurship [Morrison, Rimmington and Williams 1999]. However the competitive advantage based on innovation is often impermanent as successful innovation

attracts imitators. Furthermore the strategy focused on the development of breakthrough innovation is more difficult to imitate and extends the time taken for leaps forward in productivity and competitiveness. In relation to marketing the focus on the existing consumer needs may lead to “incrementalism” which does not offer fundamental innovation [Morrison, Rimmington and Williams 1999].

1.4.2. Maturity phase (2000–present)

The maturity phase expands over 16 years (from the year 2000). The academic achievements of the period will not be presented in the evolutionary perspective but in the topical viewpoint. In the new millennium researchers conducted diversified studies on innovation in tourism which covered such fields as: categories of innovation, determinants and driving forces, search process and knowledge source for innovation and the effects of innovation.

Categories of innovation

An important part of the research on innovation in tourism covered the introduction of adequate categorisation [Hjalager 2010]. In the present research this field of study is of primary importance.

The Schumpeterian division of innovation was adapted. It includes: “generation of new or improved products, introduction of new production processes, development of new sales markets, development of new supply markets, reorganisation and/or restructuring of the company” [Weiermair 2004, p. 2]. The OECD’s four categories were used: product, process, organisational, marketing [Hall 2009]. In tourism Hjalager et al. isolated “new products and services for tourists, new managerial methods and resource mobilization, educational spin-offs and innovation in the educational sector, reverse community innovation – innovation aiming at the benefits of the residents, reverse business innovation – innovation furthering other business branches” [2008, p. 33]. In the work of 2010 Hjalager divided innovation in tourism into: product or service, process, managerial, marketing and institutional [Hjalager 2010]. It appears that in comparison to the works published in the previous phase Hjalager extended the typology of innovation to encompass its diverse types.

There seems to be a lack of consensus on the classification of innovation in tourism. The adoption of general classifications is opposed to the creation of classifications dedicated to tourism. Therefore this field requires further scientific investigation.

Determinants and driving forces of innovation

Researchers in the maturity phase approached the issue of forces driving innovation from three viewpoints: Schumpeterian – assuming the dominant role of entrepreneur, technology-push/demand-pull paradigm and Marshallian innovation system.

Managerial skills are the key determinants of a firm's performance. The lack of skilled managers is an important barrier to a venture's success and lowers its innovativeness. It is especially the case of small companies where owners are managers involved in all areas of the firm's activity. In tourism such situation is common [Kachniewska 2011]. In the case of large tourism companies the barrier is less significant [Lerner and Haber 2000]. It was suggested that in the case of small entities innovation occurs "in arts and crafts, rather than in the form of new ventures and growth" [Getz and Petersen 2005, p. 235]. The innovativeness of such entities is relatively small in comparison to large, international tourism companies. Lifestyle entrepreneurs are able to create and introduce innovation to the wider industry. However, they specialise in developing and reproducing of niche market products [Ateljevic and Doorne 2000].

The other important stimulus of innovation is the interplay of push and pull factors. In the context of push factors the disintermediation effect of ICT on distribution channels in tourism was indicated. Moreover thanks to the use of communication technologies small travel agencies increase the chances for growth in travel distribution segment [Bowden 2007]. The efficiency of ICT in reducing costs and improving distribution strategy was showed [Buhalis 2004]. Also the employment of gamification mechanism and social media tools enabled location-based social media marketing on a large scale [Kachniewska 2015]. From the perspective of pull factors the European leisure styles were described. Some of the groups (e.g. "e-freaks") emerged recently and require tourism products suited especially to them. Therefore changing society exerts pressure for new products and innovation [Weiermair and Mathies 2004].

The systems of innovation in tourism are built on social networks and geographical proximity which support the processes of dissemination and implementation of innovation [Gołembski 2009]. In this context the geographical and activity-based clusters in tourism were described. They lead to co-localisation, complementarity, integration and synergies [Decelle 2006]. Clusters in tourism usually have strong linkages to other sectors such as: food and beverage, equipment or design. In tourism cooperation is relatively easy compared to other sectors as the sector itself "embraces a multitude of sectors" [Nordin 2003, p. 19].

In the similar vein, efficient governance is the way to stimulate innovation. The role of governance is to ensure linkages between business and knowledge production organisations such as universities and research institutions [Svensson, Nordin and Flagestad 2005].

Search process and knowledge source for innovation

Some researchers in the maturity phase focused on the research and development processes. For a tourism company the important source of knowledge is the presence in a business chain or network. Usually knowledge transfer spreads from the head offices through managerial capacities and capital. In this context the technology transfer in hotel chains was studied. The collaboration between hotel chains and local companies facilitates the implementation of innovation [Jacob and Groizard 2007].

Furthermore some knowledge is already in the organisation but needs to be captured, understood, adapted and recorded. Entrepreneurial implementation of innovative products helps to exploit the competitive differentiation opportunities [Frehse 2005]. Hallenga-Brink and Brezet analysed the process of developing sustainable innovation in micro-sized enterprises in tourism. The authors demonstrated the key role of internal and external communication in developing and implementing innovation [2005].

Moreover innovation may result from the interactions between tourism companies [Gołembski 2007]. The development of clusters takes a bottom-up perspective and authorities may only create the favourable environment. Nevertheless, once it is set, the exchange of knowledge between the collaborating actors is beneficial and results in innovation [Nordin 2003].

The impact of the cooperation between academia and business on innovation is inconsiderable due to the “impasse between consultancy and academic research; the difficulty in transfer between the differing cultures of researchers and practitioners; the past failure of researchers to engage in codification; the real barriers to transferring research to operational adopters” [Cooper 2006, p. 59]. However the important connection between universities and practitioners lies in delivering a qualified workforce. Vocational aspects in connection with deep sets of experience augment the quality of alumni which in turn leads to increased innovation capabilities [Stergiou, Airey and Riley 2008].

Effects of innovation

The studies on the effects of innovation are crucial due to the fact that they deliver an answer to the question – why innovate? Furthermore they are fundamental from the point of view of the present research. In the light of the research objectives it was crucial to determine the categories affected by innovation and their coverage in the previous research. The examination of the effects of innovation in tourism companies was based on the method of systematic literature studies – SALSALSA – Search, Appraisal, Synthesis, Analysis [Booth, Papaioannou, Sutton 2012]⁴. In order to search the publications the Scopus database was employed. The research procedure resulted in 872 relevant publications. The duplicates and the papers in languages other than English were eliminated. Also the research was limited to the articles published in journals listed on the Thomson Reuter's Journal Citation Report. Finally the full texts of the remaining publications were examined and 24 publications which focused on the effects of innovation in tourism were pinpointed⁵. The procedure is presented in Figure 2.

The whole set of publications under investigation was analysed with the use of content analysis. The results of the investigation covering the categories of effects and postulated effects are delivered in the Table 2.

In the previous research eight categories of effects were covered in the context of implementing innovation in tourism companies. Improvement in the internal organisation was achieved through: human capital management improvement, change of organisational culture and an increase in productivity due to the implementation of information technologies.

The effects on financial measures and relations with clients were covered in previous research. The increase in profits, income and market value was the result of such innovations as: the use of information and communication technologies and expanding the offer. The innovations leading to a decrease in costs included: recycling, energy-saving technologies and the minimisation of the amount of waste.

⁴ The comprehensive research on the effects of innovation in tourism companies was published in Szutowski 2014a.

⁵ Berezina et al. 2012, Blake, Sinclair and Soria 2006, Chang, Gong and Shum 2011, Chou 2014, Fuchs et al. 2010, González and León 2001, Grisseemann, Plank and Brunner-Sperdin 2013, Hashim et al. 2014, Hjalager 2002, Hjalager 2010, Jacob et al. 2003, Khan and Khan 2009, Lawton and Weaver 2010, Lee, Qu and Kin 2007, López-Fernández, Serrano-Bedia and Gómez-López 2011, Martin 2004, Martinez-Ros and Orfila-Sintes 2009, Nicolau and Santa-Maria 2013a, Ottenbacher and Harrington 2010, Siguaw, Enz and Namasivayam 2000, Victorino et al. 2005, Walsh, Enz and Siguaw 2003, Weiermair 2005, Weiermair 2004.

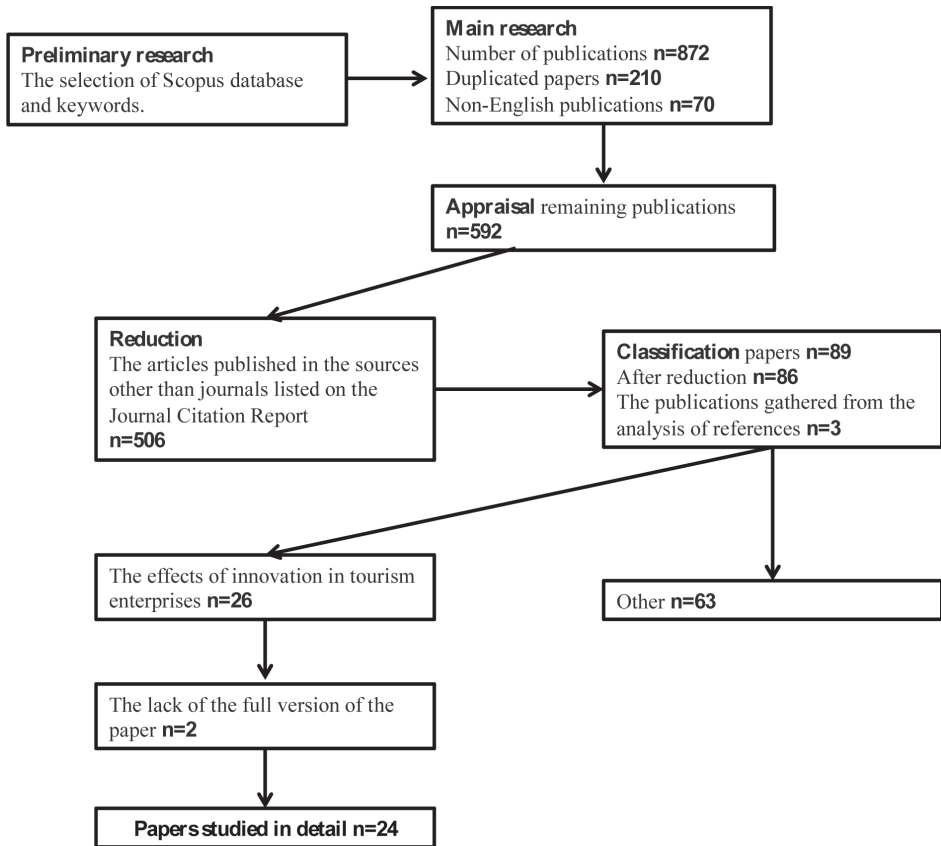


Figure 2. The strategy of the systematic literature study on the effects of innovation in tourism

Source: own elaboration

Table 2. The effects of innovation in tourism enterprises

No	Category	Postulated effects of innovation
1	Financial measures	Diminishing costs as the result of the diminishing use of resources, increase in income, profit and market value
2	Organisation	Improvement of internal processes
3	Relations with clients	Increase in the client satisfaction
4	Communication with clients	Improvement of the quality of communication
5	External relations	Improvement of the competitive position

6	Growth	Increase in employment, training
7	Service quality	Increase in the quality of services
8	Reputation	Improvement of the reputation

Source: own development

The key role of clients was reflected in two categories concerning: relations and communication. The effects on relations covered: increased client satisfaction, propensity to re-book the hotel and propensity to recommend the hotel to friends and family. The innovations analysed included the use of ICT and an innovative price policy. The improvement of the communication with clients resulted from the employment of Internet communication channels and the introduction of business customer service centres.

The improvement of the position towards competitors and the improvement in the relationships with suppliers were mainly the effects of the implementation of ICT. Such effects resulted also from the introduction of new services and repositioning.

The three other indicated categories included: growth, service quality and reputation. The improvement in the overall functioning of the company resulted from the implementation of new training and recruitment systems. The increase in quality resulted from: the implementation of ICT in the customer service centre. The improvement in reputation resulted from the change in the internal attitude towards innovation.

In conclusion innovation in tourism was approached from the holistic, evolutionary perspective. Two distinctive phases were isolated: initiation (1980–1999), and maturity (2000–present). In the initiation phase the researchers suffered from the lack of sound theoretical background. The authors focused on the new product implementations and the adoption of information technologies. The classifications of innovation in tourism were introduced.

In the maturity phase researchers covered four main topics: categorisation of innovation, determinants and driving forces of innovation, search process and knowledge source of innovation and the effects of innovation. As far as categorisation is concerned, there was no consensus between researchers. Further scientific investigation is necessary in this field. The driving forces of the innovation process covered mainly the involvement of entrepreneurs and changing demand which is in line with the technology-push/demand-pull paradigm. In tourism the important source of knowledge is the company's business chain

or network. However the cooperation with academia is still inefficient. As far as the effects of innovation in tourism are concerned eight categories were created. They derived from the scientific coverage in the previous research and included: financial measures, organisation, relations and communication with clients, external relations, growth, service quality and reputation.

Chapter summary

The issue of innovation is crucial for contemporary economics. However the comprehensive theory of innovation is still missing. The present chapter aimed at summarising the knowledge on innovation, innovation in the service sector and innovation in tourism. The chapter was based on literature studies.

In the context of the present research the definition of innovation was fundamental. Its formulation was based on the evolutionary overview of the approaches to innovation in the world. Based on the analysis of the evolution of the different approaches the definition of innovation was formulated as follows: “innovation is a process of implementing positive and new ideas into business practice”. The effects of the multi-stage process of innovation are presumed to be positive but may not be determined a priori due to the unpredictability of innovation projects.

The analysis of the most important economic theories referring to innovation resulted in the determination of the broad context for analysing innovation which was crucial for the present research. Amongst the theories referring to the external environment, the structure of the market, the competitive position of a company, the actions of competitors and the interactions between public and private sector were named as the forces influencing the innovation process. Furthermore marketing and diffusion theories indicated that changing market needs and the diffusion process stimulate innovation in companies. Theories focusing on the internal environment emphasised the role of the combination of resources, sunk costs, cohesive internal structure, agreement between agents and principals and the acting in favour of the common good by all participants of the inter-organisational game. Other theories concentrated on the evolutionary character of innovation, the unpredictability of an innovation project’s outcome and the possible irrationality of decision makers.

Due to the focus of the present research the general discussion on innovation was complemented by a deeper investigation on innovation in services. It was ascertained that innovation in services constitutes a separate field from innovation

in manufacturing. However the approaches to innovation in services are strongly diversified. The studies on the effects of innovation in services covered the increase in a firm's capabilities and the external and internal relationships. Also the researchers examined the effects on competitiveness, business processes and financial performance. Furthermore it was concluded that innovation in services shares some of the characteristics of innovation in low-tech industries and that nowadays traditional low-tech industries also apply sophisticated technological solutions.

In the light of the present research innovation in tourism was crucial. Two distinctive phases were isolated – the initial phase characterised by the lack of a firm theoretical background, and the maturity phase characterised by the acknowledgement of the importance of innovation in tourism, and in consequence, by the number of different approaches and studies. In the maturity phase researchers mainly examined one of the four fields: categories, determinants and driving forces, search process and knowledge source and the effects of innovation in tourism. In the studies covering the effects of innovation researchers referred mostly to the diminishing costs, the improvement in organisational processes and in financial measures. There were only two studies covering the effects of innovation on market value. It reveals an important research gap. The approaches to innovation differed strongly from one to another. It appears that innovation is a very wide category and needs to be addressed individually in each research project to capture its particularities.

Chapter 2

Enterprise value and its determinants

Introduction

Investment decisions are based on the analysis of the available possibilities. In order to take rational decisions investors need to evaluate the effects of company functions. There are numerous financial measures referring to different fields of a company's activity. However the most comprehensive amongst them is company value. According to the Oxford Dictionary value stands for "the regard that something is held to deserve; the importance, worth, or usefulness of something". Moreover the dictionary defines value as "the material or monetary worth of something", and "the worth of something compared to the price paid or asked for it" [Oxford Dictionary 2015]. Value includes all aspects important for company operations [Bodie and Merton 2000]. Consecutively it may be concluded that the main objective of management is to maximize the wealth of shareholders, thus the value of a firm [Rappaport 1999]. Furthermore the maximization of a company's value results indirectly in increasing employment and better working conditions for employees, growing customer satisfaction, and shouldering a greater burden of corporate responsibility [Koller, Goedhart and Wessels 2010].

From the point of view of the present research it was crucial to determine the most conceptually correct approach to valuation. In order to do so an extensive overview of approaches to valuation was performed. The approaches to valuation are strongly diversified. Seven approaches presented in the chapter include: (1) discounted cash flow -based, (2) relative value based, (3) accounting and liquidation-based, (4) goodwill-based, (5) acquisition value-based, (6) leveraged buyout-based valuations, and the (7) enterprise market value (MV). Based on the above overview it was concluded that the market value based approach is the

most accurate measure due to its comprehensiveness and up to date character. This approach was studied in detail.

Furthermore in the light of the present research the definition and operationalization of market value (MV) was essential. It was achieved through literature studies. It was concluded that even though enterprise value covers both the market value of equity and debt, it is the value of the equity (market capitalisation) that is crucial in analysing the changes in MV. It is due to regular updates and high data accessibility in comparison to the market value of debt. In consequence of the above conclusion the question of market efficiency arose. In the previous research both market efficiency and inefficiency were strongly advocated in empirical research. In this context, in the present research, investors are presumed to shape the market value of equity by reacting to incoming information. However based on the literature it was concluded that their reactions are subject to five distortions: lack of absolute rationality, long-time adjustments, insider information, momentum effect and different efficiency levels of capital markets.

Moreover from the point of view of the present research it was fundamental to determine the forces driving the changes in market value of equity. It generated the comprehensive framework for studying its fluctuations. Based on the literature review it was confirmed that the most important economic theories referring to market value cover the influence of such factors as: capital structure, risk, size, value, momentum, cost of capital, return on capital and reinvestment rate. Besides psychological and social factors should be accounted for. The factors included in empirical studies on stock prices may be divided into economic factors, market factors and company factors.

This chapter attempts to continue the disciplinary tradition by focusing on the value of companies and creating an overview of current research on the subject. The purpose of the chapter is to deliver a comprehensive view on the value of companies. Furthermore the chapter aims at presenting the principles behind the value of public companies and identifying the most important factors driving the market value of equity. Despite the importance of the topic and a long tradition of the research on value there still seems to be a lack of consensus on such fundamental matters as the efficiency of capital markets for example. Even though the direct and indirect contribution of such laureates of the Nobel Prize in Economic Science as Robert Shiller, Eugene Fama, George Akerlof, Michael Spence, and Joseph Stiglitz, Franco Modigliani, Merton Miller, William F. Sharpe, Daniel Kahneman, and James Tobin is tremendous there still is a need for further investigation of the topic.

First, an overview of the most important approaches to valuation performed to select the most conceptually correct will be presented. Second, based on the literature studies the market value of equity will be defined and the modifications of the assumptions of market efficiency will be introduced. The chapter terminates with an extensive overview of the factors driving the changes of the market value of equity.

2.1. Approaches to valuation

The crucial importance of value determines its frequent utilisation by different economic agents. The first group which analyses company value on a daily basis are investors. There are two main types of investors: short-term investors and long-term investors. Long-term investors earn from dividend payments and capital gains in the long term. Short-term investors earn on the short-term market value fluctuations [Fama 1998]. However in empirical research several specific types of investors are isolated. They include: companies, financial institutions, general government, non-profit organisations, households, and international organisations; all of which differ in their information requirements [Ekholm 2006]. The purposes of portfolio managers may include: maximum long-term nominal return, maximum long-term real return, matching prescribed liability schedule, reverting against uncertain liabilities, etc. [Leibovitz 1998]. Therefore the groups indicated above of investors to achieve their diverse purposes require different information on a company's value. It demonstrates the reasons behind creating numerous different approaches to valuation. It is crucial to select the approach that is the most conceptually correct from the point of view of the present research. However in order to achieve this objective an extensive literature study is required.

The traditional approach supported by Milton Friedman⁶ concentrating on the sole responsibility of business “to use resources and engage in activities designed to increase its profits so long as it stays within the rules of the game” [1962, p. 133] seems not be valid anymore. Nowadays it is assumed that corporations have responsibilities towards all agents affected by the company's activity, therefore to the stakeholders of the firm [Freeman and Liedtka 1991]. Firms

⁶ Milton Friedman was awardee with Nobel Prize in 1976 for “his achievement in the field of consumption analysis, monetary history and theory and for his demonstration of the complexity of stabilization policy” [Nobelprize.org 2014f].

should not separate business from ethics and should fulfil the responsibilities to stakeholders [Freeman and Velamuri 2006]. Therefore the group of agents interested in company value, as the most important measure of its performance, is significant. The analyses of the company's value tend to be performed by various stakeholders. Their diverse groups cover: investors, consumers, employees, communities, civil society, industry, policy makers and media [Friedman and Miles 2006]. All of the agents posed different information needs. Therefore the approaches to valuation are numerous and diversified.

There are many approaches to value depending on who, for whom, and why the valuation is performed [Nesterak and Kowalik 2005]. There were many attempts to order the different approaches. The first overview of the different approaches may be derived from the work on valuation approaches and metrics by Aswat Damodaran [2005]. The author isolated three approaches to valuation:

1. Discounted cash flows (DCF) valuation.
2. Relative valuation.
3. Liquidation and accounting valuation.

However the author's approach to valuation evolved. In the extensive work on corporate finance the author isolated only two basic approaches to valuation [2007]: discounted cash flow valuation and relative valuation. Furthermore in the work of 2012 Damodaran discussed tools and techniques for determining the value of any asset. Contrary to the previous works, in the latest book Damodaran focuses only on the market valuation.

It appears that the divisions proposed by Damodaran [2005; 2007] are to some extent consistent with the works of Fernandez [2002] and Hooke [2010]. However there are some differences worth indicating. Fernandez presented an accounting-biased point of view whilst Hoke offered a managerial-biased view-point. Fernandez proposed a division covering four approaches to valuation:

1. Balance sheet-based.
2. Income statement-based (relative).
3. Goodwill-based.
4. Cash flow discounting-based.

It occurs that the discounted cash flow valuation [Damodaran 2005; 2007] is the most conceptually correct. It refers to the fourth approach isolated by Fernandez. Relative valuation consists of valuing assets based upon how similar assets are priced in the market. The process relies on generating standard prices by scaling the market prices to a common variable [Damodaran 2005; 2007].

Such an approach is partially similar to the Fernandez's relative approach which seeks to determine the company's value through multiples based on earnings and sales. The multiples are chosen amongst comparable companies [Koller, Goedhart and Wessels 2010]. Liquidation and accounting valuation is based on the book value of assets and equities [Damodaran 2005] and therefore refers to the first approach isolated by Fernandez. Furthermore Damodaran did not extract the goodwill-based approach. However the author indicated that the value of a business is not the sum of the values of the individual assets. It is due to the fact that by performing a valuation of a concern the judgement must be made not only on the existing investments, but also on the expected future investments and their profitability [Damodaran 2007].

Hooke presented a managerial-biased viewpoint. The author covered five basic approaches to valuation: (1) relative value, (2) intrinsic value (discounted cash flows), (3) acquisition value, (4) leveraged buyout value and (5) technical analysis value [Hooke 2010]. However in the description of valuation methodologies the author omits technical analysis value due to the focus on trading patterns which differs from the other methods in character and purpose. According to the author intrinsic value equals "the net present value of its dividends. Intrinsic value is sometimes called fundamental value or discounted cash flows (DCF)" [2010, p. 185] which is closely related to the DCF valuation by Damodaran [2007]. Relative value "is determined by comparing it to similar companies' value" [Hooke 2010, p. 185], which equals the relative value by Damodaran [2007]. The last two approaches to valuation present the highest usefulness for a company's managers. Acquisition value calculates "a company's share price by considering its worth to a third-party acquirer" and the last approach by Hooke represents the firm's value in a leveraged buyout [2010, p. 185–187].

Based on the above discussion in this research seven approaches (most of which are internally diversified) to company value will be presented: discounted cash flows-based, relative valuation, accounting and liquidation-based, goodwill-based, acquisition value-based, leveraged buyout-based and market value based. All the approaches will be presented within the chapter. Such a comprehensive presentation of the approaches will allow the selection of the most suitable one from the point of view of this research. Figure 3.

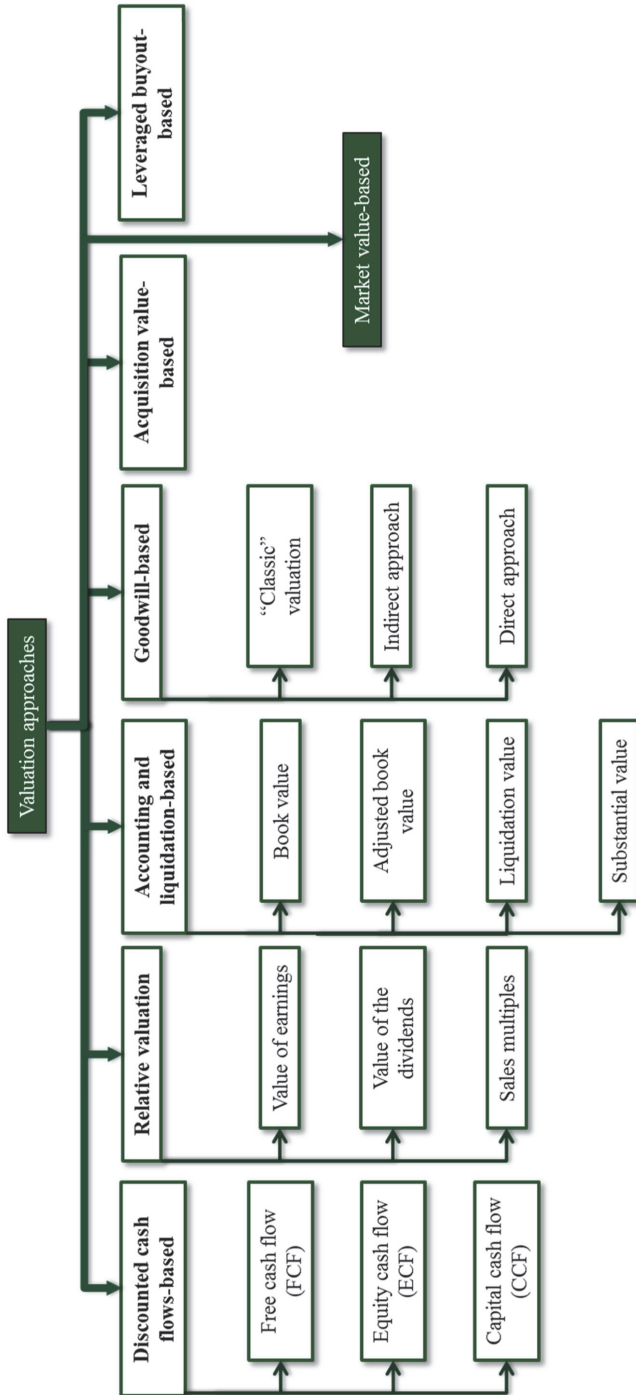


Figure 3. Different approaches to valuation

Source: own development

2.1.1. Discounted cash flow – based

The approaches relying on the discounted cash flow seek to determine the value of a company by estimating the future cash flows and discounting them with the rate matching the flows' risk in order to obtain the present value [Hamrol 2005]. Therefore a company is viewed as a cash flow generator. According to Fernandez cash flow discounting is the only approach to valuation that is conceptually correct [2002]. Moreover nowadays it is the most frequently used.

The procedure of calculating the value of a company relies on the careful forecasts of the cash flow occurring in each of the periods to come. The value reflects the cash flow generated by existing assets and the expected cash flow from future investments. Thus value is the function of key inputs: cash flow from existing investments, expected growth in the cash flow in high-growth period, the length of the period before the company becomes a stable-growth company and the cost of capital [Kochalski and Frąckowiak 2010].

The three main approaches to company valuation are based on three basic cash flows: free cash flows (which are discounted with the use of weighted average cost of capital – WACC), equity cash flows (which are discounted with the rate of the required return to equity) and capital cash flows (discounted with the use of WACC) [Fernandez 2002].

Using the free cash flow (FCF) to calculate the value of the company

The free cash flows reflect the flows generated by a company's operations without accounting for company debt. Therefore they show the cash flows for shareholders if the company had no borrowings. Omitting the outflows necessary for the future existence of the company may be misleading [Fabrozzi and Drake 2009]. In order to calculate a company's value the free cash flows must be discounted using the WACC. The WACC is adequate since the approach values the whole company [Damodaran 2007].

Using the equity cash flow (ECF) to calculate the value of the company

The approach values equity by discounting ECF at the cost of equity. Direct calculation of ECF starts with the net income. Then the non-cash expenses are added and the investment in working capital, non-operating assets and fixed assets are subtracted. Lastly the increase in debt and other non-equity claims are added and their decrease is subtracted [Koller, Goedhart and Wessels 2010]. Thus it is the flow made to shareholders after covering working capital requirements (WCR),

fixed asset investment, paying debt and financial charges [Fernandez 2002]. The required return on equity is usually determined with the use of Gordon and Shapiro's constant growth valuation model or capital asset pricing model (CAPM). The ECF approach is used to determine the value of a company's equity.

Using the capital cash flow (CCF) to calculate the value of the company

The CCF approach is appropriate if the company actively manages its capital structure to a target debt-to-value level [Koller, Goedhart and Wessels 2010]. The capital cash flow stands for the sum of equity cash flows and debt cash flows. The ECF was presented above. The debt cash flow is composed of principal repayments and the sum of interest payments. In order to discount the CCFs a measure encompassing the cost of equity and the cost of debt must be used. Thus the before-tax WACC is used to bring the CCFs to their present value [Koller, Goedhart and Wessels 2010].

It is important to notice that these methods posed important disadvantages. The models are only as good as the initial assumptions and are vulnerable to any changes in the postulated company and market performance. The methods are efficient only when there is a high degree of confidence about the future cash flows. Furthermore the models are suited only for the long-term value estimation and are not appropriate for short-term investment.

2.1.2. Relative valuation

The core of the relative valuation is to value assets based on the market prices of similar assets. It is assumed that the same assets fetch the same price on the market. Even though finding the identical asset may be impossible usually similar assets may be found. After accounting for differences between the assets their prices may be compared. As far as companies are concerned the relative valuation relies on comparing a company with the market value of a comparable company. Firms must be comparable with regard to risk, growth and cash flow characteristics and do not have to operate in the same industry [Damodaran 2007]. It seems that the approach is inappropriate for valuing innovative companies as by definition they differ significantly from the others.

In order to standardise the values of companies multiples must be employed. Three different multiples based on: value of earnings, value of dividends and sales may be introduced. According to Fernandez the approach is called relative valuation as the multiples are chosen amongst comparable companies [2002].

Value of earnings

The earnings may be used to obtain the fair value of company. The value of earnings constitutes the basis for comparing the values of companies. The prospect of earnings result from the fundamental analysis [Fabrozzi and Drake 2009]. The approach relies on the price/ earnings ratio (PER) which relates market (share price) and accounting (earnings) categories. The value of equity is calculated as the product of PER and earnings. Therefore in order to calculate a company's value one should calculate the PER ratios for several comparable companies and average the result. Next one should multiply the PER and the earnings of the company studied [Damodaran 2007].

Value of dividends

Dividend payment usually fluctuates along with earnings. Dividends are of key importance for investors as they may constitute a rather regular cash flow [Koller, Goedhart and Wessels 2010]. The key concept is that what an investor pays for shares reflects what he/she expects to receive from them. Therefore the price of a share stands for the net present value of the dividends obtained from it. The value of equity is calculated by dividing the dividend per share (DPS) ratio by the required return on equity [Fernandez 2002]. Therefore the value of the dividends paid is the basis for comparing the values of companies.

Sales multiples

Unlike the approaches presented above this relies on the company's sales. The value of the company is calculated as the product of its sales and the price/sales (P/S) ratio which in turn reflects how the market values every dollar of the company's sales. Therefore the value of a company is calculated in relation to the values of sales of comparable companies. It was found that the value of sales is an important multiple as the fundamentals of a company explain almost 100% of the P/S volatility [Mukherji and Lee 2013]. The P/S ratio is calculated as the product of PER and the return on sales [Fernandez 2002].

There are some drawbacks of relative valuation methods. The approach based on the value of dividends may be used only to value companies that actually pay dividends [Fabrozzi and Drake 2009]. Due to the restriction imposed by the ratio based on sales (imposing similar operating margins on the company's existing business), its use should be limited to those companies with volatile earnings or other situations where earnings do not reflect the long-term operating

potential [Koller, Goedhart and Wessels 2010]. Furthermore, it seems that the precision of the estimates based on the relative valuation is limited.

2.1.3. Accounting and liquidation-based

The core concept behind the accounting and liquidation based approach to valuation is that it estimates the value of the company based on the value of its assets. Usually accountants value assets basing on their historical cost. Thus they add to the value the cost of upgrades and they subtract the depreciation. Different assets may be valued using different methods. The focus is on the assets in place. Each asset is valued separately and adding them together yields the value of the business [Jaki 2008]. The proponents of the balance sheet-based approach argue that the book value of assets and equities is more reliable than valuation based on shaky assumptions about the future. However, it seems that the assumption that the balance sheet yields a reliable estimate of the value of assets and equities is idyllic. The approaches based on accounting measures covers: book value, adjusted book value, liquidation value and substantial value [Fernandez 2002].

Book value

The book value (net worth) stands for the value of shareholder equity stated in the balance sheet. It represents the difference between the total value of the company's assets (goods and rights) and its total debt with third parties. Therefore it reflects the difference between total assets and liabilities [Nunes 2003]. The accounting value of assets in most cases differs from their market value. Therefore the book value of a company rarely matches its market value [Fabrozzi and Drake 2009].

Adjusted book value

In the adjusted book value (adjusted net worth) approach a company's value is also calculated as the difference between total assets and liabilities. However the values of single assets are adjusted to their approximate market value. The adjustment process includes revising the value of mispriced assets and liabilities, including assets and liabilities not included in the balance sheet, and reclassifying equity and liability accounts if necessary [Nunes 2003]. Goodwill and deferred taxes are omitted [Baron 1996]. The approach seems more accurate as it accounts for bad debt, and obsolete and worthless items, for example.

Liquidation value

The liquidation value represents the value of the company at the moment of its liquidation – when the debts are paid off and the assets are sold. The value is calculated as the difference between the adjusted net worth and the business's liquidation expenses [Koller, Goedhart and Wessels 2010]. Assuming that the company continues to operate – liquidation expenses are not incurred. Therefore the company's adjusted book value surpasses the liquidation value. The major factors affecting the liquidation value cover market activity, market capacity and the level of competition [Gnenny, Dailydka and Lingaitis 2013].

Substantial value

As opposed to the liquidation value it is assumed that the company continues to operate. The concept of substantial value is well recognised in the history of economics [Schmidt 1930]. It relies on the valuation of the investment that should be made in order to establish the company identical to the one studied. It may also be called the replacement value [Koller, Goedhart and Wessels 2010].

It appears that the historical cost incurred some time ago may not reflect properly the current asset price and it does not account for the value created by future investment. The standard dilemma concerns how much weight to give to the historical cost of assets relative to the estimate of their value today. It seems that the reliance on historical costs causes the accounting methods not to be completely accurate at any given time. The accounting and liquidation approach offers a static viewpoint and does not account for the company's future evolution, situation in the industry, organisational structure, human resources, contracts, etc. The book value approach has numerous shortcomings which include: its static character, dealing with historical figures, failing to include intangibilities, treating all classes of accounts as having equal importance and presuming the book value as a reflection of the market value. It occurs that the adjusted book value does not account for future prospects. The substantial value approach poses at least two drawbacks: not all tangible assets are replaceable and the value of the organizational capital is omitted.

2.1.4. Goodwill-based

The goodwill of a company reflects the part of the value above the book or adjusted book value [Nesterak 2010]. Goodwill captures the intangibilities such as industry leadership, quality of the customer portfolio, strategic alliances, brands,

etc.. There are three components of goodwill: (1) business assets already in place and ready to use, (2) measured excess income, (3) expectation of future events that do not relate directly to the entity's current operations [Reilly 2015]. These factors contribute to the overall company success but are not included in the balance sheet. The approaches based on goodwill seek to value a company's assets and to quantify the gains from the earnings that the company will generate in the future [Fernandez 2002]. The approach covers: "classic" valuation, indirect approach, Anglo-Saxon or direct approach.

The "classic" valuation approach

The key concept behind the approach is that the value of a company equals the value of its assets plus its goodwill. The goodwill is calculated as the company's net income multiplied by a multiple (usually between 1,5 and 3) or as the company's turnover multiplied by a percentage of sales revenue. The income approach is commonly used in industry and the turnover approach is mostly used in retail trade [Fernandez 2002].

Indirect approach

The indirect method gives equal weight to net assets and the net income in contributing to the company's value. The value is calculated as the sum of the substantial value and the value of return divided by an appropriate interest rate (usually long-term treasury bonds). The indirect approach relies on the "super value" [Antonescu and Siminica 2008, p. 956]. Different versions of the indirect approach include different weights attributed to the net assets and the net income [Fernandez 2002].

Anglo-Saxon or direct approach

Similarly to the previous approaches this relies on adding the value of goodwill to the value of assets. However the direct approach does not rely on the super value but on the "super profit" [Antonescu and Siminica 2008, p. 956]. The super profit is calculated as the difference between the net income and the value obtained from a capital placing equal to the value of the company's assets at the interest rate "i". In the direct approach the value of the super profit is restated for an indefinite duration. Therefore, in order to obtain the goodwill, the super profit is divided by the risk adjusted interest rate earned on adequate fixed income securities [Fernandez 2002].

Goodwill-based approaches have at least two drawbacks. First, there is a serious risk of understating the value of intangible assets. Second, the period for which the goodwill is expected to last needs to be estimated, which may result in inaccuracy.

2.1.5. Acquisition value-based

The acquisition value-based approach relies on the data concerning mergers and acquisitions (M&A) of similar firms. The approach relies mainly on the costs of acquisition of comparable companies [Kochalski and Frąckowiak 2010]. Due to the fact that it is not possible to find two identical companies it accounts for the differences. Usually firms use acquisition cost valuation of assets with no fixed and determinable amounts of future cash flow. Therefore the approach is applicable when estimating the company's cash flows is hindered [Wahlem, Baginski and Bradshaw 2011]. Even though the data concerning public companies is a matter of public record there is a relatively small number of M&As of similar companies. This fact diminishes the validity of the approach. The approach is backward looking rather than concentrated on the future fundamentals [Hooke 2010].

2.1.6. Leveraged buyout-based

There is a long history of successfully closing the leveraged buyouts (LBOs) which lends credence to the approach. Moreover the private equity participants can verify the main assumptions behind the LBO (degree of permissible debt, payment schedule, interest cost). The approach applies in a situation in which investors intend to acquire a company through a LBO. Here a variation in which managers intend to acquire the company (called management buyout – MBO) will be analysed. Managers buy shares with their own equity and borrow the remainder from various lenders. The tendered shares are used as collateral for the loan. The company's valuation follows the usual procedure for an equity investment [Wahlem, Baginski and Bradshaw 2011]. The shortcoming of the approach is that many companies lack the features of an LBO candidate such as: near-debt-free balance sheet, consistent earnings record and low-tech business. Also the approach is sometimes a bottom line as the public market investors usually pay more than private equity firms [Hooke 2010].

2.1.7. Market value-based

Book value has little bearing on the company's market value. The first one reflects the value at which assets are carried on the balance sheet whilst the second one stands for the price that assets would fetch in the marketplace [Fabrozi and Drake 2009].

It appears that in the case of companies the market value is more accurate in economic decisions than the book value. First, the book value does not cover all the assets and liabilities (e.g. intangible assets such as reputation). Second, the assets and liabilities included in the balance sheet are not valued at the market value but at the purchase cost less depreciation. Therefore in order to value a company one should rely on the market prices. Market does not value only the company's assets it values also the entire companies. For the public companies the valuation of company's equity is performed on a daily basis. The enterprise market value of a company stands for the sum of claims of owners and lenders of a company: equity holders and creditors.

The firm's market value remains in relation with the fundamentals. As Campbell and Shiller stated prices do not drift far away from normal relationships to indicators of fundamental value. Valuation ratios fluctuate within historical ranges. Reaching one of the extremes usually causes a correction which brings the value to the more natural level [Campbell and Shiller 1998].

It occurs that amongst the different approaches to public company valuation those based on market data are superior to those based on accounting information. The importance of the topic stems from the fact that market value is the most effective measure of a public company's performance as it unifies information from all fields of the company's activity [Copeland, Keller and Murrin 1996]. At the same time market value is the most up-to-date measure [Milburn 2008]. Moreover it accounts for all assets and liabilities, including intangibles [Kochalski 2016]. Due to this fact it is preferable to measure the value of such categories as e.g. innovation. Furthermore the advantages of the market approach are as follows: its logic is fairly simple to understand, it uses actual data (actual prices, not estimations), it is relatively simple to apply, it includes the value of all of a business's operating assets and it does not rely on explicit forecasts [Hitchner 2006].

Summary – approaches to valuation

Value is the most comprehensive measure of a company's performance. Due to this fact different stakeholders use it in different situations. In consequence many different approaches to valuation were created. The basic division covers seven approaches. The discounted cash flows based approach relies on the future cash flows generated by companies. It is then divided by the measures used to discount the cash flows. The measures based on cash flows are vulnerable to assumption and inappropriate for short-term investing. The principle behind the relative valuation is to estimate the value of a company based on the values of similar companies. The similar companies may be selected based on the value of earnings, dividends or sales multipliers. The precision of the estimate is limited. Accounting and liquidation-based approaches calculate the value of a company based on its assets. It means that the approaches rely on historical costs which may cause inaccuracy. The good-will based approach focuses on the part of the value above the book value. Thus it measures the categories that are not included in the balance sheet and must be estimated which may cause imprecision. Acquisition-value based approaches rely on mergers and acquisitions (M&A) of similar firms. No companies are the same thus the method delivers only approximated values. Leveraged-buyout based methods refers to the situation in which investors acquire a company through leveraged buyout. The applicability of the approach is limited as most companies lack the features of an LBO candidate. The market-value based approaches rely on the prices at which companies are traded on the open market. Such an approach guarantees the comprehensive and up-to-date character of valuation.

Based on the above discussion it seems that from the point of view of the present research the market value-based approach to valuation is the most conceptually correct. It is due to the fact that for public companies the approach delivers the most precise and up-to-date data in comparison with other methods. Therefore it will be analysed in detail in the next sub-chapter.

2.2. The value of public companies

Market value based approach to valuation is superior to the ones based on the accounting information. In this context the in-depth analysis of the market value, including the division into market value of equity and the market value of debt,

seems indispensable. Furthermore the formulation of the definition of the market value of equity is essential from the point of view of the present research.

There are numerous publications on the value of public companies. Amongst the most influential are those of Eugene Fama and Robert Shiller⁷. However there seems to be a lack of consensus on such a fundamental matter for the valuation of public companies as market efficiency. Generally, despite the strong arguments of its adversaries, it is employed (with several modifications) as a general framework for analyses performed on capital markets [Fama and French 2007]. The efficient market hypothesis (EMH) assumes that market prices are shaped by the full and rapidly incorporated information which in turn determines investors' perception of the present value of future cash flows. Thus the market value of public companies represents the consensus between single investor's valuations. It seems that the efficiency of capital markets requires in-depth discussion. Moreover even though it is accepted as a general framework in the present research several modifications will be introduced.

First, the discussion on market value and the definition of the market value of equity will be shown. Second, the role of information in shaping the market value of equity will be discussed. Third, market efficiency will be considered and the modifications will be introduced.

2.2.1. Market value of equity

Market value is a general notion which stands for “the price at which an asset would change hands if sold on the open market” [OECD 2005]. According to the International Valuation Standards Council the market value is “the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion” [International Valuation Standards Council 2015]. The Royal Institution of Chartered Surveyors also adopts such a definition [2014]. Moreover the almost identical definition is delivered by The European Group of Valuers' Associations: “the estimated amount for which the property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without being under compulsion” [2015].

⁷ Both were laureates of the Nobel Prize in Economic Science in 2013 [Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences 2013].

Furthermore the US Treasury introduces a definition of fair market value: “the fair market value of any interest in a business, whether a partnership or a proprietorship, is the net amount which a willing purchaser, whether an individual or a corporation, would pay for the interest to a willing seller, neither being under any compulsion to buy or to sell and both having reasonable knowledge of the relevant facts [US Treasury 1992].

Even though each definition is slightly different they are all based on price. The semantic differences do not make the definitions mutually exclusive. Adair et al. summarized the key concepts behind all the definitions as follows [2005]:

1. A willing seller.
2. A reasonable period within which to negotiate the sale.
3. Value will remain static through the period.
4. The asset will be freely exposed to the market with reasonable publicity.
5. No account is to be taken of an additional bid by a special purchaser.

Single assets as well as entire companies are valued on an everyday basis. Market in the economic context stands for “an actual or nominal place where forces of demand and supply operate and where buyers and sellers interact (directly or through intermediaries) to trade goods, services or contracts or instruments, for money or barter. Markets include mechanisms or means of (1) determining the price of the traded item, (2) communicating the price information, (3) facilitating deals and transactions and (4) effecting distribution. The market for a particular item is made up of existing and potential customers who need it and have the ability and willingness to pay for it” [Business Dictionary 2015]. OECD specifies: “a market is where buyers and sellers transact businesses for the exchange of particular goods and services and where the prices for these goods and services tend towards equality. In order for a market to “clear” or function properly the quantity of goods and services demanded and supplied must be equal at some given price” [2008].

Based on the above considerations it may be concluded that market value is reflected in the prices that may be observed in the transactions between buyers and sellers (restricted by several conditions). As it was stated before the transactions may range from single assets to entire enterprises. At the same time most transactions concerning companies and their parts (shares) are concluded on the stock exchange, which are “organised markets for the issuance and subsequent sale and purchase of securities and (in some cases) derivative instruments based on such securities or on recognised indices of such securities” [Rutterford and Davison 2007, p. 490]. If a company is traded on the stock exchange it is called

public. Therefore the best way to follow the market value of public companies is to observe their current prices on stock exchanges [Hamrol 2005].

The market value of listed companies are decided by investors on the stock exchange and are reflected through their stock prices. Thus what determines market value is the investors' perception of the present value of the future cash flows generated during the life cycle [Appolloni et al. 2011].

The enterprise values “assess the value of the underlying business assets, unencumbered by debt and separate from any cash and marketable securities” [Berk et al. 2014, p. 33–34]. Thus the notion encompasses both the market value of equity and the market value of debt. The notion differs significantly from the market value of equity which is stated as follows: “the total market value of a firm's equity equals the market price per share times the number of shares, referred to as the company's market capitalisation” [Berk et al. 2014, p. 31]. The market capitalisation is the market value of the firm after it pays its debt. However as Frykman and Tolleryd state “equity value is sometimes called market value (MV) since it expresses the accumulated market value of all the company shares” [2003, p. 27]. Therefore as semantic inconsistency may occur the distinction between enterprise market value and the value of its equity is crucial.

Market value of equity is preferable for measuring the effects of events on a company's value. The market value of debt is difficult to obtain for firms that do not issue publicly traded bonds. The market value of equity is both easy to obtain and is constantly updated which reflects the firm-specific and marketwide changes [Damodaran 2012b]. Furthermore Grossman, and Livingstone indicate that the market value of debt may change irregularly – it undergoes changes due to new information hitting the market but the change and information may occur at a different time as “publicly owned bonds are traded infrequently compared to common stocks and their trades are not as widely reported” [2009, p. 146]. The authors indicate also that “many bonds are privately held by institutional investors and are not publicly traded at all so current prices for those bonds are not available” [2009, p. 146]. Therefore it occurs that in order to study the changes in market value due to occurring events it seems both easier (due to data accessibility) and more correct (due to the constant update) to employ the market value of equity rather than the actual enterprise market value (which covers also the value of debt which is difficult to access and is irregularly updated). Furthermore it is conceptually correct to recognize the remaining value of a company after it pays all the debts (the idea is reflected in the net worth approach described previously).

As it was stated before market capitalisation is the market value of a company's equity and equals the price per share times the number of shares. Such an

approach to market capitalisation is used also by Lynch who indicates that in order to calculate the market capitalisation of a company the number of shares outstanding needs to be multiplied by their current value [2000]. Also Damodaran shares the same approach by defining the market value of equity as: “the number of shares outstanding times the current stock price” [2012, p. 219]. Moreover, Vernimmen et al. state that market capitalisation “is obtained by multiplying the number of shares outstanding by the share price” [2011, p. 149]. Therefore based on the above considerations and the agreement between researchers a definition of market value of equity may be formulated which is crucial from the point of view of the present research. The definition is as follows:

“the product of the number of shares outstanding
and their current price”.

In a situation in which a company does not issue new shares and their number remains constant, the changes in share price represent the changes in the market value of equity. The increase in share price causes the market value of equity to increase. The decrease causes an adverse effect. Thus in order to observe that changes in the market value of equity the company stock price may be observed.

Market capitalisation constitutes the market-made valuation of the company’s net worth. The notion of outstanding shares refers to all the shares that a company has actually issued. It is composed of the float (shares that are freely bought or sold without restrictions) and the restricted shares (shares that cannot be bought without special permission of competent authority e.g. Securities and Exchange Commission – SEC). Shares outstanding do not cover the treasury stock (stock repurchased by a company to raise cash in the future or thwart a hostile takeover). Also outstanding shares differ from authorised shares (the total number of the shares that a company can issue). Moreover shares outstanding do not account for the fully diluted shares – the number of shares outstanding after possible sources of conversion such as options and warrants are executed [Investopedia 2015; InvestingAnswers 2015].

2.2.2. The role of information in shaping the market value of equity

The simplest approach to determining the value of a share is to divide the value of equity by the number of shares. Such a simplistic approach delivers an overview of the stock price. However the logic behind stock valuation is much more profound. The price is formulated in the buy/sell transactions closed by investors

formulating different expectations of the company's future cash flows. Investors anticipate the future cash flows based on the available information. The process of shaping the price covers acquiring information, processing information, formulating expectations and closing the deal with a determined price [Damodaran 2007]. The role of information shaping market value is crucial from the point of view of the empirical research reported in Chapters 4 and 5.

The price of the company stands for the market consensus as different investors have access to different information, process it differently and formulate different expectations on the future cash flows. Market value of equity changes constantly as it adapts to the constantly changing environment (which is one of its strengths). The fluctuations are caused by new information hitting the market [Fama and French 2007]. It is due to the fact that the new information impacts the investors' perception of the company's future cash flows. A new market consensus needs to be established between the bid (price that the buyers are offering) and ask (price that sellers ask for their shares) prices. The difference between the ask and bid prices is called a spread. Once the bid and ask prices equal the order is placed. Little spread signals stability of the stock [Abdullah 2010]

Furthermore investors may change their perception only if they receive new information. Therefore the accessibility of information and the whole information system is of key importance for capital markets. The regulatory authorities should enforce the reliability, completeness and timeliness of information disclosure by companies. However once a stock is traded on the market several sources of information influence its price. Such sources cover inter alia analysts' recommendations, TV, media platforms, print and electronic media outlets, etc. [Klein, Dalko and Wang 2012]. The impact of information disclosure on stock prices, investment culture, market sentiment and societal factors is profound and with long-lasting consequences. In this context it seems essential that the companies willing to benefit from innovation should manage the adequate information policies.

Information is at the heart of stock prices analysis. The majority of investors rely on public information. In this context a company's announcements are crucial [Pomykalski 2001; Merdyk 2007]. Focusing on public incoming news is broadly accepted in finance and strategy literature [Sharma and Lacey 2004] and commonly used in empirical research [Pauwels et al. 2004; Sharma and Lacey 2004; Sorescu, Shankar and Kushwaha 2007; Hanssens, Rust and Srivastava 2009].

Despite the obligation to disclose important information, corporate executives and managers are in the position to generate insider information. Also there is evidence that they are able to trade with success using economically important private information [Klein, Dalko and Wang 2012]. The information system

seems to reduce but not eliminate the information asymmetry. The notion stands for the imbalance of power between the best and worst informed investors. George Akerlof, Michael Spence and Joseph Stiglitz described the unpropitious effects of information asymmetry⁸. George Akerlof concentrated on the product market but the considerations apply also the shares traded on the stock market. The author “studied markets where sellers of products have more information than buyers about product quality. He showed that low-quality products may squeeze out high-quality products in such markets and that prices of high-quality products may suffer as a result” [Nobelprize.org 2014c]. The high-quality stocks (would be “cherries” in Akerlof’s nomenclature) sold in the initial public offering (IPO) may achieve only the price of average-quality stocks (“lemons”) due to the fact that uninformed investors are unable to judge the high quality and are willing to pay the average price [based on Akerlof 1970]. Joseph Stiglitz “showed that asymmetric information can provide the key to understanding many observed market phenomena” [Nobelprize.org 2014d]. In the stock market a screening process diminishes the information asymmetry between buyers and sellers, however too little or too much screening leads to Pareto inferior equilibriums [based on Stiglitz 1975]. Michael Spence “showed how the able agents may improve the market outcome by taking costly action to signal information to poorly informed recipients” [Nobelprize.org 2014e]. Positive information about the company may improve investors’ perception even though no actual positive changes take place. Therefore the information may be detached from facts and still impact positively on investors [based on Spence 1973].

Therefore, based on the above discussion, it may be concluded that a company’s market value is best reflected in its market capitalisation. The market capitalisation changes as the result of incoming information, which in turn changes investors’ perception of the present value of future cash flows. However the information system does not eliminate the information asymmetry which has a profound effect on the market price consensus. In this context a discussion on market efficiency seems important.

2.2.3. Market efficiency

There seems to be a lack of consensus on the efficiency of capital markets which is especially important in the light of the present research. Amongst the numerous

⁸ All the three authors were awarded the Nobel Prize in 2001 [The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2001].

publications both the efficiency [Fang and Lee 2013; Munir et al. 2012] and the inefficiency [Malkiel 2003; Abergel and Politi 2012] were proven. The diversity of empirical findings resulted from applying different methods, scopes, time frames, etc., Nevertheless the theoretical assumptions of market efficiency seem to be accepted as the general framework for analyses performed on capital markets.

The discussion about market efficiency was vital. On one hand Eugene Fama “demonstrated that stock price movements are impossible to predict in the short-term and that new information affects prices almost immediately, which means that the market is efficient” [Nobelprize.org 2014a]. On the other hand Robert Shiller “discovered that stock prices can be predicted over a long period, such as over the course of several years. In contrast to the dominant perception stock prices fluctuated much more than corporate dividends. Shiller’s conclusion was therefore that the market is inefficient” [Nobelprize.org 2014b].

The efficiency of capital markets

The efficient market is the one in which prices always fully reflect available information allowing firms to make investment-production decisions and investors to choose amongst securities [Fama 1970]. The idea of market efficiency may be approached from different perspectives. The theoretical foundation was contained in the efficient market hypothesis (EMH) which was stated in three forms: weak, semi-strong and strong.

In the weak form the prices follow the random walk which means that successive price changes are independent and identically distributed. Prices react immediately to the incoming information. Therefore the prices of today reflect the information of today and cannot be predicted based on historical prices. Even though the weak form does not imply that the prices are at the equilibrium at every moment, it prevents various actors from systematically profiting from inefficiencies [Fama 1970]. The weak form holds if the random walk of prices is observed.

In the semi-strong form the prices fully reflect all publicly available information. The security prices adjust rapidly and fully to an information generating event (e.g. announcements of firms, stock splits, new security issues, innovation etc.). It means that the initial investors’ reaction to the incoming information is precise and does not require any further adjustments in future. The semi-strong form implies that no excess return may be gained by using technical or fundamental analyses [Fama 1970]. The semi-strong form holds if market reaction

to incoming information is immediate and precise which means that no further adjustments are observed afterwards.

In the strong form all available information (not only public) “is fully reflected in prices in the sense that no individual has higher expected trading profits than another because he has monopolistic access to some information” [Fama 1970, p. 409]. However the strong form is further discussed by Fama who indicates that in many cases the strong form does not hold due to legal issues for instance preventing private information from becoming public. The strong form holds if no participants earn excess returns in the long term.

The strong theoretical background does not make the EMH irrefutable [Lo 2007]. It was criticised both in the periods of economical stability [Hilsernath 2004] and in the post- crisis environment [Nocera 2009; Cassidy 2010; Simkovic 2009]. The criticism concerned such basic assumptions as: the absolute rationality of investors, their immediate response and the ease of information sharing. It seems that the scientific community reached a consensus on employing the EMH as a general framework (“there is wide acceptance in this literature that a reasonable level of efficiency can generally be presumed to exist in active, well-regulated capital markets” [Milburn 2008, p. 293]), but with certain modifications changing the initial assumptions. It appears that the modifications are crucial for the present research which builds on market efficiency. Their adoption allows the construction of a general, theoretical framework concerning company value employed in the empirical research reported in Chapters 4 and 5.

First, the absolute rationality of investors is neglected. The errors in judgements made under conditions of uncertainty are common. In the classical approach there are five factors which hinder the rational analysis of data: “discrepancies between acceptance and application of normative rules; effects of content on the application of rules; Socratic hints that create intuitions while testing them; demand characteristics of within-subject experiments; subjects’ interpretations of experimental messages according to standard conversational rules” [Kahneman 1982, p. 123]⁹. Moreover it seems that a smaller impact is assigned to diagnostic data rather than to casual data. The dominance of casual logic is explained by a reluctance to revise old concepts under new facts and the ease of explaining unexpected phenomena [Tversky and Kahneman 1977]. In the modern approach Fama and French analysed the disagreements between

⁹ Daniel Kahneman was awarded the Nobel Prize in 2002 for having integrated insights from psychological research into economic science, especially concerning human judgement and decision-making under uncertainty” [Nobelprize.org 2014k].

investors and tastes for assets as consumption goods. They concluded that a single investor may overreact or underreact to the upcoming information [2007]. Furthermore Brav and Heaton constructed an “overconfidence” model as the result of the examination of the behavioural approach and structural uncertainty [2002]. Moreover Brennan and Xia [2001] explored the issue of anomalies being genuine or merely apparent. If the anomaly is genuine it impacts investors’ perception, otherwise it does not. Nevertheless as the market averages the valuations of single investors, it remains efficient.

Second, the initial investor’s reaction may be improper and it tends to adjust over time. Therefore the assumption of the precise and immediate reaction to the incoming information needs to be loosened. The past information, which was not confirmed by subsequent earnings, is followed by the correction of the initial reaction [Kaestner 2006]. Therefore in order to observe the full market reaction (including initial reaction and the correction) a long horizon is required. Moreover from the point of view of a company it was ascertained that some stocks adjust faster to market wide information than others [Prasanna and Menon 2012].

Third, the groups of insiders who profit from private information seem to exist. Insiders are able to achieve abnormal returns over a long period. However the bigger their number the more the private information is reflected in asset prices [Stockl 2014]. Fama delivers an alternative explanation according to which in the normal distribution of the returns earned by investors there may be some “stars”. However their existence is statistically reasonable and does not have to result from having access to insider information [Fama 1970].

Fourth, there is a momentum effect. Firms experiencing high returns in the past period signal high expected returns [Fama and French 2008]. Jegadeesh and Tittman [1993; 2001] indicated that buying stocks that have performed well and selling stocks that have performed poorly in the past generates significant positive returns. In their publication of 2001 the authors indicate that momentum profits may be “due to delayed overreactions that are eventually reversed” [Jegadeesh and Tittman 2001, p. 699].

Fifth, it is acknowledged that different markets in different periods can demonstrate different levels of efficiency depending on their size, depth and liquidity amongst other factors. The empirical evidence indicates that the markets in Europe are the most information-efficient. At the same time those in Asia and Latin-America are less information-efficient [Kristoufka and Vosvrda 2012]. However the efficiency of capital markets in Europe is also strongly differentiated [Baciu 2014].

Fama [2011] indicates that a market “can’t resolve uncertainties that are unresolvable”. As a result different levels of risk aversion, economic uncertainty

and volatility in prices remain common phenomena. According to the author the fact that the market does not anticipate at any time future stock prices does not erase its efficiency [2011]. Furthermore Elbarghouthi, Quasim and Yassin indicate that “the price behaviour in developed markets can be characterised as random walk” [2012, p. 167], which determines the practical applicability of EMH. In this light it appears that the market should react to new information on company innovation. However in order to represent the relation five assumptions need to be adopted: lack of full investors’ rationality, adjustments through time of their initial reactions, existence of insiders, presence of momentum effect, different efficiency levels of stock markets. Such theoretical foundation is essential in the context of the empirical research reported in Chapters 4 and 5.

Price and value

Discounted cash flows, rate of return and risk are the fundamental factors influencing a company’s value. For public companies the market value of equity is reflected in the stock prices. However prices as they reflect the investors’ perception of the company’s net worth may fluctuate around the values determined using other methods [Damodaran 2007].

The more efficient the market the better it incorporates all the available information into valuation. As a result the market price of equity is precise, comprehensive and up-to-date. However, even on the highly efficient markets, prices do not have to reflect precisely the value of equity at every moment. According to most empirical evidence the market reacts fast [Damodaran 2007] and fully [Milburn 2008] to the new information but is not infallible.

There are three main reasons why the price may deviate from the values of company determined using other methods. First, the available information may be insufficient or unreliable. In such a case the investors’ expectations of future cash flows is wrong. Second, investors may improperly transform information into expectations. Third, even if the information is precise and investors interpret it correctly, there may be some investors who intend to conclude transactions with prices different from the rational expectations [Damodaran 2007].

Summary – value of public companies

Valuation methods based on market data are more reliable than the ones based on book information. Market value is reflected in the transactional prices (restricted

by several conditions) concluded between buyers and sellers. Enterprise value covers the market value of equity and debt. However, it is the value of equity that is crucial in determining the actual company's value. It is due to higher data accessibility and update regularity. The market value of equity is also called market capitalisation and defined as: the product of the number of shares outstanding and their current price.

Investors formulate their expectations on the present value of future cash flows based on incoming information. The price observed on the market stands for the investors' consensus as different investors analyse different information, process it differently and formulate different expectations. Even though information is of key importance for the capital markets the information system is unable to eliminate fully the information asymmetry between different agents.

In the present research the assumption of market efficiency is employed as a general framework for analyses. However five modifications to EMH seem indispensable. At the conceptual level the absolute rationality of investors is neglected. It is assumed that single investors may overvalue or undervalue companies. The adjustments of the initial investors' reaction are allowed. It means that the precise reaction of the market is not immediate. Investors may adjust their initial valuation over time. The existence of insiders profiting from private information is permitted. In such a case the market value of equity may fluctuate even when no information hits the market. Furthermore it is assumed that momentum affects stock prices. The companies increasing the market value of equity are presumed to increase it further and the companies in which market value of equity falls are presumed fall further. It is assumed that different markets may demonstrate different efficiency levels. It means that the precision and time of valuation may vary.

2.3. Factors driving the market value of equity

The number of factors driving market value of equity is almost uncountable. However the strength of their influence is strongly differentiated. It is important from the point of view of the present research to determine the factors which influence the changes in the market value of equity. It allows for the generation of a holistic framework for studying its fluctuations. First, the most prominent theories on factors driving market value of equity will be presented. They concentrate on such factors as capital structure, risk, size, value, momentum, cost of capital, return on capital, reinvestment rate and the psychological and social factors. Second, an overview of specific factors used in empirical researches will be delivered. The

comprehensive framework divides them into economic factors, market factors and company factors. The present sub-chapter builds on the studies of literature.

2.3.1. Theoretical background

The simple approach covers three factors: weighted average cost of capital (WACC), return on capital (ROC) and reinvestment rate. The WACC stands for the calculation of cost of capital in which different capital types are represented proportionally. Two components make up capital funding – equity and debt. Both equity holders and lenders require a certain return on the money they provided. Thus the weighted average cost of capital represents the expected return to debt holders and equity owners. The return on capital embodies the overall return earned on both equity and debt invested in the investment. The reinvestment rate reflects the expected growth rate and the company's return on capital. It measures how much a company is ploughing back to generate growth in the future. The difference between the cost and the return on capital determines if the company is creating value. If the difference is positive then further investment increases share prices. If the opposite is the case as a result of investment the share price decreases. The magnitude of the share price movement is determined by the rate of reinvestment [Damoraran 2007].

In the perfect market the market value of a firm (reflected in the stock prices) depends on the firm's earning power and the risk of the underlying assets. At the same time it is independent from dividend policy and method of financing [Modigliani and Miller 1958]. According to Modigliani and Miller¹⁰, who studied the "effect of financial structure on the market valuation" [1958, p. 264], the perfect market is a subject of such restrictions as: no taxes, transaction and bankruptcy costs, no effect of debt on earnings before interest and taxes (EBIT), information symmetry, equivalent cost of borrowing from companies and investors. In such circumstances a company's capital structure does not affect its WACC and as a result its market value of equity [Modigliani and Miller 1958]. However in practice the capital structure irrelevance proposition presented above does not hold due to the unrealistic assumptions. Modigliani and Miller developed the trade-off theory of leverage, which covers also corporate taxes. In the second approach capital structure impacts on the market value as the firm with more debt

¹⁰ Franco Modigliani was awarded the Nobel Prize in 1985 "for his pioneering analyses of saving and of financial markets" [Nobelprize.org 2014g]. Merton Miller was awarded the Nobel Prize five years later, in 1990, for his "pioneering work in the theory of financial economics" [Nobelprize.org 2014h].

profits from the tax shield [Modigliani and Miller 1963]. The lowered WACC improves investors' perception of the company and the share price increases which is consistent with the Damodaran's framework.

Furthermore the role of unrecorded and unmeasured assets seems important. It is due to the fact that the same group of assets may be used with different levels of efficiency and synergic effects. James Tobin¹¹ studied the relationship between the market value of assets and the value of the company's recorded assets. In his publication of 1969 the author introduced the ratio between an asset's market value and its replacement cost. As Tobin and Brainard explain the famous "q" stands for "the ratio between two valuations of the same physical asset" [Tobin and Brainard 1976, p. 1]. If the quotient surpasses "1" then some unrecorded or unmeasured assets are reflected in the market value. In such a situation a firm may issue stock and receive a relatively high price for it. Therefore a firm may finance the facilities and equipment with a relatively small issue of stock. If the quotient is less than 1 the market value of the company's assets is less than their recorded value which signifies the inefficiency of the use of assets [Tobin 1969].

The value of stock is determined inter alia by the expected return it offers. In this context the calculation of expected return is crucial. At the same time the riskier the asset the higher the return it must offer to attract investors. The simple approach to calculating expected return covers the risk free rate of return, the expected market return and beta (measure of stock's risk) of the security. The model is called Capital Asset Pricing Model (CAPM). Without going into detail the model indicates clearly that investors require a premium to compensate the additional risk and that the only way to earn more is to accept the additional risk [Sharpe 1964; Sharpe 1970]¹².

The assumption that the expected return depends only on the riskiness of an asset seems to simplify the idea. In addition to the risk factor, size and value factors should be added. The size factor – "small minus big" (SMB) accounts for the spread between firms with large and small market capitalizations. At the same time small firms usually outperform large ones. The value factor – "high minus low" (HML) accounts for the spread between the firms with high (value stocks) and low (growth stocks) book-to-market ratios. Value stocks usually outperform growth stocks [Fama and French 1993]. The addition of the two factors which effect the expected returns and therefore the market value of equity was developed

¹¹ James Tobin was awarded the Nobel Prize in 1981 for "his analysis of financial markets and their relations to expenditure decisions, employment, production, and prices" [Nobelprize.org 2014j].

¹² William F. Sharpe was awarded the Nobel Prize in 1990 "for the pioneering work in the theory of financial economics" [Nobelprize.org 2014i].

by Kenneth French and Eugene Fama. Further development covered the addition of the fourth factor – momentum. It reflects the tendency for an increasing stock price to continue growing and for a decreasing stock price to continue falling [Carhart 1997].

Robert Shiller challenged investors' rationality stated in the efficient market hypothesis [Shiller 2003]. The author argued that investors should price stock based on the present value of future dividends. However empirical research indicated that the volatility of the stock market surpassed significantly what could be expected from the data [Shiller 1981]. One of the explanations is that stocks are subject to fashion [Shiller, Fischer and Friedman 1984]. Investment decisions are led not only by the objective facts. The broader social science perspective should cover also psychological and sociological factors. The bubbles that occur on stock markets result from misleading speculations which transform into irrational exuberances. Such a situation leads the cyclical adjusted price-earnings ratio to irrationally high levels which results in a sharp decline [Shiller 2015].

Damodaran [2007] presented the general framework for analysing the market value of equity covering WACC, ROC and reinvestment rate. The approach of Modigliani and Miller [1958; 1963] delivered a general explanation on the effect of capital structure on a firm's market value. Sharpe [1970] emphasized the importance of the risk factor. Fama and French added additional size and value factors [1993] and Carhart introduced the momentum factor to the model [1997]. The rationality of investors and the efficiency of markets was challenged by Shiller who demonstrated the magnitude of psychological and sociological factors. However the list of factors affecting market value of equity is almost uncountable. Next, the most important factors will be presented with the use of a comprehensive framework proposed by Madura [2008].

2.3.2. Factors used in empirical researches

There have been numerous studies on the factors determining the market value of equity. Malhotra and Tandon [2013] performed a comprehensive review of such studies published before 2010. Nirmala, Sanju and Ramachandran [2011] also delivered an overview of publications published between 1988 and 2009 focusing on market value of equity determinants. Since 2010 every year new publications have appeared. A further complement of the authors' reviews covers the works of Sloan [2012], Gatua [2013], Ejuvbekpokpo and Edesiri [2014], and Islam and Dooty [2015]. The studies covering the determinants of the market value of equity are presented in Table 3.

Table 3. Studies covering the determinants of market value of equity published between 1982 and 2015

No	Study	Identified factors
1	Zahir and Khanna [1982]	Dividend per share, yield, book value
2	Srivastava [1984]	Dividend
3	Balkrishan [1984]	Book value and dividend per share
4	Chawla and Srinivasan [1987]	Dividend and retained earnings
5	Karathanassis and Philippos [1988]	Dividend, retained earnings, size
6	Midani [1991]	Earnings per share, financial leverage
7	Zahir [1992]	Dividend, earnings, yield
8	Irfan and Nishat [2002]	Dividend yield, leverage, payout ratio, size
9	Pradhan [2003]	Dividend, retained earnings
10	Sen and Ray [2003]	Dividend payout ratio
11	Mehta and Turan [2005]	Market capitalization, market price to book value ratio and price-earnings ratio
12	AL-Omar and AL-Mutairi [2008]	Book value per share, earning per share, trade volume
13	Khan [2009]	Dividend, retained earnings
14	Somoye, Akintoye and Oseni [2009]	Earnings per share, foreign exchange rate, gross domestic product, lending interest rate
15	Sunde and Sanderson [2009]	Corporate earnings, management, lawsuits, mergers and takeovers, market liquidity and stability, availability of substitutes, government policy, macroeconomic fundamentals, investor sentiments, technical influences, analysts reports
16	Uddin [2009]	Dividend, earning per share, net asset value per share
17	Nirmala, Sanju and Ramachandran [2011]	Dividend per share, price-earning ratio, debt-equity ratio (leverage)
18	Sloan [2012]	Non-financial factors: volume, recession, djia; financial factors: stock price of past quarter, dividends, current assets, current liabilities, total assets, net income; recent news – divestitures
19	Gatua [2013]	Interest rate, foreign exchange rate, share index, lagged share prices
20	Malhotra and Tandon [2013]	Book value, dividend per share, earnings per share, dividend cover, dividend yield, price-earnings ratio
21	Ejubbekpokpo and Edesiri [2014]	Earnings per share, book value per share and dividend cover
22	Islam and Dooty [2015]	Dividend and retained earnings

Source: own development based on Malhotra and Tandon [2013], and Nirmala, Sanju and Ramachandran [2011]

The empirical research on the impact of innovation announcements on the market value of equity requires accounting for the factors determining it. The factors identified in the numerous studies are strongly diversified and require to be placed in an order. The diverse factors may be divided into three groups: economic factors, market-related factors and firm-specific factors [Madura 2008]. Each type is internally divided. In order to organize the reasoning the factors presented above are shown using the proposed three groups.

Economic factors

The first group of market value of equity determinants covers the economic factors. They refer to the economy-wide situation and events of economy-wide importance. There are five such factors: economic growth, governmental policy, interest rates, foreign exchange rate and currency exchange rate.

The first of the factors is the economic growth. The higher the growth, the higher the postulated increase in demand for the company's services and products, and consequently the higher the growth in the firm's cash flows. The information on high economic growth places upward pressure on the value of companies. The increase in GDP is most likely to result in an increase in stock market prices. The decrease in GDP causes the adverse effect [Stock and Watson 2002].

The second of the factors includes government policy. The changes in government spending, system of taxation, industrial policy, monetary policy, etc. impact on the willingness to buy shares [Sunde and Sanderson 2009]. Furthermore governments are able to impose legal frameworks on the functioning of companies which alter the predictions of future cash flows. The possibilities of governments to affect companies' stock prices are numerous. Thus every time a government acts the results of its actions need to be evaluated.

The third of the economic factors includes interest rates which are one of the most prominent drivers of market value of equity. The risk free rate of return (e.g. treasury bonds) reflects the minimum rate of return required by investors. In order to buy a risky asset an investor needs to be compensated with the risk premium for the included risk which stands for a higher expected rate of return. The relationship between interest rates and stock market performance is not linear but strong [Brennan and Xia 2001].

The foreign exchange rate is the fourth of the economic factors affecting market value of equity. The more a country's economy is dependent on the international exchange the more companies' stock prices are vulnerable to changes in the foreign exchange rate. It is especially the case of small economies. The increase in the foreign exchange rate is generally positively related to the stock

prices [Campbell 2003]. It appears that the foreign exchange rate is of crucial importance for such sectors as e.g. tourism.

The last of the economic factors involves the currency exchange rate. Investors using other currencies than the one in which the company's stock is denominated are willing to buy shares when the currency is weak and to sell when it is near its peak. Furthermore the currency exchange rate is crucial for import/export activities. Therefore the cash flows of the firms involved in exportation (or cooperating with such firms) are stimulated to growth when the currency is weak and the export is profitable. The company's cash flows are adversely affected by a strong currency's exchange rate. The cash flows of companies involved in importing are positively affected by a strengthening currency and negatively by a weakening one [Madura 2008]. It appears that this factor is important for companies managing international operations, such as tourism companies.

Market-related factor

Market-related factors refer to the functioning of the market itself. This type of factor includes forces determining the operations on the market. There are six such factors: investor sentiment, the January effect, stability, trading volume, share index and availability of investment subsidiaries.

The first of the market-related factors includes investor sentiment which means the general investors' mood on the stock market. It is important due to the fact that market valuation reflects investor perception which in turn is determined by the investors' mood. In consequence the investors' valuation may be to some extent detached from the current economic conditions. The irrationality of investors may embody theoretically improper reactions to the economic factors presented above. Furthermore some investors seem to follow others instead of performing their own valuations which creates the irrational exuberance explained by Shiller [2015]. It is especially important in the context of the popularity of innovation. The general optimism with respect to innovation projects may result in exaggerated affirmative market reactions to innovation announcements.

The second market-related factor is the January effect which is based on the fact that many portfolio managers are evaluated at the end of the year. Such managers invest in risky assets at the beginning of the year but near the end of the year they are motivated to invest in large and more stable companies. Therefore there is an upward pressure on small and risky stock at the beginning of the year [Madura 2008]. Also the market reward to risky projects such as innovation is greater at the beginning of the year.

The third of the factors includes market stability which is reflected in relatively small stock price fluctuations. The sentiment of stability relates positively to market value of equity. However market instability may signify high investment risk and may result from inefficient insider trading governance. Therefore a high volatility of market value of equity repels investors and the stable market attracts them [Sunde and Sanderson 2009]. The factor is crucial in intra-country comparisons.

Trading volume is the fourth of the market-related factors. It may refer to the whole market or a single company. The number of transactions on the market reflects its liquidity. The low liquidity of the market may reflect insufficient funds available to buy shares. It results in the decrease in market value of equity and sharp market value of equity changes. It is especially important in the context of the empirical research reported in Chapters 4 and 5 conducted on different capital markets. The increase in trading volume and in liquidity stimulates market value of equity to grow. At the company level the volume covers demand for the stock reflected in “buy” and “sell” offers [Sloan 2012]. Large turnover occurs in the times of sharp price changes [Sun 2003; Al-Omar and Al-Mutairi 2008].

The fifth of the market-related factors is the change of the all-share index which reflects the strength of the stock market as a whole [Sloan 2012]. There is a slight positive relationship between the all-share index movements and the market value of equity of particular companies [Gatua 2013]. The increase in the all-share index reflects investors’ positive expectations for the future of the whole market. It results in an increased chance for particular companies to experience cash flow increases. Moreover past changes of the index may affect the single company MV in future due to the momentum effect [Sloan 2012].

The sixth of the market-related factors that affect market value of equity is the availability of subsidiaries such as treasury bills, loan stocks, etc. The more investment possibilities are available to investors the less they concentrate on shares [Sunde and Sanderson 2009]. However such reasoning seems misleading as the efficient financial system assures the proper functioning of companies, which in turn, improves the expectations of a future company’s cash flows.

Firm-specific factors

The price of a company’s stock is affected by firm-specific factors. Such factors may be divided into financial and non-financial [Sloan 2012]. Financial factors will be presented first. The group includes: dividend, retained earnings, revenue, earnings, current liabilities, price-earnings ratio, book value per share, and leverage.

Dividend is the first of the firm-specific, financial factors. Dividend stands for the part of after-tax profits distributed to shareholders. Even though the net profit after tax belongs to shareholders, the income that investors really receive is the part of earnings paid as cash dividends. The increase in dividends signal that firm may afford it, as the dividend declaration informs about the organisation's future [Khan 2009]. The decrease in dividend reflects firm's expectation that it will not have sufficient cash flows [Pradhan 2003]. In practice the dividend policy may be reflected in the dividend per share ratio (DPS) [Karathanassis and Philippas 1988], dividend cover [Irfan and Nishat 2002] and dividend yield [Malhotra and Tandon 2013].

A firm may retain some of the earnings in order to assure internal financing for the expansion, or to pay debt. The portion of the earnings, which is not distributed in dividend, is called retained earnings. In some cases the increase in retained earnings causes market value of equity to increase [Islam and Dooty 2015]. In the developed companies the effect of retained earnings is significantly smaller than the effect of dividend payment [Khan 2009] and in growth companies the effect of retaining earnings is higher [Pradhan 2003].

The third and fourth firm-specific factors are the company's revenues and earnings. Revenue stands for the money that the company receives within a specific period. It reflects the "top line" from which the costs should be subtracted in order to determine the net income. Earnings (net income) are calculated by adjusting the revenues for depreciation, costs of doing business, taxes, interests and other expenses. The increase in both "top line" and "bottom line" is a positive signal and results in the increase in market value of equity [Sloan 2012]. Conversely earnings that are smaller than predicted impact negatively on a firm's valuation [Madura 2008]. In practice the important measure is earnings per share ratio (EPS) [Midani 1991; Ejubekpokpo and Edesiri 2014].

The fifth of the firm-specific factors includes current liabilities, which represent the short-term debt (due within a year). If the account exceeds over the company's cash and cash equivalents it may signify poor financial health. The increase in current liabilities is generally perceived as a negative signal as the debtors will require payment soon. Also the increase in current liabilities increases the risk to the company's operations [Sloan 2012].

The sixth factor is the relation between market price per equity and earnings per share. The price-earnings (PE) ratio reflects what investors are willing to pay for the net profit per share. The ratio is based on the investors' expectations of future earnings. They pay more for the firm with high expected earnings. Therefore

there is a positive relationship between the PE ratio and the market value of equity [Nirmala, Sanju and Ramachandran 2011].

The seventh factor is the book value per share (the net asset value per share). It stands for the assets that a company has on behalf of each of the equity shares. Thus it reflects the investment per share made by shareholders in the business. Furthermore it refers to the value at which assets are carried on the balance sheet. The increase in book value per share has a significant positive association with the market value of equity [Uddin 2009; Malhotra and Tandon 2013; Ejuvbe-kpokpo and Edesiri 2014].

Last, the eighth firm-specific, financial factor is the leverage. It may be measured as debt-equity ratio which reflects the proportion of assets financed by debt against assets financed with equity. Increasing debt causes the firm to pay interest. Therefore it lowers the earnings available to shareholders. Furthermore investors prefer firms with low debt as they still represent unexploited development possibilities. Increasing the leverage is presumed to lower the share price [Nirmala, Sanju and Ramachandran 2011]. Increasing debt leads to the increased risk. It is especially important in the context of innovation which by definition carries additional risk.

Despite the numerous financial factors market value of equity is led also by a company's non-financial factors. They refer to the functioning of the company. The non-financial factors include: company size, management, legal issues, acquisitions and analysts' publications.

The first of the firm-specific, non-financial factors includes the size of a firm. It is presumed that smaller firms offer higher average returns but also higher risk. The bigger firms are usually more diversified and thus less risky. Furthermore the volatility of share prices of bigger firms is smaller. There are numerous ways to measure a company's size, one of which is the average market value of common stock within a set period. It is presumed that the firm's size affects market value of equity positively [Irfan and Nishat 2002].

The second factor is the quality of management. It is a crucial determinant of market value of equity. Changes in management affect both the expected returns and the riskiness of company operations. The changes in management teams having success results in a decrease in market value of equity. It is opposite to the change of unsuccessful senior management which causes market value of equity to increase [Sunde and Sanderson 2009].

Legal issues are the third of the factors. They determine the position of a company on the market. Lawsuits and other legal proceedings decrease the expectations of future cash flows. It results from both: bad publicity and possible

finances, withdrawal of trading licences, etc. The riskiness of investment in such a company increases. Therefore the occurrence of legal problems causes market value of equity to decrease [Sunde and Sanderson 2009].

The fourth of the firm-specific, non-financial factors is acquisitions. The effect of acquisition is different on the target firm's and the acquirer's market value of equity. In the case of the target firm the market value of equity tends to increase as the demand for the company's stock increases. Once the acquirer attempts to buy the target stock the target firm's stock price will be bid up. The effect on the acquirer is not straightforward and depends on the perceived effects of synergy between the two firms.

The fifth of the firm-specific, non-financial factors are the reports published by specialised analysts on particular companies. Such reports have an impact on market value of equity. The "buy" and "sell" recommendations included in the reports affect investors' perception of a company. Many investors take heed of such recommendations. Since the analysts are the specialists in the domain their advice is generally accepted [Sunde and Sanderson 2009].

The present review focused on the most important economic theories referring to market value of equity and the factors used in empirical research within the period of more than thirty years. The review was essential in the context of the present research as it refers to the changes in market value of equity. Indicating the factors influencing the market value of equity allowed the generation of the comprehensive framework for analysing its fluctuations. The theories were developed mostly by the laureates of the Nobel Prize and included such factors as: cost of capital, return on capital, reinvestment rate, capital structure, risk, size, value, momentum. Furthermore the breakthrough works of Robert Shiller forced the inclusion of psychological and social factors. The factors isolated by researchers in empirical investigations were numerous. The comprehensive framework divided them into economic factors, market and company factors.

Chapter summary

Value is the most comprehensive financial measure of a company's performance. It includes information from all the fields of company activity. There is a long disciplinary tradition of research on value therefore the present chapter aimed at making an overview of current research on the value of companies, with particular regard to public ones. First, the different approaches to valuation were presented and the most conceptually correct – market based-valuation – was

selected. Second, the definition of the market value of equity was formulated. Third, discussion on market efficiency was offered and five modifications were adopted. Fourth, internal and external factors determining the changes in the market value of equity were indicated. The chapter relied on the studies of literature.

It was ascertained that a company's value is the most comprehensive measure of its performance. However the approaches to valuation are strongly diversified as it may be performed by different agents with different purposes. In the chapter seven approaches to valuation were presented. Discounted cash flows-based valuation relies on summing the present value of the future cash flows generated by a company which makes it vulnerable to initial assumptions and is inappropriate for short-term investment. Relative valuation consists of valuing assets based on the market prices of similar assets, thus its precision is limited. The principal behind the accounting and liquidation-based valuation is that it involves the historical cost of assets which in turn may be the cause of inaccuracies. The goodwill-based valuation captures intangibles and refers to the value above the book or adjusted book values. The categories not covered by the balance sheet need to be estimated. The idea behind the acquisition value-based valuation is that it relies on data concerning mergers and acquisitions of similar firms. Thus it delivers an approximation of the company's value. The leveraged buyout-based valuation covers the price that investors pay to acquire company with their own equity and borrowings from various lenders. The approach is limited by the fact that not many companies are candidates for a leveraged buyout. The enterprise market value (MV) covers the sum of market capitalisation and market value of debt. In the context of the present research the market value based approach seems the most accurate measure. For publicly traded companies it averages numerous individual valuations and delivers up-to-date estimates.

In the case of public companies, even though enterprise value covers both the market value of equity and debt, it is the value of equity (market capitalisation) that is crucial in analysing the changes resulting from incoming information. It is due to the fact that the market value of equity is updated regularly (market value of debt may change irregularly), and data is accessible (contrary to the data on market value of debt). In the light of the present research market capitalisation may be defined as: the product of the number of shares outstanding and their current price. In the present research, in line with widely accepted theory, it is assumed that investors shape stock prices by reacting to incoming information. However the information system reduces, but does not eliminate the information asymmetry. Thus five modifications of the efficient market hypothesis were indicated. First, investors are not fully rational as they may have

tastes for assets such as consumption goods and be overconfident in performing valuations. Second, they do not act immediately as their initial reaction to incoming information may be adjusted over time. Third, groups of insiders profiting from private information exist. Fourth, the momentum effect indicates that the past performance of a company influences its future performance. Fifth, different markets have different levels of efficiency.

From the point of view of the present research it was essential to determine factors driving the changes in the market value of equity. There are numerous such factors named in the most prominent economic theories. If the cost of capital is smaller than the return on capital and the firm reinvests the stock prices increase. The rate of reinvestment determines the magnitude of the increase. Firms that optimise capital structure may profit from tax benefits and minimise costs which causes upward pressure on stock prices. Furthermore risk (the only way to earn more is to accept the additional risk), size factor (small firms usually outperform large ones), value factor (value stocks usually outperform growth stocks) and momentum impacts on the market prices of assets. Moreover psychological and social factors should be accounted for. The detailed analysis indicated that numerous factors leading stock prices may be divided into economic factors (economic growth, governmental policy, interest rates, foreign exchange rate and currency exchange rate), market-related factors (investor sentiment, the January effect, stability, trading volume, share index and availability of investment subsidiaries) and firm-specific factors. Firm-specific factors may be subdivided into financial and non-financial. Firm-specific financial factors cover: dividend, retained earnings, revenue, earnings, current liabilities, price-earnings ratio, book value per share, and leverage. The firm-specific non-financial factors cover: company size, management, legal issues, acquisitions and analysts' publications. The studies of literature demonstrated a multitude of factors driving stock prices which resulted from the lack of a dominant and widely accepted framework. Authors approached the determinants of market value of equity from different perspectives and levels. In this light it appears that in each research the conceptual background needs to be built exclusively for the study to encompass all its particularities.

Chapter 3

The model approach to linking innovation and the market value of tourism enterprises

Introduction

The notion of innovation covers the process of implementing positive and new ideas into business practice. Amongst the numerous predictors of changes in market value innovation is one of the most important [Hall 1998]. Hay and Morris set the theoretical link between innovation and market value in 1979. The authors employed one of the most fundamental economic rules indicating that higher returns involve higher risk. They stated that high investment in innovation is a “high risk-high return” strategy, which in turn is attractive to shareholders anticipating better financial performance. In the result investment in innovation results in higher risk and higher potential returns, which increases the market value of equity. Nowadays such an explanation still holds. Despite the risk every innovation carries, in general innovation results in the increase of market value as stated by Sorescu [2012].

From the point of view of the present research it is crucial that most innovation announced to the general public may be to positively influence a company’s cash flow. Such a possibility is recognised by investors and included in their prediction of company value, which in turn is reflected in changes in the market value of equity. A market reacts to the available information. In the case of innovation announcements it seems that markets tend to be very optimistic. Less informative releases, with no details on innovation, may be as influential as their more innovative equivalents [Hall 1998].

There exists some scientific research indicating the positive impact of innovation on market value. Usually authors concentrate on one of the two distinctive

stages of the innovation process: early (e.g. R&D expenditures, patent applications, preannouncements), and late (e.g. new product launches) [Greenhalgh and Rogers 2006; Sorescu and Spanjol 2008]. In both cases the link between the variables was proven to be statistically significant. Ehie and Olibe pinpoint the fact that in contemporary economics a company's development results more from new knowledge than from physical assets which increases the importance of innovation. Innovative products and services enable firms to enhance intangible assets, differentiate themselves from others and thus increase the market value.

Despite the above the scientific research on the relationship between innovation and a companies' market value is relatively seldom. It concerns especially the predictors of market value. In the previous studies most researchers employed only two or three additional variables to improve the estimation of the effects of innovation. In the set of literature studied there were only two papers which covered more than three predictors. Therefore a comprehensive study systematically selecting the most important predictors and testing them seems to be still missing. The research gap concerning the relationship studied and the theoretically related variables appears to remain. Fortunately there seems to be a consensus as far as the market value change proxy is concerned. Most researchers used the measure of abnormal returns to identify the changes in MV resulting from innovation. In such cases they employed the methods of event-studies [Rao, Chandy and Prabhu 2003; Sood and Tellis 2009] and buy-and-hold abnormal returns [Sorescu, Chandy and Prabhu 2007].

In relation to the above discussion the purpose of this chapter was to create a conceptual model representing the relationship between innovation announcements and the market value of the equity of tourism enterprises. Such a model is a novelty and constitutes the author's original contribution. Consistently with the Oxford Dictionary, it is a simplified description of a system or process built to assist prediction [2016]. In the present research a systematic approach to model building was employed. The previous research on the relationship studied was summarised before the author's own propositions were introduced. Thus the first step was comprehensive study of the literature covering both: the impact of innovation on market value in tourism and the impact of innovation on the market value in services performed with the use of Salsa (Search, Appraisal, Synthesis, Analysis) method. The second step comprised the inclusion of seven potential predictors.

The conceptual model of the relationship between innovation and the market value of equity of tourism enterprises covered a comprehensive set of 11 predictors. The model is divided into three parts: innovation-level variables,

firm-level innovation-related variables and interaction and second-order effects. The innovation-level includes seven variables such as: patent, CSR, type, degree of novelty involved, source, stage and communication. The two firm-level innovation-related variables cover: R&D intensity and innovativeness. Furthermore the squared effect of R&D intensity and the interaction between R&D intensity and innovativeness are covered. In the study a total of 8 control variables is determined: industry, size, volume, total cash dividend, operational experience, leverage, return on equity, and growth. Such a model will be tested in the empirical study reported in chapters 4 and 5.

The first part of the chapter provides a general view on the subject. The second part delivers methods applied in a systematic literature study. It starts with the description of the scoping research. Next are details on the search, appraisal and synthesis procedures applied in literature review. The third part of the chapter includes an analysis of the publications gathered in the literature study. The fourth part of the chapter provides details on the model and hypotheses development including the author's proposed predictors. The comprehensive model covering the original input in respect to previous research took graphic and analytical forms.

3.1. A systematic approach to literature studies

The purpose of the systematic literature study was to summarise the research on the relationship between innovation and the market value of the equity of tourism enterprises. It attempted to encompass the comprehensive set of publications in the field. Firstly the scoping research was performed. Second the systematic literature study was completed. It focused on both: the impact of innovation on market value in tourism and on the relationship between innovation and market value in services. The method used relied on four steps: search, appraisal, synthesis and analysis [Booth, Papaioannou and Sutton 2012].

Scoping research

The scoping research aims at determining the general view on the subject, the most influential works, the previous literature reviews on the subject and the grey literature (not formally published) referring to the subject. The general view on the subject is that the relationship between innovation and market value is of key importance [Hall 1998] and that in most cases innovation stimulates growth

in market value [Sorescu 2012] which is crucial from the point of view of present research. However most of the previous studies concerned the manufacturing sector. Services (and especially tourism) were largely neglected [Ehie and Olibe 2010]. In the context of the present investigation the most influential work is “The effect of innovation on hotel market value” by Nicolau and Santa-Maria [2013a]. It refers directly to the impact of innovation on the market value of hotels. The overall results indicated a positive short-term stock market reaction to innovation announcements equalling 1,53% with process and marketing innovation having the highest positive effect. However the authors indicated the need for further investigation as their research relied on only 24 innovation announcements from 2 hotel companies [2013a].

Furthermore the early publication of Hall “Innovation and Market Value” [1998] delivered a firm background for studying the relationship between innovation and market value. Hall indicated that the market value of firms is related to their knowledge assets. The author specified that financial markets positively value R&D, investment and patents. New information on the company’s innovation activity causes a positive reaction even if it delivers hardly any specific details.

According to the author of the present book there have been no literature reviews concerning the relationship in the context of tourism or services. Capturing value from innovation in the tourism sector was referred to by Najda-Janoszka [2013] who built on the works of Pierce, Boerner and Teece [2002] and indicated the four crucial factors allowing the value to be captured: the imitability of innovation, the scope of legal protection of innovation, complementary assets and technologies, temporal advantage.

Even though it does not refer to tourism or services the literature review covering “characteristics of innovation and their consequence on market valuation” performed by Sorescu [2012] seems important in the context of the objectives of the present research. The characteristics included: stages of the innovation process, degree of innovativeness, and the place where innovation is generated [Sorescu 2012]. Sorescu evokes numerous ideas and their authors. Innovation needs to be understood as the process ranging from initial idea to product commercialization [Sood and Tellis 2009]. Moreover most researches proved a significant impact of innovation on market value on the two distinctive stages: early stage (e.g. R&D expenditures, patent outputs, preannouncements) and late stage (e.g. new product launches) [Greenhalgh and Rogers 2006; Sorescu and Spanjol 2008]. Furthermore, radical innovation impacts positively on the market value of equity but at the same time it significantly increases a firm’s risk.

Incremental innovation on the other hand impacts positively only on Tobin's q , and therefore it is necessary for the maintenance of normal profits but it is not a source of abnormal economic return [Srinivasan et al. 2009]. Moreover innovation may be generated in house, through technological alliances, obtained from acquired firms, developed with the help of suppliers, customers and other individuals unrelated to the firm [Sorescu and Spanjol 2008]. The relationship between open-innovation and revenues is an inverted U-shape (both searching for innovation too narrowly and too widely may be wrong) [Laursen and Salter 2006; Stam 2009].

The determinants of shareholder value created by innovation include: a firm's size and R&D and marketing activities, firm ownership and environmental factors [Sorescu 2012]. Firm size correlates positively with firm's net present value. However, as far as cumulative abnormal stock returns are concerned, small firms benefit the most [Blundell, Rachel and Van Reenen 1999; Sorescu, Chandy and Prabhu 2003; Lee and Chen 2009]. Marketing support (pre-launch research aiming at determining consumers needs and post-launch marketing campaign) and R&D intensity also relate positively to the impact of innovation on the market value [Curewitz 2009]. Besides, institutional investors are better prepared for handling risk than individual investors which encourages radical innovation in institutionally owned firms [Kochhar and David 1996]. Lastly, firms operating in less than fully competitive markets experience higher returns on innovation [Greenhalgh and Rogers 2006].

The value created by innovation is best reflected in the stock prices [Sorescu 2012]. It is due to the fact that the value of stock overcomes the problems concerning partial measures as earnings, Tobin's Q (vulnerable to accounting choices), consumer satisfaction and attitudes, etc. The announcement of innovation changes investor expectation of future cash flows and in consequence stock prices. That change represented the estimate of the NPV of all future cash flows associated with the innovation concerned. Also it reflects the entire effect that the innovation has on all other metrics (consumer attitudes, earnings etc.). Sorescu [2012] showed that the measure of abnormal returns is dynamic and is often employed to represent changes in market value of equity in event-studies concerning innovation. The short-term cumulative abnormal returns (CARs) were used by Sood and Tellis [2009] and Rao, Chandy and Prabhu [2003]. The long-term abnormal returns were employed: with the use of buy and hold abnormal returns (BHARs) by Sorescu, Chandy and Prabhu [2007], and with the use of calendar time portfolio abnormal returns by Chan, Lakonishok and Sougiannis [2001], and Sorescu, Shankar and Kushwaha [2007].

Furthermore the meta-analysis of the 28 studies (covering 28 individual regressions) on the market value of innovation by Balladrini et al. [2005] is in line with the objectives of the present research. The authors used R&D investment as a proxy for innovation. The relationship between R&D investment (or capital) and a firm's market value is positive. However there is a high degree of variability in the valuation in different industries and countries. The role of R&D in evaluating firm's innovation activities is partial. Patents and advertising posed important moderating roles. Besides, adding industry-level controls improve the specification of the relationship between R&D investment and market value. Balladrini et al. [2005] indicated that their sample covered mainly US-based studies which only allowed a division into US and non-US research and which made the results conclusive for the US market. They postulated that especially the European context is important due to the specific characteristics of the stock markets there [2005, p. 29].

Besides which no grey literature was found (not formally published) and consequently such publications are not reported here nor will they be included.

The scoping research permitted the identification of keywords for the main research. It was ascertained that a combination of keywords referring to: innovation, market value, tourism and services is in line with the aims of present research. Therefore four separate groups of keywords were created. The search terms presented below are the compilation of (1) the search terms observed in the literature revised in the process of the scoping research and (2) the search terms used in preliminary studies. Finally the search terms were specified as follows:

1. Referring to innovation: innovation, improvement, modernisation.
2. Referring to the market value: "market value", "firm value", "stock price".
3. Referring to tourism: tourism, hospitality, travel.
4. Referring to services: services, "service industry".

The scoping research resulted in the identification of five databases suitable from the point of view of present study. Due to their wide usage databases such as: Web of Science, JSTOR, Ebsco, Scopus and Scholar were selected¹³.

Despite some evidence in manufacturing or general context, scoping research indicated the research gap concerning the relation between innovation and market value in tourism and services. Therefore, the systematic literature study was performed. It focused on the impact of innovation on companies' market

¹³ Different aspects of the scoping research and the preliminary research were published in Szutowski [2014a; 2014b].

value in tourism and in services. Based on the scoping research, the main literature study’s search strategy was formulated. In line with Booth, Papaioannou, and Sutton [2012] procedure consisted of four steps including search, appraisal (technical exclusion, substantial exclusion, inclusion), synthesis and analysis. The whole procedure is presented on the Figure 4.

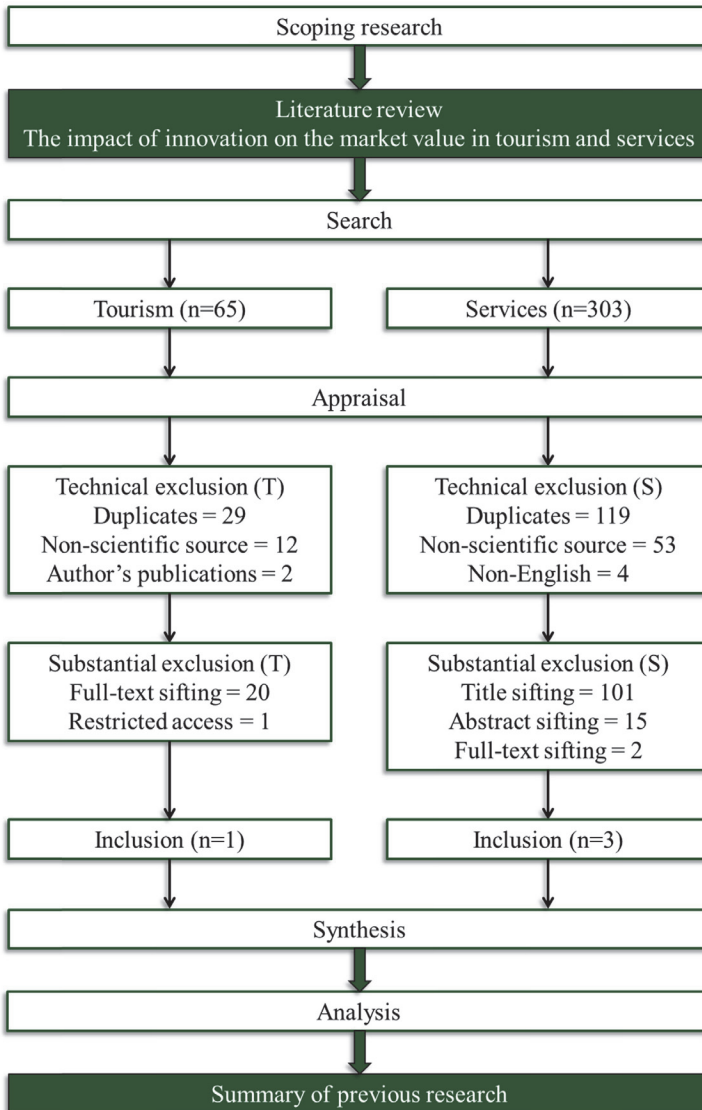


Figure 4. The strategy of literature studies

Source: own elaboration

As may be seen in Figure 4 the procedure relied on four steps preceded by scoping research. The final result of the systematic literature study was the synthesis of previous research on the relationship between innovation and the market value of tourism enterprises. In the context of tourism and services slightly different search terms were employed which identified 368 publications in total.

Search

Search is the first stage of the SALSA method employed in the literature study [Booth, Papaioannou and Sutton 2012]. In the present research the impact of innovation on market value was studied in the context of tourism and services. In the case of tourism every single search was performed as a combination of the three search terms presented above (referring to innovation, market value and tourism). In the case of services the search terms referred to innovation, market value and services. The search procedure was performed in five above databases. Therefore, in the case of tourism, a total of 135 independent searches were performed and in the case of services the number of independent searches was 90. First, the search terms were searched in publication titles. However this resulted in no papers. Therefore the research coverage was expanded according to the capabilities of particular databases to: articles' titles, abstracts and keywords (Scopus), abstracts and titles (Ebsco, JSTOR), titles and topics (Web of Science) and titles (Scholar). Both American and English spellings were covered.

In order to receive the most comprehensive view on the subject, the research covered scientific papers, conference proceedings and books. There were also no restrictions for the source at this stage (e.g. the inclusion of the Journal Citation Report (JCR) by Thomson Reuters). However in order to guarantee the timeliness of the publications a time restriction was set between January 2000 and December 2015 (inclusive).

The procedure resulted in 65 papers in the context of tourism and 303 in the context of services. The precise results disaggregated amongst different keyword combinations are presented in Appendix 1. The papers themselves were evaluated in the next step.

Appraisal

The appraisal stage is used to ensure the particular value that individual studies hold for the research [Booth, Papaioannou and Sutton 2012]. The procedure was itself divided into two main steps: exclusion and inclusion. The idea

behind the first was to eliminate the inappropriate publications from the point of view of present research. Inclusion aimed at adding to the set of papers studied the potentially important works omitted in the search procedure.

Exclusion consisted of pinpointing publications inappropriate from the point of view of current research. The publications were excluded for two main reasons – technical and substantial.

In the process of excluding papers due to technical reasons the papers published by non-scientific sources (popular science magazines and news) were excluded. In the context of tourism all the papers published in popular science journals and news ($n = 12$) were eliminated. The search results showed papers published by the author of the present thesis ($n = 2$). They reported the results of the preliminary studies and will not be included in the set of articles studied. In the context of services 53 non-scientific publications were eliminated. The process of elimination of duplicates resulted in the exclusion of 29 papers referring to tourism and 119 referring to services. In the context of services four publications in languages other than English (Spanish, Lithuanian, and French) were excluded. At this step 22 and 127 publications remained for tourism and services respectively.

A substantial exclusion in the context of tourism was performed based on the full texts of the remaining papers. It covered the elimination of all papers with no actual references to one of the three domains – innovation, market value and tourism ($n = 13$) or with no possible contribution to the present study due to the lack of conclusions on the relationship studied ($n = 7$). Moreover the access to one of the publications was restricted. The substantial exclusion in the context of services relied on three siftings: title sifting, abstract sifting and full-text sifting. In the first all titles were reviewed to eliminate publications which do not concentrate on the subject ($n = 101$). Therefore, after the title sifting, 26 papers remained. Abstract sifting relied on the study of publications' abstracts in order to eliminate inappropriate publications. Based on the abstracts 15 publications were eliminated (5 – manufacturing, 2 – no references to market value, 8 – no focus on innovation). The remaining 11 publications were assessed based on their full texts. In this step two publications were eliminated (1 – restricted access, 1 – no focus on innovation). At this step one publication remained in the context of tourism and nine in the context of services.

Inclusion consisted of the inclusion of publications important from the point of view of the current research but omitted in the previous steps. The

one step forward (with the use of a Scholar database) and backward snowballing procedures were performed [Jalali and Wohin 2012]. The backward snowballing consisted of a reference check of all the publications and resulted in 25 publications. The forward snowballing consisted of finding publications in which those selected in the literature study were quoted. It delivered one result important from the point of view of present research. First from the 26 publications found in the snowballing procedures, four duplicates were eliminated. Second abstract and full text sifting were applied. The procedure resulted in eliminating 18 publications (12 – were out of the time frame, 3 – no focus on innovation, 2 – focused on manufacturing, 1 – only in Chinese). Finally four publications were included as the result of the inclusion procedure. The number of publications remaining for further analysis were fourteen – two in the context of tourism and twelve in the context of services.

Synthesis

The papers remaining for the analysis were synthesised to deliver an overview of the approaches to the relationship studied. In order to deliver an overview of the relationship between innovation and market value a mapping review procedure was applied [Graham-Matheson et al. 2006]. The procedure relies on the precise attribution of codes to all publications studied. The key aspects of the studies are mapped using keywords and then presented in the form of a table. The key words were review-specific and developed for the present study. In all the papers the existence of the relationship between innovation and market value was demonstrated. The papers were synthesised in the form of two tables (covering tourism and covering services) containing the reference information and the information on the studied relation. Table 4 and Table 5.

Based on the synthesis step it may be concluded that the relationship between innovation and market value in tourism and services exists and is positive. However the numerous approaches and the non-compliance in the choice of variables indicate the need for further analysis which is important from the point of view of present research.

Table 4. The papers concentrating on the impact of innovation on market value in tourism

No	Author(s)	Year	Title	Relation	Sample	Time	Country
1	Nicolau and Santa-Maria	2013a	The effect of innovation on hotel market value	Positive, moderated by type	2 hotel companies listed in Spain – NH and Sol Melia. 24 announcements.	1996–2008	Spain
2	Zach, Krizaj and McTier	2015	The Value of Tourism Innovation: The Case of US Hotels	Negative in the case of new property openings	2 hotel companies listed in US. 131 announcements	2011–2013	US

Source: own sources

Table 5. The papers concentrating on the impact of innovation on market value in services

No	Author (s)	Year	Title	Relation	Sample	Time	Country
1	Chuang and Lin	2015	Co-creating e-service innovation: Theory, practice, and impact on firm performance	Positive, indirect relationship through cocreation	396 financial service firms	03.2013 – 10.2013	Taiwan
2	Nicolau and Santa-Maria	2013b	Communicating excellence in innovation	Positive relation moderated by growth, experience and service character	30 announcements of innovation awards	1994–2008	Spain
3	Son et al.	2011	Understanding the impact of IT service innovation on a firm's performance: The case of cloud computing	Positive relation moderated by size and service character	183 firm-level announcements regarding cloud computing	2005–2010	US
4	Khansa and Liginlal	2009	Has decreasing innovation hurt the stock price of information security firms? Time series analysis	Positive relationship driven by R&D intensity and patents	33 security software companies	1998–2008	US
5	Filson	2002	The impact of e-commerce strategies on a firm's value: Lessons from Amazon.com and its early competitors	Positive relationship moderated by the source of innovation (alliances and acquisitions)	328 events for Amazon.com, BarnesandNoble.com, CDNOW, N2K	1997–2001	US

6	Ho, Fang and Hsieh	2011	The relationship between business-model innovation and firm value: A dynamic perspective	Positive relationship moderated by high-tech/low-tech industry	2 companies: HTC (high tech) and 7-eleven Taiwan (low tech)	1997– 2011; 1979–2011	Taiwan
7	Ehie and Olibe	2010	The effect of R&D investment on firm value: An examination of US manufacturing and service industries	Positive relationship driven non-linearly by R&D investment and moderated by firm size and industry concentration.	26,429 firm-years	1990–2007	US
8	Meng, Zhang and Wei	2015	Market value of innovation: An empirical analysis of China's stock market	Positive relationship moderated by debt to assets ratio, sales, asset turnover, degree of total leverage, assets to sales ratio, tradable shares and ratio of shares from top ten controlling shareholders.	1.455 firms	2003–2013	China
9	Ho, Keh and Ong	2005	The effect of R&D and advertising on firm value: an examination of manufacturing and non-manufacturing firms	No significant relationship	15,039 firm-years	1962–2001	US
10	Cho and Pucik	2005	Relationship between innovativeness, quality, growth, profitability and market value	Positive relationship mediated by increase in quality	Companies from the Fortune database	1999–2001	US
11	Dotzel, Shankar and Berry	2013	Service innovativeness and firm value	Positive relationship moderated by customer satisfaction, firm age, market size, market growth, operating margin and competitor innovation activities.	90 firms/9industries/1,049 innovations	2000–2004	US
12	Hall, Jaffe and Trajtenberg	2005	Market value and patents	Positive relationship moderated by R&D intensity, patent yield of R&D, and citations received by the patent.	4.864 firms, 3 milion patents, 16 million citations	1963–1999 (P), 1975–1999 (C)	US

Source: own sources

Analysis

The comprehensive literature study covering both the impact of innovation on market value in tourism and the impact of innovation on the market value in services resulted in two publications in the context of tourism and twelve papers referring to services. In order to achieve the purpose of the analysis of the literature to determine the relationship between innovation and the market value of equity of tourism enterprises all the fourteen publications were analysed jointly. The analysis covered the main similarities and differences amongst the approaches to the relationship between innovation and market value. The meta-synthesis method was used here which follows the seven-step meta-ethnography approach by Noblit and Hare [1998] and Siau and Long [2005]. All the analysed articles were compared and merged with one another. The procedure resulted in the creation of a model representing the relationship between innovation and market value in tourism. The analysis stage will be described in the next section.

3.2. Linking innovation to the market value of tourism enterprises

In accordance with one of the purposes of the present research to create a model representing the relationship between innovation announcements and the market value of equity of tourism enterprises the analysis of the selected literature covered the indication of the predictors of the market value of equity. The procedure laid the ground for the synthesis of previous research and the inclusion of the author's propositions. Taxonomic analysis was employed and a three-item classification system was proposed [Onwuegbuzie, Leech and Collins 2012]. Based on the attributed keywords the whole set of variables used or indicated in the set of papers studied was divided into consistent groups. Content analysis and meta-synthesis were performed in order to indicate key variables and the commonalities and differences between them. All the papers found in the literature study were included in the meta-synthesis. It seems that in the context of the relation studied three distinctive groups of variables are important: innovation-level predictors, company-level innovation-related predictors and control variables.

3.2.1. Innovation-level variables

There were four publications which focused entirely or partially on the innovation-level analysis and its impact on market value. However it is important to notice that

it is in this group that the only two papers covering the tourism industry are placed. In order to identify innovation-level predictors of the relationship studied a content analysis of the four papers was performed. The data is provided in Table 6.

Table 6. Innovation-level variables

Authors	Variables	Use	Variable's proxy	Remarks
Nicolau and Santa-Maria [2013a]	Type	Used	Division into: product, process, organisational, marketing. Authors extracted also distribution innovation.	(1) Study performer in the tourism industry. (2) Classification adapted after OECD and Eurostat[2005].
	CSR	Proposed	–	
Zach, Krizaj and McTier [2015]	Type 1	Used	Division into: product, process, management, logistics, institutional	(1) Study performer in the tourism industry. (2) Adapted after Hjalager [2002].
	Type 2	Used	Division into: regular, niche, revolutionary, architectural	Adapted after Hjalager [2002], who in turn adapted it after Abernathy and Clark [1985].
	Type 3	Used	Division into: product, process, organisational, market	Adapted after Jacob et al. [2003], who in turn adapted it after Sundbo and Galouj [1998].
	Type 4	Used	Division into: product, process, delivery, organisation, market (and marketing)	Adapted after Volo [2006].
	Type 5	Used	Division into: product, process, marketing, organisational	Adapted after OECD and Eurostat [2005].
	Type 6	Used	Division into: product, process, market, institutional	Adapted after UNWTO [2002].
Khansa and Liginlal [2009]	Patent count	Used	–	The authors indicated also the worth of patent citations: „the extent to which patents are cited is an indication for their worth” [2009, p. 5].
Hall, Jaffe and Trajtenberg [2005]	Citations received by patent	Used	The ratio of citations to patent stocks	The authors did not concentrate directly on the innovation-level analysis but they recognised the importance of patent citations which may be attributed to this level.

Source: own sources

In the context of the impact of innovation on market value the division of innovation by type seems justifiable. Innovation may be divided using the classification of OECD and Eurostat [Nicolau and Santa Maria 2013a]. However

“the use of other taxonomies would offer a broader view in terms of academic perspectives (as it would permit the identification of the best explanatory classification) as well as in terms of management perspectives (as it would show decision-makers the best innovation types according to the taxonomy used)” [Nicolau and Santa Maria 2013a, p. 77]. At the same time distributional innovation appears to be a specificity of tourism [Nicolau and Santa Maria 2013a]. The importance of distribution in the context of tourism seems to be confirmed in the extant literature [Kachniewska 2014]. Furthermore, the importance of organisational changes in contemporary economics was emphasized as “innovations led to new types of management concepts and tools” [Nesterak 2012].

There are numerous taxonomies which may be used to code innovation announcements such as: Hjalager [2002], Jacob et al. [2003], Volo [2006], UNWTO Thesaurus on Tourism and Leisure Activities [UNWTO 2002] and the OECD and Eurostat Oslo Innovation Manual [2005]. All of the taxonomies were employed by Zach, Krizaj and McTier [2015] but the authors do not provide any details as to how precisely the attribution of codes was performed. The variables’ proxies and remarks presented in Table 6 stem from the direct analysis of the publications shown. It is worth noticing that the “Type 4” variable is based on the matrix of innovation types and dimensions of tourism experience which are: accessibility, affective transformation, convenience, value [Volo 2006]. The need for a dedicated classification of innovation for tourism seems to be supported.

In total there were seven different proxies for innovation type used in the previous research without indicating the superiority of any of them. Most of them concentrated on the subjective division but the “Type 2” variable included also the degree of novelty. Therefore it was concluded that a research gap concerning the types of innovation in tourism remains. In order to determine the appropriate classification a separate study of literature was conducted.

The examination of the different classifications of innovation in tourism was based on the systematic literature studies. Journal scope was limited to the journals included in Thomson Reuter’s Journal Citation Report, section “hospitality, leisure, sport and tourism”. The papers were synthesized using meta-synthesis following the steps of meta-ethnography approach. The innovation classifications delivered by the selected publications were translated by one another. It resulted in two distinctive approaches to type based on the: subject and degree of novelty¹⁴. The procedure is presented in Appendix 2.

¹⁴ The comprehensive research on the classification of innovation in tourism companies was published in Szutowski [2014b].

The result of the systematic literature studies is delivered on the Figure 5. The figure is composed of the two axes. The vertical axe covers the five types of innovation in tourism. The horizontal axe covers three degrees of novelty involved. Incremental innovation represents the minor improvements, the “new to the company” category stands for the novelties at the company level, and the radical innovation represents the innovation new to the market. The presentation of both classifications in one multidimensional framework constitutes a basis for precise analysis of innovation in tourism companies.

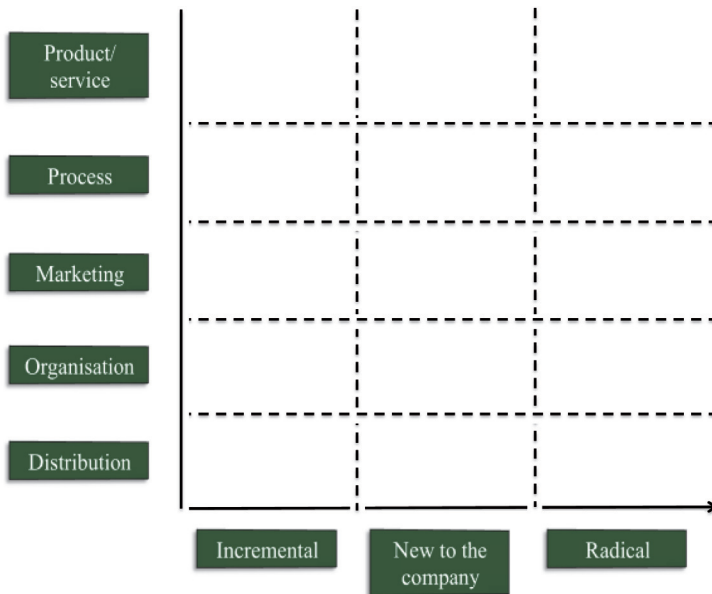


Figure 5. Multidimensional classification of innovation in tourism

Source: own development

It was ascertained that the subjective classification by type designed for tourism companies should encompass five types, defined as follows:

1. Product/service – new or significantly improved products and services e.g. components, user friendliness, functional characteristics, technical specifications, etc..
2. Process – new or significantly improved production method of goods or services e.g. equipment, software, techniques, etc..
3. Marketing – new or significantly improved marketing methods e.g. promotion, pricing, design, packaging, etc..

4. Organisation – new or significantly improved organisational methods including both internal organisational and external relations e.g. staff empowerment, job profiles, authority systems, collaborative structures, etc. and collaboration with research organizations, relationships with other firms and institutions, integration with suppliers, etc..
5. Distribution – new or significantly improved delivery methods, logistics, sales channels e.g. intermediaries, distribution channels, etc..

In the context of the present research it seems appropriate to recognise the importance of patents. The patent count may be used as a proxy of innovation. It may be used in the context of the whole service industry. The number of citations a patent obtains is a measure of its value [Khansa and Liginlal 2009]. However “substantial time is needed after a patent is granted to accumulate significant information about its citations. This means that citations-based analysis will never be usable for the evaluation of current or very recent innovations” [Hall, Jaffe and Trajtenberg 2005, p. 31]. Furthermore patents might be used as a proxy of innovative output. They indicate that patents are a rich data source for the study of innovation due to several reasons: patents deliver highly detailed information on innovation, the number of patents is significant and growing, the information is disclosed voluntarily. However one serious limitation of the use of patents as an innovation proxy may be denoted: “not all innovations are patented simply because not all inventions meet the patentability criteria and because the inventor has to make a strategic decision to patent as opposed to relying on secrecy or other means of appropriability” [Hall, Jaffe and Trajtenberg 2005 p. 5]. Furthermore authors state that “we have very little idea of the extent to which patents are representative of the wider universe of inventions since there is no systematic data about inventions that are not patented. This is an important, wide-open area for future research” [2005, p. 5].

In the papers studied the patent variable was not internally divided which means that no different types of patents were extracted in the analysis [Khansa and Liginlal 2009]. Therefore in the present research no typology of patents is introduced. In the simple approach the patented innovation will be compared with non-patented ones. In the context of tourism patents are often impractical which stems from the nature of the changes implemented. The reliance on technological advancements is growing but tourism companies are most often the users not the creators of these solutions.

In conclusion the analysis of the innovation-level predictors of the company’s market value resulted in the identification of two variables: patent (patented/

not patented), type (product/service, process, marketing, organisation, distribution). The above variables will be included in the conceptual model presented in section 3.4.6. The model.

3.2.2. Firm-level variables

The variables used in the previous studies were different but interrelated. Thus a method of data integration was required. In order to identify key predictors and control variables a meta-synthesis was performed. The procedure allowed the synthesis and translation of studies.

All the publications included in the papers studied were related to some extent by their subjective scope. The information on the statistically significant firm-level variables and variables' proxies used in particular researches are presented in Table 7. In the present study the variables used in the selected publications were divided into the ones referring to innovation and control variables.

Table 7. Statistically significant variables reported in the articles studied

Author(s)	Variables	Proxies	Remarks
Nicolau and Santa-Maria [2013b]	Growth	Growth in turnover over the last three years	Significant (positive)
	Experience	Age	Significant (negative)
	Service character	Service/manufacturing character	Significant (positive) for "Experience x service" Insignificant for "Service"
Son et al. [2011]	Firm size	Distinction between large (S&P 500) and SME (S&P SmallCap 600 and S&P MidCap 400) based on the indices	Significant (higher in SME).
	Industry sector	Manufacturing/non-manufacturing sector	Significant (higher returns in non-manufacturing)
	Strategic intention	Operational efficiency which attempts to improve work productivity internally and strategic positioning which aims to enhance business capabilities in the market	Significant (internal higher in software; external higher in hardware).
Khansa and Liginlal [2009]	R&D intensity	Ratio of R&D spending to revenue	Significant (positive)
Filson [2002]	Alliances and acquisitions	Product Line Expansion through/ without alliances and acquisitions	Significant (strategies that do not involve acquisitions and alliances generate more value)

Author(s)	Variables	Proxies	Remarks
Ho, Fang and Hsieh [2011]	Business model	Incremental, radical	Significant (radical delivers higher returns)
	Target market	New, existing	Significant (new delivers higher returns)
Ehie and Olibe [2010]	R&D investment	Ratio of R&D expenditure to total net sales	Significant (positive)
	Size	Natural logarithm of a firm's total sales	Significant (negative)
Meng, Zhang and Wei [2015]	Debt to assets ratio	Debt to assets ratio	Significant (negative)
	Size	Sales	Significant (negative)
	Asset turnover	Asset turnover	Significant (positive)
	Degree of total leverage	Degree of total leverage	Significant (positive)
	Assets to sales ratio	Assets to sales ratio	Significant (negative)
	CSH	Ratio of shares from top ten controlling shareholders	Significant (positive)
	Tradable shares	Tradable shares	Significant (positive)
	Industry	Service industry/manufacturing industry	Significant (higher in service industry)
Cho and Pucik [2005]	Innovativeness	Innovativeness score ranking – Fortune	Significant (positive)
	Quality of products and services	Quality score from ranking – Fortune	Significant (mediation effect of quality existed in the relationship between innovativeness and market value)
	Growth	Growth in assets, revenues, and capitalisation	Significant (mediates the relation between innovativeness and market value)
Dotzel, Shankarand Berry [2013]	Customer satisfaction	American Customer Satisfaction Index as reported by the National Quality Research Centre (1–100)	Significant (positive)
	E-innovativeness,	Annual firm-level count of e-innovations (new-to-market e-innovations weighted twice relative to new-to-firm e-innovations)	Significant (positive)
	Firm size	Natural logarithm of firm's sales revenues	Significant (positive)
	Firm age	Natural logarithm of firm's age in years	Significant (negative)

	Market growth	Annual percentage growth in industry sales revenues	Significant (positive)
	Acquisitions	Annual firm-level count of acquisitions	Significant (positive)
	Operating margin	Ratio of net income before depreciation to sales revenues	Significant (positive)
	Competitor innovation activity	Ratio of annual incremental cumulative competitors' sales revenues to market size	Significant (negative)
	Market growth*utility	Market growth*utility	Significant (negative)
Hall, Jaffe and Trajtenberg [2005]	R&D intensity	The ratio of R&D stocks to the book value of assets	Significant (positive)
	Patent yield of R&D	The ratio of patent count stocks to R&D stocks	Significant (positive)
Chuang and Lin [2015]	E-service capability	Three items: technology, human and business	Significant (positive)
	Cooperation capability	Construct formed of 10 items	Significant (positive)
Ho, Keh and Ong [2005]	R&D intensity	Ratio of R&D spending to revenue	Significant (positive)
	R&D ²	Squared R&D intensity	Significant (negative)
	Size	Natural logarithm of market capitalisation	Significant (negative)

Source: own sources

Amongst all the literature ten papers reported 35 statistically significant firm-level variables important from the point of view of the present research. The variables were strongly diversified. Based on the meta-synthesis and analysis of the publications seven were pinpointed as crucial for the present research (two innovation-related and two control variables). R&D intensity and innovativeness were the only two innovation-related variables. They will be discussed in the next sub-section. Furthermore five control variables were continuously reported as crucial in previous research: size [e.g. Ehie and Olibe 2010], industry [e.g. Son et al. 2011], growth [e.g. Cho and Pucik 2005], experience [e.g. Dotzel, Shankar and Berry 2013] and degree of total leverage [e.g. Meng, Zhang and Wei 2015].

Firm-level innovation-related predictors

There are numerous firm-level variables important in the context of market value changes. However only a few refer to innovation. From the point of view of this research their extraction is of crucial importance. Table 8.

Table 8. Firm-level innovation-related predictors and their proxies

Variables	Proxies		
	1	2	3
R&D intensity	Ratio of R&D spending by the revenues [Khansa and Liginlal 2009]	Ratio of R&D expenditure to total net sales [Ehie and Olibe 2010]	Ratio of R&D stocks to the book value of assets [Hall, Jaffe and Trajtenberg 2005]
Innovativeness/ e-innovativeness	Innovativeness score ranking – Fortune [Cho and Pucik 2005]	Annual firm-level count of e-innovations (new-to-market e-innovations weighted twice relative to new-to-firm e-innovations) [Dotzel, Shankar and Berry 2013]	

Source: own elaboration

The company R&D intensity reflects the firm's expenditure on R&D. The ratio of R&D spending to sales revenues may be used as "this measure is better at capturing how intensive R&D activities are to meet demand. R&D intensity has been found to be a major determinant of firm market value" [Khansa and Liginlal 2009, p. 5]. Furthermore, the ratio of R&D expenditure to total net sales may be employed as "this is preferred to using absolute R&D investment level as it relates to firm size and may confound the relationship R&D investment has on the market performance of a firm" [Ehie and Olibe 2010, p. 130]. Also, the ratio of R&D stock to the book value of assets may be used [Hall, Jaffe and Trajtenberg 2005]. Based on the above examples it may be concluded that the ratio of R&D expenditure to total net sales is the best proxy of R&D intensity in the present research. It accounts for a company's size which in turn is important amongst the strongly diversified tourism enterprises.

The innovativeness of a company may stand for "the innovativeness score ranking" drawn from Fortune [Cho and Pucik 2005] and the annual firm-level count of e-innovations (new-to-market e-innovations weighted twice as much as new-to-firm e-innovations) [Dotzel, Shankar and Berry 2013]. It seems that in the case of present research employing the annual firm-level count of innovation

is more appropriate due to practical reasons (most tourism companies are not covered by such rankings). Thus this proxy will be employed. Contrary to the measure used by Dotzel, Shankar and Berry [2013], in this research all types of innovation will be equally important.

Control variables

There are numerous variables that impact on the changes in market value of equity. Their omission in the model results in transmitting their effect on the variables actually included in it. Such a phenomenon may cause a significant bias in the estimation of the parameters. Thus the selection and inclusion of control variables is a well-founded requirement. Control variables cover the firm-level innovation-unrelated variables. Table 9.

Table 9. Control variables and their proxies

Variables	Proxies			
	1	2	3	4
Size	Distinction between large (S&P 500) and SME (S&P SmallCap 600 and S&P MidCap 400) based on the indexes [Son et al. 2011]	Natural logarithm of a firm's total sales [Ehie and Olibe 2010]	Sales [Meng, Zhang and Wei 2015]	Natural logarithm of firm's sales revenues [Dotzel, Shankar and Berry 2013]
Industry	Service/manufacturing character [Nicolau and Santa-Maria 2013b]	Manufacturing/non-manufacturing sector [Son et al. 2011]	Proposed [Khansa and Liginlal 2009]	Proposed [Meng, Zhang and Wei 2015]
Growth	Growth in turnover over the last three years [Nicolau and Santa-Maria 2013b]	Growth in assets, revenues, and capitalisation [Cho and Pucik 2005]		
Operational experience	Age [Nicolau and Santa-Maria 2013b]	Natural logarithm of firm's age in years [Dotzel, Shankar and Berry 2013]		
Leverage	Degree of total leverage Meng, Zhang and Wei [2015]			

Source: own sources

The firm size represents generally company sales [Ehie and Olibe 2010; Meng, Zhang and Wei 2015; Dotzel, Shankar and Berry 2013]. The simple measure of sales [Meng, Zhang and Wei 2015] or the natural logarithm of a firm's total sales may be employed [Ehie and Olibe 2010]. The explanation for using the second measure is as follows: "size is measured as a natural logarithm of a firm's total sales to avoid any compounding effect of firm size on firm performance by controlling for economies and diseconomies of scale. Log transformation not only results in an easy interpretation of results (because the changes in the logarithm domain represent relative (percentage) changes in the original metric) but it also makes the distribution of the data closer to a normal distribution" [Ehie and Olibe 2010, p. 130]. Furthermore the natural logarithm of a firm's sales revenues may be used [Dotzel, Shankar and Berry 2013]. However the use of logarithmic transformation seems not to be appropriate for the present research. The exceptional approach to the "size" variable relies on stock indices [Son et al. 2011]. In such case inclusion in the S&P 500 as a proxy of large firms and S&P SmallCap 600 and S&P MidCap 400 as proxies for small and medium companies may be employed. However this method seems irrelevant for the present research as most of tourism companies are not included in any stock index. Based on the above discussion this research found that total sales seem to be the best proxy for a company's size.

The industry in which a company operates is generally used to differentiate service from manufacturing companies [Nicolau and Santa-Maria 2013b; Son et al. 2011]. However here the focus is set on tourism companies which operate generally in services. Therefore the division into manufacturing and service companies seems inappropriate. However tourism companies are strongly diversified and operate in different economic sectors. In order to capture these differences the basic tourism characteristic activities (TCA) will be isolated: accommodation for visitors, food and beverage activities, passenger transportation, travel agencies and other reservation service activities, cultural activities, sports and recreational activities, retail trade of country-specific tourism, characteristic goods, and other country-specific tourism characteristic activities [UNWTO 2010]. The passenger transportation activity grouped such specific activities as: railway passenger transport, road passenger transport, water passenger transport, air passenger transport and transport equipment rental.

Company growth is included in order to differentiate growing companies from stagnating ones. Growth in turnover over the last three years [Nicolau and Santa-Maria 2013b] or the growth in assets, revenues and capitalisation may be used [Cho and Pucik 2005]. In the first case no clue was offered in the studied

literature as to why such a variable was selected to represent growth. Cho and Pucik explain the way of calculating growth [2005] but do not explain the reason behind selecting such a variable. Therefore here the growth variable will represent the average three-year growth in total revenue here.

The operational experience reflects the time that the company operates. The mere number of years the company functions [Nicolau and Santa-Maria 2013b] or a natural logarithm of a firm's age in years may be employed [Dotzel, Shankar and Berry 2013]. In the studied literature none of the authors explained the reason behind choosing particular proxies for a firm's experience. Therefore the simple measure of number of years since the company operates will be employed.

The leverage represents the use of borrowed capital to increase the return on investment. Highly leveraged firms had significantly more debt than equity which increases the risk. Depending on the situation leverage may magnify both: potential gains and potential losses. If leverage is used properly it may be the tool for generating shareholder wealth. However if it fails the credit risk and interest expenses destroy shareholder value [Meng, Zhang and Wei 2015]. Here the debt-to-equity ratio is the proxy for leverage.

The systematic studies of literature allowed indicating two innovation-level variables (patent and type), two innovation-related company-level variables (R&D intensity and innovativeness), and five control variables (size, industry, growth, operational experience and leverage). The literature review laid the foundation for the introduction of the theoretically related predictors of the market value of equity being the author's propositions which are delivered in the next subchapter.

3.3. Model development and hypotheses

3.3.1. Context

The purpose of the author's model is to represent the relationship between innovation announcements and the market value of the equity of tourism enterprises. As discussed in Chapter 2 the market value of equity may be defined as the product of the number of shares outstanding and their current price. Thus each piece of information that has the potential to shape a tourism company's stock price may cause a change in the market value of equity. Companies purposely release positive news and shape communication policies in order to benefit as much as possible from them. The extant literature confirms this [Damodaran 2007]. The

new pieces of information are contained in diverse sources such as: newspapers, magazines, journals, television, radio transcripts, photos and others. All those forms will be referred further as announcements [Klein, Dalko and Wang 2012]. In Chapter 1 innovation was defined as: “a process of implementing positive and new ideas into business practice”. In the context of the above definition innovation announcements are perceived as positive information concerning the real improvements in a company’s functioning. Tourism companies voluntarily release them in expectation of positive market reaction. Therefore the following hypotheses may be formulated:

H1. There is a positive relationship between innovation announcements and the market value of equity of tourism enterprises.

As discussed in Chapter 2 the market acknowledges new information efficiently. Thus it is assumed that every time new information hits the market investors acknowledge it straight away. The prices follow a random walk which means that the prices reflect the information of the current day and cannot be forecast based on historical prices. In this light innovation announcements are immediately recognised by investors seeking profit. Scientific evidence confirms this [Fama and French 2007]. Single investors may overreact or underreact to incoming news. However the market averages such bias and remains efficient as a whole [Brennan and Xia 2001]. In this contest it seems reasonable to assume that:

H2. The impact of innovation announcements on the market value of equity of tourism enterprises is immediately and fully incorporated in stock prices.

In connection with Chapter 2 leakage and dissemination effects are presumed not to be statistically significant. Assuming the normal distribution of returns there is a group of investors who temporarily beat the market. Some investors may invest in a company’s stock right before the announcement without having any particular insider information. However it is equally probable that others sell the shares in the pre-announcement period. Buy and sell transactions take place continuously. According to extant literature the increase in the market value of equity in the period preceding the announcement does not have to result from discounting insiders’ information [Fama 1970]. In the context of the above consideration it is assumed that:

H3. No information leakage and dissemination occur in the period preceding the announcement.

By definition, innovation is a positive change which is willingly communicated to the market by tourism companies expecting abnormal changes in market value of equity. Successful innovation announcements impact

positively on the market value of equity of tourism enterprises. However each innovation carries a portion of risk. Due to high competition and high market requirements there might be a number of unsuccessful announcements for which the market judges that the risk outweighs the benefits. As a result of unsuccessful announcements the market value of equity decreases. Nevertheless considering the supposed general positive effect of innovation announcements it is right to assume further that:

- H4.** The positive change in the market value of equity resulting from the successful innovation announcement is bigger in absolute value than the negative change resulting from the unsuccessful one.

Based on the previous empirical evidence the relationship between innovation and market value is not straightforward. In this context there are a number of predictors of market value change. The market does not evaluate innovation in isolation from the implementing company. Its characteristics determine the changes in the market value of equity. Tourism companies differ from each other in countless characteristics. However not all of them seem to be of key importance in the light of the present model. From the point of view of the effects of innovation the characteristics related to innovation activities are of crucial importance. In this light, hypothesis 5 is formulated as follows:

- H5.** Innovation-related company-level variables predict the changes in the market value of equity above and beyond the effect of the control variables.

The characteristics of innovation itself play a crucial role. Investors evaluate innovation announcements separately to estimate the benefits of implementation. The more they know about the innovation the better can they estimate the future cash flows stemming from it. The more information the investors have, the more precise is their valuation of innovation. As was demonstrated in the present chapter innovation may differ in type and patent protection. However the set of predictors is not limited to these two. In this context, hypothesis 6 will be stated as follows:

- H6.** Innovation-level variables predict the changes in the market value of equity above and beyond the effect of the control and innovation-related company-level variables.

The existence of moderation effects is especially justifiable as the number of variables in the model increase. The predictors in the present model are substantially connected as they all refer to innovation. Accounting for the moderation effects increases the prediction power of the model. Also

independent variables may impact on the changes in market value non-linearly as their marginal effects are not constant. Thus, it is assumed that:

H7. Interaction and second-order effects predict the changes in the market value of equity above and beyond the effect of the control, innovation-related company-level and innovation-level variables.

3.3.2. Innovation-level predictors

In the present research there are seven (five of which are author's propositions) innovation-level predictors of the changes in market value of the equity of tourism enterprises resulting from innovation announcements: patents, type, CSR, degree of novelty, source, stage and communication.

Patent protection excludes other organisations from using the developed solution without a company's consent which creates an advantage for the innovating company. The lack of protection may result in other companies copying the solution without incurring the costs of development which actually worsens the company's competitive position. The value of protected innovation outweighs the value of unprotected one as the protection prevents dilution of benefits by copying the solution by other companies. The approach is shared by the extant literature [Hall, Jaffe and Trajtenberg 2005]. Moreover in contemporary economics dominated by information technologies, the ease of copying increases the significance of patents even further. The present model contrasts patented and non-patented innovation. It is assumed that:

H8-1. There is a positive effect of patents on the changes in the market value of equity resulting from innovation announcements.

Furthermore the inclusion of a CSR variable was important due to the today's trend that seems to favour socially responsible solutions. The market reacts to them positively as environmental responsibility is often a sign of cost cutting. The issue is crucial especially in the case of hotels where the fixed costs are high. Existing scientific evidence indicates that CSR practices influence positively consumer satisfaction and company performance [Lou and Bhattacharaya 2006]. In this light innovation with elements of CSR may cause a higher increase in the market value of equity. There are numerous classifications of CSR, which allow its different types to be distinguished. Based on the systematic literature studies it may be concluded that three main typologies of CSR are crucial [Szutowski and Ratajczak 2016]. The first one (type of reaction) divides CSR activities into proactive and reactive. The second one (degree of development) was

proposed by Visser [2010] and consists of five types of CSR: defensive, philanthropic, marketing, strategic and systemic. The third (field of activity) embraces social, environmental, ethical, human rights and consumer concerns [European Commission 2011]. From the point of view of the present research the most simplified approach seems appropriate. The CSR variable only was proposed, and there is no previous research on it in the context of innovation/market value analysis. Therefore innovation holding elements of CSR will be contrasted with the one with no elements of corporate social responsibility. It will be assumed that:

H8-2. Innovation's CSR elements contribute positively to the changes in the market value of equity resulting from innovation announcements.

There are numerous classifications of innovation by type. In the present study five types are isolated. Product innovation is especially important for companies as it allows them to differentiate themselves in the marketplace and boost profits. Innovation announcements referring to product innovation are the easiest for investors to judge. All the other categories require more interior knowledge of companies. Also the benefits of the new products may be discounted fast on the market whilst the implementation of other innovation types may require some time to produce benefits. Keeping this in mind hypothesis 8-3 is stated as follows:

H8-3. The effect of product innovation on the changes in the market value of equity resulting from innovation announcements is greater than that of other innovation types.

In the present model three degrees of novelty involved were isolated (incremental, new to the company and radical). As indicated previously investors are looking for companies implementing "high risk-high return" strategies [Hay and Morris 1979]. The more positive changes in a company's functioning the innovation causes the better it is perceived by the market. High potential benefits are what attract investors which is why the following hypothesis is stated as:

H8-4. A positive relationship exists between the innovation's degree of novelty and the changes in the market value of equity resulting from innovation announcements.

The "source" of innovation was introduced in order to distinguish firms that develop innovation through internal research from the ones that develop innovation in collaboration or copy it from other companies. In contemporary economics the openness of companies seems to constitute both necessity and a standard. Due to the ease of communication,

companies are using internal and external inflows and outflows of knowledge. Existing literature seems to confirm this [Chesbrough, Vanhaverbeke and West 2006]. The development of innovation in collaboration permits the use of knowledge and experience of the collaborator and diminishes the risk of failure. Also the development of innovation in open innovation systems is a cost-effective strategy. Here innovation will be divided into developed in-house, developed through collaboration and copied. It is hypothesized that:

- H8-5.** The effect of innovation developed in-house on the changes in market value of equity resulting from innovation announcements is smaller than that of innovation from other sources.

In its definition innovation is described as the “process”. It seems reasonable to differentiate innovation from the point of view of the advancement of the process. The division into two distinctive stages includes the development and commercialisation of innovation. The first is treated by the market as a promise of future results, the second is the result itself. Thus they differ in the level of uncertainty (discussed in Chapter 2). The development stage may be defined as: “project initiation, progress and other events that imply a project has not yet reached a successful outcome” [Kelm, Narayanan and Pinches 1995, p. 771]. The commercialisation stage begins with the introduction of innovation [Kelm, Narayanan and Pinches 1995] and finishes when investors fully incorporate the information on innovation in the stock prices. Therefore in the present model the “development” stage will be contrasted with “commercialisation” and the hypothesis is formulated as follows:

- H8-6.** A positive relationship exists between the innovation stage and the changes in the market value of equity resulting from innovation announcements. The present research does not concentrate on innovation as such but on innovation announcements. Therefore the inclusion of a communication variable seems justifiable. A communication variable is especially important if after releasing the initial information a company updates it. If the second and further announcements deliver any new valuable information than the market is presumed to react. However if the second and further announcements repeat the initial information then there should be no reaction from the market (as all the information is already known). The existing scientific evidence delivers similar conclusions [Sorescu, Shankar and Kushwaha 2007]. Thus in the difference between the first announcement and the second and further announcements and their impact on market

value will be reflected by the inclusion of a communication variable. It is assumed that:

H8-7. The effect of the first innovation announcement on changes in the market value of equity is greater than that of the second and further announcements.

3.3.3. Firm-level innovation-related predictors

As it was stated in this chapter investors estimate the effects of the announced innovation in respect to the innovation-related characteristics of the announcing company. R&D expenditures are strongly related to innovation. However the measure favours large companies with greater financial capabilities. The measure of R&D intensity presents the expenditures in relation to the total sales which increases the informative value. A high intensity of investment in research and development increases the chances of new successful developments and it stimulates a firm's pro-innovative culture. Even though tourism is not an R&D intensive industry [Sequeira and Campos 2007] the lack of such activity may result in a significant lag behind competitors and the changing preferences of customers. In this light, the following hypothesis is made:

H9-1. The stronger the firm's R&D intensity the greater the change in the market value of equity resulting from innovation announcements.

The issue of company innovation may be approached from the point of view of expenditure. However it may also be approached from their results. Innovativeness is the measure representing previous successful developments. It shows the overall effect of all the company's innovation activities. The more innovative the company, the greater is its experience, which in turn, diminishes the risk of further implementations. Also in an industry characterised by low innovativeness, its high levels may be an effective tool of differentiation. In the present research it is assumed that:

H9-2. A firm's innovativeness is positively related to the changes in the market value of equity resulting from innovation announcements.

3.3.4. Interaction and second-order effects

In the light of the discussion in this chapter it is assumed that the variables may interact. It seems that there is a relationship between the intensity of company's spending on research and development and its innovativeness. Two opposed situations cover firms with relatively low innovativeness with respect to their R&D intensity and firms with relatively high innovativeness in relation to their R&D

intensity. The first are perceived negatively as they incur costs but deliver hardly any results. The second are perceived positively as they produce outcomes in a cost-effective manner. By keeping R&D constant the increase in innovativeness in this context should deliver over proportional effects. The effect of innovation will be the most positive in companies that successfully implement new solutions without incurring extensive R&D costs. From this perspective it seems reasonable that:

H10-1. There is an interaction effect between R&D intensity and innovativeness in the context of the changes in the market value of equity resulting from innovation announcements.

The effects of R&D activity in relation to expenditure are greatest at low levels of R&D spending. The increase in expenditure causes the effects to increase less than proportionally. The marginal returns on R&D expenditure diminish. Thus the non-linear effect of R&D intensity is highly possible in the present study. The estimation of the parameter for the squared R&D intensity variable should result in negative values. The diminishing marginal returns to R&D intensity are in line with extant literature [Huang and Liu 2005]. In this context it is reasonable to assume that:

H10-2. There is a negative effect of the squared R&D intensity on the changes in the market value of equity resulting from innovation announcements.

3.3.5. Control variables

As it was stated previously the inclusion of the right control variables is necessary for the correct estimation of parameters. Thus, three more control variables in addition to the previously stated ones will be introduced. This means that the model will have eight control variables in total.

Investors profit from investment on the stock market in two ways. They benefit from capital gains which represent the difference between the buy and sell price of stocks and they receive dividends [Dubey 2013]. Thus investors are generally more willing to invest in companies that distribute dividends. It seems rational to differentiate companies which pay dividends regularly from those that pay rarely or do not pay dividends at all. Therefore such a division will be reflected in the variable “total cash dividend” (TCD) in the year preceding any innovation announcement.

High levels of the return on equity (ROE) ratio signify that the company produces earnings with little capital requirements. It is especially important for

investors who deliver the necessary capital. Investors are willing to invest in companies with high ROE as they generate satisfactory earnings and do not dilute capital by issuing further shares on the market. Yet the more a company dilutes the capital the less previous investors benefit from the profits [Sferra 2013]. Due to this fact it seems rational to deal with the difference between companies with high and low return on equity ratio in the research.

The variable “volume” (VOL) represents the number of shares traded in a security during the quarter preceding the innovation announcement. Volume is then the measure of activity. In general the more shares trade from sellers to buyers, the faster and more precisely the price movements reflect investor reaction to incoming information. Thus it seems justifiable to incorporate a “volume” variable in the present research in which market reactions are of primary importance.

3.3.6. The model

The procedure of model development presented above laid the ground for the creation of the author’s model depicting the relationship between innovation announcements and the market value of equity of tourism enterprises. In line with previous considerations the predictors were divided into three groups – innovation-level predictors, firm-level predictors and interaction and second-order effects. The three groups represent the distinctive parts of the model. A separate group is the control variables. The two innovation-level variables indicated in the publications covered by the systematic literature studied and the five predictors constituting the author’s propositions are presented in Tables 10 and 11.

Table 10. Innovation-level variables and their proxies

No	Variable	Notation	Operational measure
1	Patent	PAT	Patented/not patented
2	CSR	CSR	Elements of CSR/no elements of CSR
3	Type	TYPE	Product, process, marketing, organisational, distributional
4	Degree of novelty involved	DNI	Radical, new to the company, incremental
5	Source	SRC	Developed in-house/developed through collaboration
6	Stage	STG	Under development/after commercialisation
7	Communication	COM	First/second or further announcement

Source: own sources

The model encompasses two firm-level innovation-related predictors. These refer to the company-level but are crucial from the point of view of the effects of innovation. They refer to the company's input and output in the context of innovation. They are delivered in Table 11.

Table 11. Firm-level innovation-related variables and their proxies

No	Variable	Notation	Operational measure
1	R&D intensity,	R&D	R&D expenditure to total net sales
2	Innovativeness	INNOV	Annual firm-level count of innovations

Source: own sources

The model includes the interaction and second-order effects of selected variables. The present model covers two such effects. Their inclusion is important to capture the moderation and non-linear effects of variables which is author's original contribution. They are contained in Table 12.

Table 12. Interaction and second-order variables and their proxies

No	Variable	Notation	Operational measure
1	Interaction	R&D*INNOV	The product of R&D intensity and
2	Squared R&D intensity	R&D ²	The square of R&D intensity

Source: own elaboration

The above considerations materialised in the conceptual model presenting the relationship between innovation and the market value of tourism enterprise. The model took a graphic form accompanied by a descriptive component. It is composed of three separate groups of innovation-related predictors and the group of control variables. The arrows represent the direction of the relationship. All the predictors and the control variables impact directly on the market value of equity. It is presented in Figure 6.

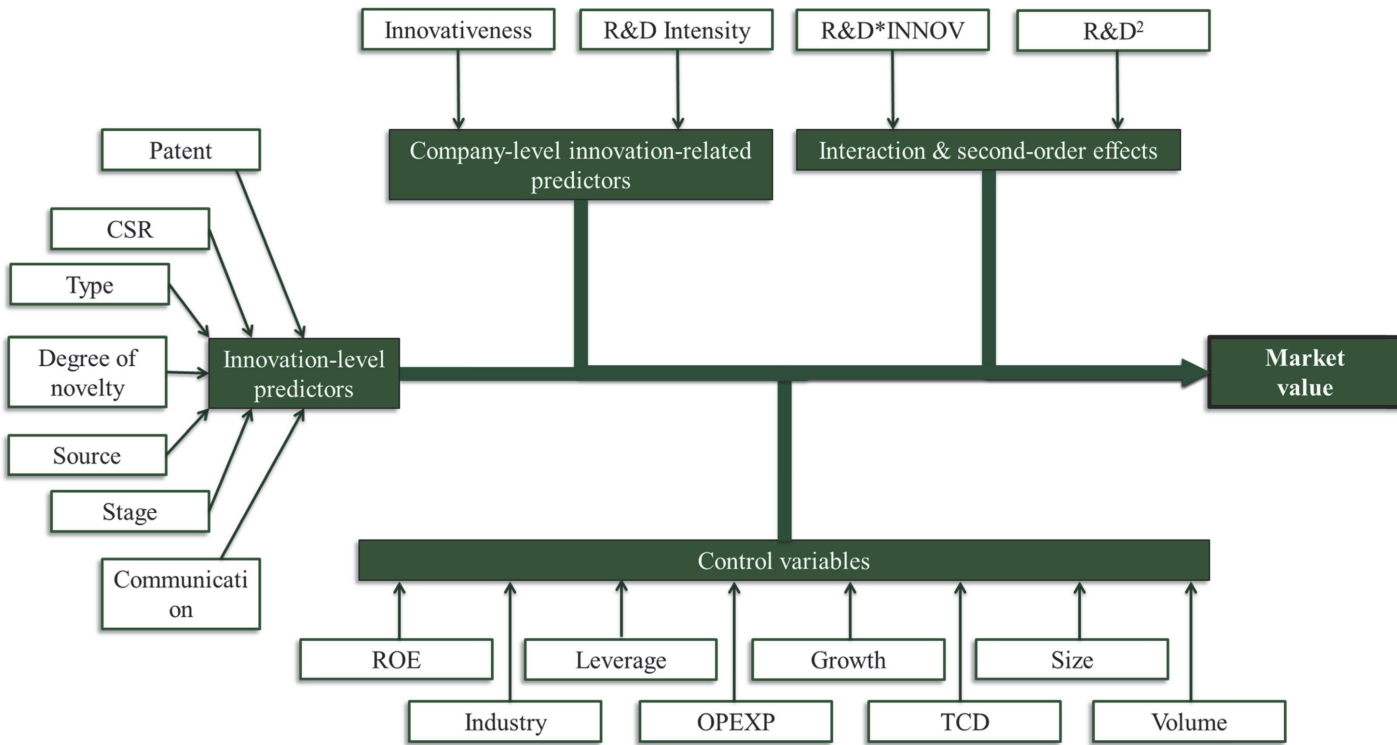


Figure 6. The model representing the relationships between innovation and the market value of equity of tourism enterprises

Source: own development

The model represents the impact of innovation announcements on the market value of equity of tourism enterprises. The magnitude of the impact depends on seven variables attributed to innovation-level: patent, CSR, type, degree of novelty, source, stage and communication and two firm-level innovation-related variables: R&D intensity and innovativeness. The model covers the interaction between R&D intensity and innovativeness and the second-order effect of R&D intensity. In order to assure a correct estimation of the parameters, eight control variables were selected: size, industry, growth, operational experience, volume, total cash dividend, leverage and ROE. In this research it is assumed that the causal relation is in one direction only.

The model in analytical form comprises of one equation with the market value of equity (MV) as a dependent variable. The equation allows the variables to be dichotomous, multi-category and continuous. The model in the analytical form is as follows:

$$\begin{aligned}
 MV = & \beta_0 + \beta_1 SIZ + \beta_2 IND + \beta_3 GWTH + \beta_4 OPEXP + \beta_5 VOL + \beta_6 TCD \\
 & + \beta_7 LVR + \beta_8 ROE + \beta_9 R\&D + \beta_{10} INNOV + \beta_{11} PAT + \beta_{12} CSR \\
 & + \beta_{13} TYPE + \beta_{14} DNI + \beta_{15} SRC + \beta_{16} STG + \beta_{17} COM \\
 & + \beta_{18} R\&D * INNOV + \beta_{17} R\&D^2 + \varepsilon
 \end{aligned}$$

where:

SIZ	– firm size,	TYPE	– the type of innovation,
IND	– firm industry,	DNI	– degree of novelty involved,
GWTH	– firm growth,	SRC	– source of innovation,
OPEXP	– firm operational experience,	SGT	– stage,
VOL	– volume,	COM	– communication,
TCD	– total cash dividend,	R&D*INNOV	– interaction effect between R&D intensity and innovativeness,
LVR	– leverage,	R&D ²	– second-order effect of R&D intensity,
ROE	– return on equity,	ε	– error term.
R&D	– firm R&D intensity,		
INNOV	– firm innovativeness,		
PAT	– patent,		
CSR	– CSR,		

The theoretical model being the author's own creation will be tested empirically. Some of the above predictors have never been tested in the context of the

impact of innovation on the market value of tourism enterprises and the others require further investigation despite inclusion in previous research. The methods employed in empirical verification and the results are reported in chapters 4 and 5.

Chapter summary

There seem to be relatively little scientific research on the impact of innovation on the market value in the context of both tourism and services. The existing scientific evidence indicates that the relationship is positive despite the risk implied by the implementation of every innovation. Previous research on the relationships covered some theoretically related variables. However in the set of literature studied only two publications covered more than three predictors. Therefore there seems to be a research gap concerning the relationship itself and its determinants.

The present chapter aimed at creating a conceptual model representing the relationship between innovation announcements and the market value of equity of tourism enterprises. The model is new. To the best of the author's belief no previous attempts to schematise the relationships have been made. The model will be tested empirically in the following chapters. In order to construct the model the systematic approach was employed. The existing scientific evidence was synthesized to construct a firm conceptual background for the inclusion of the author's proposed variables. A comprehensive systematic literature review was conducted. It covered both: the impact of innovation on the market value in tourism and the impact of innovation on the market value in services.

As a result of the systematic literature study and author's own contribution, a group of 11 variables important from the point of view of the impact of innovation on market value was selected. They were divided into three groups: innovation-level predictors company-level innovation-related predictors and interaction and second-order effects. Innovation-level variables covered: patents, CSR, type, degree of novelty involved, source, stage and communication. The firm-level innovation-related variables included innovativeness and R&D intensity. Furthermore the interactions between R&D intensity and innovativeness, and squared R&D intensity were introduced. The model encompassed eight control variables: industry, size, volume, total cash dividend, operational experience, leverage, return on equity and growth. The model took graphic and analytical forms with a descriptive component. Based on the in-depth analysis of each variable included in the model, notations and operational measures were created.

The method of systematic literature study allowed the achievement of the purpose of the present chapter. The model was constructed with no major limitations. The next step after the creation of the conceptual model is its empirical testing. In the following chapters the methods of empirical research and its results will be presented.

Methods of empirical research

Introduction

Data analysis is one of the key elements of research. The right choice of data processing methods ensures that the analysis may be performed and conclusions drawn [Weinberg and Abramowitz 2002]. There are a number of rules which determine the correctness of scientific research. Thus, scientific research should adhere to several important rules such as: the reliance on a sound theoretical background, the use of systematic procedures, the usage of approved methods and techniques and the clear documentation of the findings which allows other researchers to assess them [Boeijs 2010].

In the light of method selection procedure the context of the study was determined first. The objective of the research is to indicate and measure long- and short-term effects of innovation announcements on the market value of equity of tourism enterprises. The whole design of the research, including the methods of gathering and analysing data was constructed to allow the achievement of this purpose. The subject of analysis was the abnormal change in market value of equity resulting from innovation announcements of tourism enterprises. The time frame ranged from February 2011 to February 2016. The spatial scope covered all the 28 European Union member states.

Furthermore it was essential to establish appropriate methods to determine the population and select the sample. The total number of 7847 companies listed on 32 stock exchanges was analysed to determine the enterprises whose innovation announcements will form the population. Data collection included a precise selection procedure which allowed the selection of press releases from the total number of almost 5 million pieces of information released for the selected companies. Next, for the chosen 9,000 announcements content analysis was used to

determine their substantial value in the light of the present research. All the announcements were analysed in detail to decide if they concern a company's innovation defined as a process of implementing positive and new ideas into business practice. Sample size was calculated based on three approaches: the power of the chosen methods to detect abnormal changes in market value of equity, applicability of the model verification methods and the ability to generalize results. The sample included 398 observations.

It was fundamental to determine precisely the dependent and independent variables. In order to calculate the effects of innovation announcements the research employed the concept of abnormal returns (ARs). The research applies two different methods for calculating abnormal returns: event-study to assess the short-term abnormal returns and buy-and-hold abnormal returns to calculate the long-term ARs. In the case of event-study method expected returns were calculated using the Carhart four-factor model [1997] and abnormal returns were standardised [MacKinlay 1997]. The research employed two methods of testing the statistical significance of abnormal returns: Z-test [MacKinlay 1997] and two different groups of means test [Cowan and Sergeant 2001].

In the context of data analysis methods the description of the abnormal returns and the test of the conceptual model were of key importance. Therefore, after testing for ARs' statistical significance, the methods of descriptive statistics were employed. The methods covered: central tendency, dispersion, skewness and peakedness.

After determining the statistical significance and describing the abnormal returns the research concentrated on testing empirically the model developed in Chapter 3. The significance of the whole model and of the single predictors was tested with the joint use of response surface regression and hierarchical regression. The first one allows the inclusion of main effects and higher-order effects for the continuous independent variables and the 2-way interaction effects of the predictor variables. The second one relies on building successive regression models, each adding new predictors.

In accordance with the widely accepted guidelines [Harvard 2015] the chapter explains the specific data collection methods and the research techniques used to answer the research questions. The purpose of the chapter is to describe the materials and methods so that the study could be repeated and the validity of results and conclusions could be judged [Nikolov 2013; Azevedo et al. 2011; Kallet 2004; Perneger and Hudelson 2004]. The chapter will be structured as follows:

1. Context and design of the study.
2. Description of the population.

3. Variables description.
4. Data analysis.

The presentation of the methods used in the research in the above framework ensures that all the important aspects of the study are presented.

4.1. Context and design of the study

It was important to verify the methods employed in the previous studies. In the research focussed on tourism Nicolau and Santa-Maria [2013a] and Zach, Krizaj and McTier [2015] employed the event-study approach. In both studies authors analysed short-term changes in market value resulting from companies' press releases concerning innovation. The authors operationalized the changes in market value as the abnormal stock returns resulting from the announcement in different event windows surrounding the release. Both studies were burdened with several limitations. First the authors introduced only the divisions of innovation by type. Second Nicolau and Santa-Maria relied on only 24 innovation announcements [2013a] and Zach, Krizaj and McTier gathered data from only two US hotel firms [2015]. In the context of services Son et al. [2011] studied the effects of cloud computing innovation announcements on the market value of the firm represented by average abnormal returns during the three days surrounding the event. Filson [2004] concentrated on the impact of commerce strategies on a firm's value. The author employed the event-study method and gathered companies' press releases concerning innovative changes in commercial strategies. Abnormal returns in three days event windows were calculated. Nicolau and Santa-Maria [2013b] studied the short-term effects of innovation award announcements with the use of the event-study method. Authors analysed the impact of innovation press releases on the abnormal returns generated in an eleven-day event windows. Ho, Fang and Hsieh [2011] studied the long-term relationship between business model innovation and the firm's value. The authors analysed the changes in market value over an eight-year period. Similarly Ehie and Olibe studied the effects of R&D investment on market capitalisation [2010]. Authors studied the year-to-year changes in market value and concluded that there is a positive relationship between R&D investment and market value in both services and manufacturing. Peng [2008] used the buy-and-hold abnormal return (BHAR) method to evaluate the long-term effects of different announcements on companies' market value. The author

indicated that it is a standard procedure to employ BHAR to analyse long-term changes in market value of equity.

The above evidence shows that previous research adopted event-study as the standard approach for studying the effects of innovation on the companies' market value in the short term. In event-studies the focus is set on "the effect of an event on the price of a particular class of securities of the firm, most often common equity" [MacKinlay 1997, p. 13]. The authors represented companies' market value by the market value of equity and tested the abnormal changes in stock prices resulting from innovation announcements. In long-term studies the buy-and-hold abnormal returns method was selected as the basic approach.

In the present research in order to achieve its purpose to indicate and measure long- and short-term effects of innovation announcements on the market value of equity of tourism enterprises the research design was constructed as follows. The study built on the changes in market value of the equity of public tourism companies. The changes were represented by the abnormal returns generated in the specified time windows surrounding the release of the announcement. In the research the sole events of interest were the innovation announcements. In order to study the relationship between innovation announcements and the market value of equity in tourism two research methods were employed: event-study in the short term and buy-and-hold abnormal returns in the long term. The important elements of the research are enumerated below.

Subjective scope

The subject of analysis was the market value of equity change resulting from innovation announcements of tourism enterprises. At the same time innovation announcements covered all media coverage of company's innovation activity, especially articles in newspapers, magazines and journals, television, and radio programmes, conference speeches, publications on the websites, and others. The companies in question did not have to create the announcement.

Time frame

The time frame covered the period of relative stability after the major economic crises. It ranged from February 2011 to February 2016. In the period of 2007 and 2008 the worldwide economy suffered from the global financial crisis which caused instability in the whole financial sector. The financial crisis was caused by subprime lending, easy credit conditions, predatory lending and incorrect pricing. The crisis was followed by a European debt crisis that started in 2009.

The major attempts to address “severe tensions in financial markets” [European Central Bank 2011, p. 17], and preserve financial stability were the introduction of European Financial Stability Facility (a special purpose vehicle which is authorised to issue bonds guaranteed by euro area countries), which became operational in August 2010 and the European Financial Stabilisation Mechanism (an emergency funding programme guaranteed by European Commission) which became operational in May 2010¹⁵ [Council of the European Union 2010; European Central Bank 2011]. Both systems performed their first operations in January 2011. This moment is selected as the beginning of relative, after-crisis stability. In this research the beginning of the time frame is the first month that follows – February 2011. The data on innovation was gathered until February 2016 (inclusive), which ensures the possibility of applying the selected research methods and a calculation of the long-term changes in market value of equity.

Spatial range

The study covers all tourism companies listed on the main stock exchanges in the European Union. Tourism companies include companies managing different tourism activities. The main stock exchanges are those being part of the World Federation of Exchanges or the Federation of European Securities Exchanges. The country of listing is of primary importance. Therefore the spatial scope encompasses all the 28 European Union member states. The spatial scope was specified even though computerisation and consolidation of modern stock markets diminishes the importance of physical location.

Data

Both quantitative and qualitative data was used. Specialised news databases were used to collect data on innovation announcements. The changes in the market value of equity of public companies are publicly available and accessible through stock exchange databases. In the case of missing data it was collected directly from companies of interest.

¹⁵ In March 2011 the EU Council established the European Stability Mechanism, a permanent crisis management framework [European Central Bank 2011, p. 17].

4.2. Description of the population

Tourism enterprises release innovation announcements voluntarily to communicate development. The population covered all the innovation announcements of tourism companies listed on the most important stock exchanges in the European Union released in the period of February 2011 – February 2016. There is no available sampling frame covering tourism companies' innovation announcements therefore such a sampling frame was created exclusively for this research. The procedure covered the precise content analysis of 9,000 announcements. The population was 932 announcements.

4.2.1. Specification criteria

The population studied included innovation announcements of companies managing different tourism activities¹⁶ and listed in EU-28. First, the main stock exchanges operating in the European Union were selected. Second, tourism enterprises listed on these exchanges were pinpointed. Third, the innovation announcements were collected.

The study included only public companies, listed on the most important stock exchanges in Europe. In the 28 countries in the European Union, there were 32 stock exchanges being part of World Federation of Exchanges – WFE or Federation of European Securities Exchanges – FESE [World Federation of Exchanges 2016; Federation of European Securities Exchanges 2016]. In 25 countries there was one such stock exchange, in Germany there were three, and in Spain there were four. Some of the exchanges operated as part of stock exchange groups such as BME, Euronext, and Nasdaq OMX. The stock exchange groups and single stock exchanges covered in the research were divided by their level of consolidation and listed in Table 13.

¹⁶ Discussion on tourism activities is provided in chapter 1. Theory of innovations, subsection 1.4 Innovation in tourism companies.

Table 13. European stock exchanges being part of WFE and FESE

Consolidation level		No	Name
No/low		1.	Bulgarian Stock Exchange
		2.	Cyprus Stock Exchange
		3.	Deutsche Borse Group
		4.	Borse Berlin
		5.	Boerse Stuttgart
		6.	Athens Exchange
		7.	Irish Stock Exchange
		8.	Bourse de Luxembourg
		9.	Borza'ta Malta
		10.	Warsaw Stock Exchange
		11.	Bursa de Valori Bucuresti
		12.	Burza Cennych Papierov v Bratislave
		13.	Budapest Stock Exchange – Budapesti Ertektozsde
		14.	Ljublianska Borza
Average	LSE Group	1.	London Stock Exchange
		2.	Borsa Italiana
	CEESEG	3.	Wiener Borse
		4.	Burza Cennych Papiru Praha
High		1.	BME
		2.	Euronext
		3.	NASDAQ OMX

Source: own development

Amongst the EU28 countries only Croatia did not have any representation in FESE or WFE. Zagrebačka Burza is not a part of any of these organisations. Some stock exchanges tended to cooperate. In Spain the stock exchanges from Madrid, Barcelona, Bilbao and Valencia operated together as Bolsas y Mercados Españoles [2016]. Moreover Euronext – a pan-European financial service corporation unified the exchanges in Paris, Amsterdam, Brussels, Lisbon and London into a single market [Euronext 2016]. Nasdaq OMX from 2003 unified seven

stock exchanges in Europe (six in the European Union and one in Iceland). OMX North covered stock exchanges in Copenhagen, Stockholm, Helsinki, Reykjavik and OMX Baltic the ones in Tallinn, Vilnius and Riga [Nasdaq OMX 2016]. Moreover in 2007 the London Stock Exchange acquired the Milan-based Borsa Italiana to form the London Stock Exchange Group [2016]. Lastly, the Central and East European Stock Exchange Group (CEESEG), a holding company, comprised the stock exchanges in Vienna, and Prague. Until 2015 the organisation included also the Budapesti Ertektörsde and the Ljubljana Stock Exchange, but the latter was sold to the Zagreb Stock Exchange in 2015 [Central and East European Stock Exchange Group 2016].

Stock markets may be divided into regulated and alternative. Alternative Trading Systems (ATS), described by the European regulatory term Multilateral Trading Facilities (MTF) are considered a growing investment service [Trinity Capital Investment 2010]. However the companies listed on MTFs are subjects to less regulation than those listed on traditional exchanges. Therefore this research covered only the companies listed on traditional stock exchanges.

Consolidation and computerisation of stock exchanges has meant that the physical location is nowadays of relatively low importance and that international recognition and high operational quality are of key importance. All the selected stock exchanges operate internationally. Spatial scope was determined to schematise the research. The main markets of the European stock exchanges guarantee the highest quality and accessibility of data.

After determining the main stock exchanges in Europe the next step covered the identification of tourism enterprises. All the companies listed on the above stock exchanges were taken into consideration. Therefore at this stage 7,847 companies were analysed. The companies were analysed one by one in order to pinpoint the ones managing the tourism activities. Based on publicly available information the companies were classified as tourism companies if they generated more than half of their value added in tourism activities. Also, in the case of companies managing more than one tourism activities, the dominant type of activity was evaluated based on the intra-firm, cross-sectional calculation of value added generated. In the case of no appropriate financial data being available the clarification was achieved through direct contact with the companies (by e-mail). The number of the companies investigated and the number of selected tourism companies is included in Table 14.

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Table 14. The number of companies under investigation

No of companies	Tourism companies	The percentage of tourism companies
7847	111	1,414%

Source: own development

The number of analysed companies ($n = 7847$) is greater than the number of public companies in the selected stock exchanges at any particular moment. The analysed period covered five years and numerous companies performed the IPOs whilst others went bankrupt.

At this stage the study covered a total of 111 companies. However the final analysis included data from only 88 companies. It was due to the three facts. First, some companies did not release any innovation announcements in the period studied ($n = 16$). Second, the data on innovation was not accessible or sufficiently precise which prevented classification, coding and further analysis ($n = 7$).

The tourism companies under investigation performed different tourism activities. The most represented category was passenger transportation including railway companies, airlines, ferries, car rental companies and road transportation companies. The second was sport and recreational activities covering amusement parks, holiday resorts, and casinos. The data is in Table 15.

Table 15. The number of companies by tourism characteristic activities

	Accommodation	Food and beverage	Passenger transportation	Travel agencies	Cultural activities	Sport and recreation	Other
No of companies	19	11	29	4	3	21	1

Source: own development

In this research two firm-level innovation related variables are employed – R&D intensity and innovativeness. Both variables were measured over the period of one year preceding the announcement day. On average tourism companies release 3,73 innovation announcements per year. However they differ significantly in the informative value ranging from comprehensive information to short notes. The mean R&D intensity of tourism companies equals 0,73%, which

means that tourism companies spend on average the equivalent of less than 1% of total sales on research and development. The data is shown in Table 16.

Table 16. R&D intensity and innovativeness

	Min	Max	Mean	SD
R&D intensity	0	0,0352	0,0073	0,0028
Innovativeness	0	14	3,73	2,91

Source: own development

The data is consistent with expectations and previous research that reported tourism not to be an R&D intensive sector [Sequeira and Campos 2007]. Low intensity sectors spend on R&D below 1% of the sales. The medium-low sectors spend between 1% and 2%, and the medium-high between 2% and 5%. The EU between-sector average equals 2,7% [Hernandez-Maestro, Munoz-Gallego and Santos-Requejo 2014].

Furthermore, it is worth indicating that 19 companies were listed on more than one stock exchange – Table 17.

Table 17. Tourism companies listed on more than one European stock exchange

No	Company	Stock exchange	Stock exchange
1	Accor S.A.	Deutsche Borse Group	Europext – Paris
2	Air France-KLM	Deutsche Borse Group	Europext – Paris
3	All Nippon Airways Co. Ltd.	Deutsche Borse Group	LSE
4	Carnival Corp & plc Paired with 1 share of beneficial interest from P&O Princess Cr	Deutsche Borse Group	LSE
5	Carnival plc	Deutsche Borse Group	LSE
6	Pierre & Vacances S.A.	Deutsche Borse Group	Euronext – Paris
7	Ryanair Holdings plc (Spons. ADRS)	Deutsche Borse Group	LSE
8	Société des Bains de Mer et du Cercle des Etrangers a Monaco S.A. (SBM)	Deutsche Borse Group	Euronext – Paris
9	Thomas Cook	Deutsche Borse Group	LSE
10	TUI	Deutsche Borse Group	LSE
11	Whitbread PLC	Deutsche Borse Group	LSE
12	Ryanair	LSE	ISE

13	INTERNATIONAL CONSOLIDAT.AIRLINES GROUP	LSE	BME
14	Fortuna Entertainment Group N.V.	Deutsche Borse Group	CEESEG
15	EDREAMS ODIGEO	Deutsche Borse Group	BME
16	AENA	Deutsche Borse Group	BME
17	MELIA HOTELS INTERNATIONAL S.A.	Deutsche Borse Group	BME
18	NH Hotels	Deutsche Borse Group	BME
19	Fortuna Entertainment Group N.V.	Deutsche Borse Group	CEESEG

Source: own development

After determining the main stock exchanges in the European Union and indicating public tourism enterprises the next step covered the determination of the innovation announcements. No elimination procedure for the announcements was applied. Thus the population encompassed all the innovation announcements of tourism companies listed in the European Union released between February 2011 and February 2016. The determination of sample size, the creation of the sampling frame and sampling procedure and the collection of data are described in the next subchapters.

4.2.2. Methods of the selection of subjects

Large populations require sampling procedures to form their representative subsets and make the research feasible. In the present sub-chapter the size of the sample is discussed from the points of view of: the power of the chosen methods to detect abnormal changes in market value of equity, applicability of the model verification methods and generalizability of results.

As it was stated before event-study and buy-and hold abnormal returns methods were employed. In this context their ability to detect the presence of non-zero abnormal returns is crucial. The lack of such an ability would have forced a change of the research design.

First, the power of the test was evaluated. The power of the test is defined as: “the likelihood of rejecting the null hypothesis for a specified level of abnormal return associated with an event” [MacKinlay 1997, p. 28]. The two-sided test of the null hypothesis that the abnormal returns are zero was performed using the cumulated abnormal return based statistic θ_1 . The power of the test was

$$P(\alpha, H_A) = \text{pr}(\theta_1 < c \left(\frac{\alpha}{2}\right) | H_A) + \text{pr}(\theta_1 > c(1 - \frac{\alpha}{2}) | H_A)$$

where:

- α – the size of the test,
- H_A – alternative hypothesis,
- θ_1 – test statistic,
- $c(x) = \Phi^{-1}(x)$, $\Phi(\cdot)$ – standard normal cumulative distribution function.

The θ_1 statistic was given by:

$$\theta_1 = \frac{ACAR(t, T)}{\text{var}(ACAR(t, T))^{0,5}}$$

where:

- ACAR – average cumulated abnormal returns,
- t – first day of event window,
- T – last day of event window.

The alternative hypotheses were constructed based on the results of preliminary studies¹⁷ and the results of Nicoalu and Santa-Maria [2013a]. The first one relied on the cumulated abnormal changes in market value of equity equaling 0,0062 obtained in the preliminary research. The second one employed the cumulated abnormal changes in market value of equity equaling 0,0064 stemming from the results of Nicoalu and Santa-Maria [2013a]. The variance used in the calculation stemmed from the preliminary research and equalled 0,000576. The variance corresponds to the standard deviation of 0,024. Two confidence intervals were used 0,95 and 0,99. In the result the analysis of the power of four different cases was performed. The selected data is delivered in Table 18 and in the Figure 7.

The power of the test reported above ranged from 0 (low power) to 1 (high power). As may be seen in the Table 18 and in Figure 7 the reasonable power was obtained very quickly. In all the four analysed cases the power equaling 0,5 was achieved at the latest by 99 observations. In two cases such power was achieved in less than 60 observations. The power at the level of 0,8 was achieved at the latest by 174 observations. Furthermore the power of the test equalled at least

¹⁷ The preliminary research was published in Szutowski and Bednarska [2014].

0,9 in all cases by 220 observations. The maximum power of the test at the level of one was achieved at the levels of 290 observations for AR 0,64%, $\alpha = 0,05$, the level of 309 for AR 0,62%, $\alpha = 0,05$, the level of 374 for AR 0,64%, $\alpha = 0,01$, and the level of 398 for AR 0,62%, $\alpha = 0,01$. Therefore applying the most secure assumptions resulted in the sample size determined at the level of 398 observations but the reasonable power of 0,9 is achieved already by 220 events.

Table 18. The results of the analysis of power

Sam-ple size	Abnormal changes in market value of equity			
	0,0064		0,0062	
	$\alpha = 0,05$	$\alpha = 0,01$	$\alpha = 0,05$	$\alpha = 0,01$
1	0,06	0,01	0,06	0,01
2	0,07	0,02	0,07	0,02
3	0,07	0,02	0,07	0,02
4	0,08	0,02	0,08	0,02
5	0,09	0,02	0,09	0,02
6	0,10	0,03	0,10	0,03
7	0,11	0,03	0,10	0,03
8	0,12	0,03	0,11	0,03
9	0,13	0,04	0,12	0,04
10	0,13	0,04	0,13	0,04
11	0,14	0,05	0,14	0,04
12	0,15	0,05	0,15	0,05
13	0,16	0,05	0,15	0,05
14	0,17	0,06	0,16	0,05
15	0,18	0,06	0,17	0,06
16	0,19	0,07	0,18	0,06
17	0,20	0,07	0,19	0,07
18	0,20	0,07	0,19	0,07
19	0,21	0,08	0,20	0,07
20	0,22	0,08	0,21	0,08

Sam-ple size	Abnormal changes in market value of equity			
	0,0064		0,0062	
	$\alpha = 0,05$	$\alpha = 0,01$	$\alpha = 0,05$	$\alpha = 0,01$
25	0,27	0,11	0,25	0,10
30	0,31	0,13	0,29	0,12
35	0,35	0,16	0,33	0,15
40	0,39	0,19	0,37	0,17
45	0,43	0,22	0,41	0,20
50	0,47	0,25	0,45	0,23
60	0,54	0,30	0,52	0,28
70	0,61	0,37	0,58	0,34
80	0,66	0,42	0,64	0,40
90	0,72	0,48	0,69	0,45
99	0,76	0,53	0,73	0,50
100	0,76	0,54	0,73	0,50
120	0,83	0,64	0,81	0,60
140	0,88	0,72	0,86	0,68
160	0,92	0,79	0,90	0,76
174	0,94	0,83	0,93	0,80
180	0,95	0,84	0,93	0,81
200	0,96	0,88	0,95	0,86
220	0,98	0,92	0,97	0,90
250	0,99	0,95	0,98	0,93
290	1,00	0,98	0,99	0,97
300	1,00	0,98	0,99	0,97
309	1,00	0,98	1,00	0,98
350	1,00	0,99	1,00	0,99
374	1,00	1,00	1,00	0,99
398	1,00	1,00	1,00	1,00
400	1,00	1,00	1,00	1,00

Source: own development

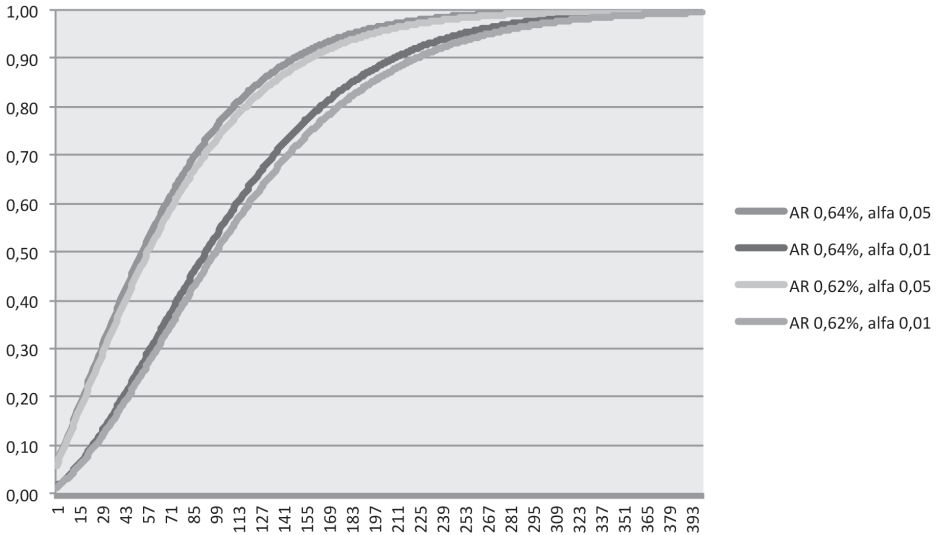


Figure 7. The results of the analysis of power

Source: own elaboration

Second, the size of the sample was considered from the point of view of the model presented in the previous chapter. The model includes 17 independent variables. In order to perform the analysis using multiple regression a minimal sample size of 279 observations was required. The calculation formula in this case was [Kelley and Maxwell 2003]:

$$n = \left(\frac{Z_{(1-\alpha/2)}}{w} \right)^2 * \left(\frac{1 - R^2}{1 - R_{XXj}^2} \right) + p + 1$$

where:

n – required sample size,

w – half-width of the entire confidence interval,

$Z_{(1-\alpha/2)}$, p – number of predictor variables, R^2 is the population multiple correlation coefficient predicting the dependent variable from p predictor variables,

R_{XXj}^2 – is the population multiple correlation coefficient predicting the j^{th} predictor from the remaining $p-1$ predictors.

The values of R^2 and R^2_{XXj} were estimated prior to data collection based on the results of preliminary studies¹⁸. The 95% confidence interval was adopted. In such case, the necessary sample size equals 278,8 observations, which is rounded to the next larger integer, and gives 279 observations.

Third, the size of the sample was considered from the point of view of generalization of results. The margin for error was set at 5%, which is a common choice in similar studies. The confidence level equalled 95% (with the corresponding Z value of 1,96), which also is a common choice. The sample size was calculated with the use of following formulation:

$$n = \frac{N}{1 + \frac{e^2(N-1)}{Z_{\alpha}^2 * p * q}}$$

where:

- n – required sample size,
- Z_{α}^2 – the level of confidence,
- e – margin of error,
- p – the estimated proportion of attribute that is present in a population,
- q – “1-p”,
- N – number of observations in sampling frame.

Furthermore, the attribute distribution (the value of “p”) was assumed at the level of 0,5. It signified that the percentage of positive and negative changes of market value of equity was presumed to be equal. Such a choice was the safest and it entailed the largest sample size. The result of the calculation indicated that 273 observations are necessary to generalise the results with the given assumption.

In order to assure the full reliability of the reasoning the above results were compared to those obtained through the alternative formulation:

$$n = \frac{Z_{\alpha}^2 * p * (1 - p)}{e^2}$$

¹⁸ Different aspects of the preliminary research were published in Szutowski [2014c; 2015a; 2015b].

Similarly to the previous calculation it was assumed that the values of p and q equal 0,5. In the simplified form the formulation is as follows:

$$n = Z\alpha^2 * \frac{1}{4e^2}$$

where:

- n – required sample size,
- $Z\alpha^2$ – the level of confidence,
- e – margin of error.

Such a formulation is independent from the number of units in the population. The result of the calculation indicated that 384,16 observations were necessary to generalise the results with the given assumption. Therefore the sample size of 385 innovation events would have to be collected.

In conclusion, in order to assure the full power of the selected methods to detect abnormal returns, the applicability of multiple-regression to test the model and the generalizability of results, the sample size was set at 398 observations. Such a number was drawn randomly from the sampling frame.

4.2.3. Data collection

The population included all the innovation announcements of tourism companies in the specified period. In order to generalize results the observations were selected randomly. First, a sampling frame of all the innovation announcements was created. Second, the observations were drawn randomly from the sampling frame. The sampling frame reflecting the whole population was created with the use of specialised news' databases. Third, the specific information on observations drawn in the sample was obtained through diverse sources. The information covered the characteristics of innovation and the company and the changes in market value of equity. Therefore four different kinds of data were collected:

- The data on all the innovation announcements covering their contents and release dates (sampling frame).
- The data on the characteristics of particular innovations covering such predictors as: patents, CSR, type, degree of novelty involved, source, stage and communication (sample).
- The data on the characteristics of the particular companies covering such predictors of market value of equity as: R&D intensity and innovativeness,

and such control variables as: industry, size, volume, total cash dividend, operational experience, leverage, return on equity and growth (sample).

- The data on the changes in market value of equity (sample).

Specialised news' databases were used to collect the precise data on innovation announcement releases and to construct the sampling frame. The search terms covered different combinations of company names and such keywords as: innovation, improvement and modernisation. In the research four databases were employed. The Factiva database by Dow Jones & Company, which is one of the world's principal source of news, data and insight. It offers access to news and information sources on more than 22 million private and public companies [Dow Jones 2016]. Factiva provides access to more than 32,000 sources, which include newspapers, magazines, journals, television and radio transcripts, photos and others. Eikon by Thomson Reuters which provides access to trusted analytics, news and data, all filtered by relevance [Thomson Reuters 2016]. The database covers news exclusives and provides the broadest range of information on any industry. ProQuest databases which include a collection of content from 90,000 publishers [ProQuest 2016]. The databases cover e-books, periodicals, newspapers, governmental and cultural archives and historical collections. The Amadeus database was also employed. The Amadeus database by Bureau van Dijk provides access to comparable business and financial information on Europe's largest 510,000 private and public companies. It covers 43 countries in total [European University Institute 2016].

The total number of pieces of information released in the media in the specified period and concerning the companies studied scarcely countable and is roughly 5 million (The number estimated based on the Google Trends.). However, most of it did not refer to innovation and the employment of specialised tools was required. The precise search procedure using the above databases allowed the selection announcements referring to innovation.

Despite the precise specification of the research criteria the research resulted in more than 9,000 announcements. The announcements were strongly diversified. Thus the content analysis method was employed to evaluate their usefulness from the point of view of the research. The procedure covered four steps: selecting content for analysis, determining units of content, coding the content and counting and drawing conclusions:

1. The content selected for analysis covered 9,000 innovation announcements. Therefore the procedure of selecting announcements, which effectively

- concerned actual innovation, relied on the analysis of the content of all 9,000 releases.
2. A single innovation announcement constituted the unit of content. All the announcements were analysed separately, one by one.
 3. The content was coded. All the announcements were analysed in detail to decide if they concern a company's innovation defined as a process of implementing positive and new ideas into business practice. Specialised codes were attributed to all the announcements and covered its subject and four fields based on the above definition: implementation into business practice, newness, positive effects and process character.
 4. Almost 20% of all the announcements did not refer to innovation at all which made their titles highly misleading. Furthermore approximately 25% did not refer in any way to the implementation of innovation in particular companies. Additionally approximately 13% of the announcements referred to ideas, which were not new even to the companies mentioned. Besides which approximately 8% of announcements did not specify the effects of innovation. Moreover approximately 23% of the announcements reported innovations, which have already been implemented in the past. Only approximately 11% of all announcements referring to innovation concerned innovation consistent with the above definition.

In the research it was concluded that the word “innovation” was highly overused and thus the final number of announcements actually referring to innovation was significantly smaller than 9,000. The population – the total number of all the innovation announcements of tourism companies listed in the European Union released between February 2011 and February 2016 and consistent with the author's definition of innovation was 985.

The 985 announcements constituted the population, however due to the use of particular methods in the present study the list must had to be modified in order to create a sampling frame. The 53 announcements were eliminated due to confounding events occurring in the ± 6 days event window¹⁹. Yet, if other financially relevant announcements occur during the event window, the isolation of an event of interest is difficult [McWilliams and Seigel 1997]. For each announcement under investigation such confounding announcements as: other innovation announcements and dividends, signing of a major government contract, announcement of

¹⁹ Event windows are discussed in Chapter 4. Methods of empirical research, subchapter 4.3.1. Dependent variables.

an impending merger, filing of a large damage suit, change in a key executive and the announcement of unexpected earnings, were checked [McWilliams and Seigel 1997]. Foster [after: McWilliams and Seigel 1997, p. 637] advised the elimination of observations that have confounding events which was employed here. The selection of announcements from the point of view of the methods employed in this research resulted in 932 observations remaining for further analysis.

In the next step the sample was drawn from the sampling frame. As was calculated before the sample size was 398 observations. Therefore such a number was drawn randomly.

Seven innovation-level variables were employed to characterise each announcement. The first one was patent. In the sample 25 announcements referred to the patented innovation. The remaining 373 reported innovation with no legal protection. The second variable was CSR. Thirty-seven announcements reported innovation with elements of CSR. The residual 361 did not have such elements. The third variable was innovation type. Here five innovation types were isolated. The most represented was product/service innovation. The data on the number of announcements reporting different innovation types is provided in Table 19.

Table 19. Announcements reporting different innovation types

	Product/service	Process	Marketing	Organisational	Distributional
Type	129	100	88	37	44

Source: own development

The fourth innovation-level variable was the degree of novelty involved. In line with the expectations based on the low R&D intensity radical innovation was represented the least. Table 20.

Table 20. Announcements reporting different degrees of novelty involved

	Radical	New to the company	Incremental
Degree of novelty involved	65	256	77

Source: own development

The announcements in the sample may be disaggregated between different innovation sources. In the present research three sources were isolated. The most represented included innovation developed in-house. The data is contained in Table 21.

Table 21. Announcements reporting different sources

	In-house	Collaboration	Copied
Source	292	86	20

Source: own development

The sample consisted of 67 announcements reporting the development of innovation, and 331 announcements referring to commercialised innovation. Last but not least, the sample may be disaggregated between the first announcements and the second and further announcements. The first category encompassed 361 announcements and the second accounted for 37 observations.

In order to perform the analysis precise data concerning each of the 398 observations was required. The data concerning particular innovations was researched with the use of the Factiva, Eikon, and Amadeus databases. In the case of seldom missing information it was researched directly on the companies' websites or collected directly from companies through e-mails. The information on a particular innovation was gathered for each innovation announcement in the sample. The search terms covered company names and the keywords describing particular innovations. The method was relatively effective, however some data was inaccessible through any of the databases. Furthermore companies often actualised their websites by archiving historical data which prevented the use of the websites to collect information on innovation implemented several years earlier. Due to the above the direct communication with companies through e-mails was inevitable in a few cases. Its effectiveness was relatively low.

Data on particular companies was also gathered. In order to assure the maximum accuracy of financial variables quarterly data, instead of yearly data was used. For every company observed variables were researched separately and reflected the company's situation in the quarter in which the innovation announcement occurred. The search terms were formed from company names. The Eikon database was used also to gather company data. In addition to what was stated above, Eikon provides access to timely, trusted and accurate content from more than 400 exchanges over 70 direct exchange feeds. Data is delivered via Thomson Reuters Elektron low latency data feeds which include 80 providers more than 1,300 institutional clients and 2,000 contributing sources in 175 currencies and estimates from over 930 brokers and cover more than 22,000 companies. Fundamentals cover more than 99% of the world's market cap [Thomson Reuters 2016]. The procedure was relatively effective. However in some cases financial data had to be taken directly from company websites.

For the determination of changes in the market value of equity two pieces of information were needed – share price and the number of shares outstanding. Such data is publicly available and accessible through the databases of individual stock exchanges. In the case of missing data both pieces of information were available through Yahoo Finance and Google Finance. The search terms reflected the company names. Data accessibility through stock exchanges databases was relatively poor. Therefore the use of Yahoo Finance and Google Finance was often required.

The ProQuest, Eikon, and Amadeus databases are subscribed to by the Poznań University of Economics. The Factiva database was subscribed to during the time of the research. Yahoo Finance and Google Finance databases are open access.

Summary – description of the population

The research covered 111 tourism enterprises listed on the most important stock exchanges in the European Union in the period February 2011 – February 2016. The total number of pieces of information released for the companies studied in this period approximated 5 million, 9,000 of which referred to innovation. The precise selection procedure allowed the determination of the population of 932 observations consistent with the definition of innovation adopted in this research. Three independent methods were applied to determine the minimum sample size. The highest number of observations was calculated in the analysis of the power of event-studies to detect abnormal returns – 398 observations. Such a number was adopted as the sample size and drawn randomly from the sampling frame. Four different data sets were required for the research to be complete – data on: the innovation announcements (including release date), the characteristics of a particular innovation, the characteristics of the individual companies and the changes in market value. The data was acquired in the complex process of data mining covering specialised news', financial and stock exchange databases. Missing information was acquired directly from the companies under investigation.

4.3. Variables description

The next step is the description of variables. First, the methods of calculating dependent variables in the short and long terms are presented. Therefore the

detailed discussion on the event-study (short term) and buy-and-hold abnormal returns (long term) methods is demonstrated. Second, the methods used to include the independent variables into the analysis are described.

4.3.1. Dependent variables

Short-term abnormal returns

In line with the definition of the market value of equity it depends on two elements – the number of shares outstanding and their current price. Thus in the situation in which a company does not issue new shares the changes in share price represent the changes in the market value of equity [Damodaran 2012a; Vernimmen et al. 2011]. It was the case in all the observations made here. In order to assess whether innovation announcements had any effect on the market value of equity the measure of abnormal return was employed.

Abnormal returns (ARs) measure the difference between the actual return and the expected return. The actual return was observed directly on the stock market and it stood for the stock price fluctuations that actually occurred – “actual ex-post return of the security over the event window” [MacKinlay 1997, p. 15]. Expected (normal) return represented the return that would have occurred if no event had taken place. The calculation formula for the abnormal returns was as follows:

$$AR_{it} = R_{it} - E(R_{it})$$

where:

AR_{it} – abnormal return for firm i on day t ,

R_{it} – actual return for firm i on day t ,

$E(R_{it})$ – expected return for firm i on day t .

Expected returns are calculated with the use of econometric models. In the research the expected return calculation was performed with the use of the Carhart four-factor model [Carhart 1997]. The use of a market model is the standard approach in event studies [McWilliams and Seigel 1997, p. 628]. However the model employed offered some gain in reducing the variance of the abnormal returns. The explanatory power of additional factors contributed to the precision of the estimation of expected returns.

The traditional asset pricing model – Capital Asset Pricing Model (CAPM) uses one factor ($R_m - R_f$) to describe the return on a stock. Fama and French

introduced in their three-factor model two additional factors: SMB (small-minus-big) and HML (high-minus-low). As described in Chapter 2 small caps and stocks with a low price-to-book ratio tend to perform better than the market [Fama and French 1993]. The Carhart four-factor model introduces the fourth factor – “momentum”. It is denoted WML which refers to “winners minus losers”. It represents the tendency for the stock to continue rising if it rises, and to continue declining if it declines. The opposed portfolios are value-weighted, zero-investment, factor-mimicking [Carhart 1997]. The calculation formula for the four-factor model is as follows:

$$E(R_{it}) = \alpha + \beta_1 * (R_{mt} - R_f) + \beta_2 * SMB + \beta_3 * HML + \beta_4 * WML$$

where:

$E(R_{it})$	– the expected return calculated with the use of the Carhart model,
R_{mt}	– the return on the stock market index on day t,
R_f	– the risk free rate of return,
SMB, HML and WML	– returns on portfolios for size, book-to-market equity and one-year momentum in stock returns,
α	– intercept,
$\beta_1, \beta_2, \beta_3, \beta_4$	– parameters.

The intercept and the parameters in the above formula were estimated from a least squares regression of the excess return of a stock in excess of the risk free rate on the stock index return less the risk free rate ($R_{mt} - R_f$), SMB, HML and WML over the estimation period of 250 days prior to the innovation announcement which is standard procedure [MacKinlay 1997]. The estimation period was shortened by several days in the case of event windows covering the period before the announcement. As MacKinlay states “the event period itself is not included in the estimation period to prevent the event from influencing the normal performance model parameter estimates” [1997, p. 15]. The estimation periods preceded directly the event windows. It ranged from –250 days to one day before the beginning of the event window. For example, for the +/-6 days event window, the estimation period ranged from –250 to –7 days before the event.

Actual returns were observed directly on the market and did not require any calculation. For public companies such data was publicly available. The difference between the actual returns and the expected returns calculated with the use of the Carhart model formed the abnormal returns.

In the next step the abnormal returns were standardised [Dodd and Warner 1983]. Such standardization led to more powerful tests [MacKinlay 1997]. The standardisation was based on the standard deviation of the abnormal returns. The calculation formula for the standardised abnormal returns (SARs) was as follows [McWilliams and Siegel 1997]:

$$SAR_{it} = AR_{it}/SD_{it}$$

where:

SD_{it} – was given by the following formula:

$$SD_{it} = \left\{ S_i^2 * \left[1 + \frac{1}{T} * \frac{(R_{mt} - R_m)^2}{\sum_{t=1}^T (R_{mt} - R_m)^2} \right] \right\}^{0,5}$$

where:

S_i^2 – the residual variance for firm i ,

R_{mt} – the return on the stock market index on day t ,

R_m – the average return from the market portfolio in the estimation period,

T – the numbers of days in the estimation period.

There are two ways of aggregating standardised abnormal returns: through time (in the event window) and across securities/observations [MacKinlay 1997]. Aggregation through time is referred to as “cumulation”. The result is called “cumulative abnormal return” and is denoted CAR. Aggregation through observations is calculated as the mean of the abnormal returns in a particular day. The measure is called average abnormal return (AAR). The two ways of aggregating are presented on the Figure 8.

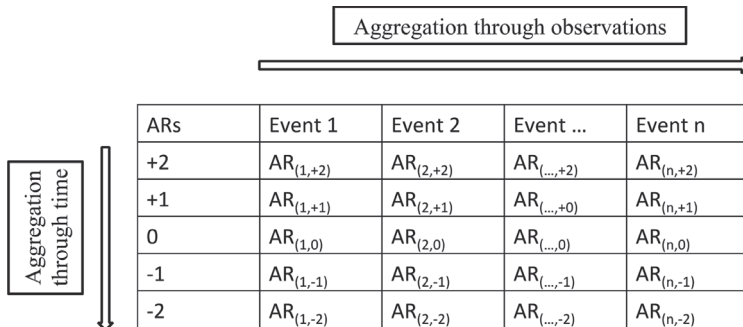


Figure 8. Aggregation through time and observations

Source: own research

The daily standardised abnormal returns were aggregated through time – cumulated over the previously presented event windows. As MacKinlay states: “the abnormal return observations must be aggregated in order to draw overall inferences for the event of interest” [1997, p. 21]. Therefore the values of cumulated abnormal returns were calculated. The calculation formula was as follows:

$$CAR_{it} = \left(\frac{1}{k^{0.5}} \right) * \sum_f^l SAR_{it}$$

where:

CAR_{it} – the cumulated abnormal return for the firm i in the window t ,

k – the number of days in event window,

f – the first day of event window,

l – the last day of event window.

After CAR_{it} was calculated the procedure of aggregation through observations was performed. According to McWilliams and Seigel: “the standard assumption is that the values of CAR_i are independent and identically distributed. With this assumption we convert these values to identically distributed variables by dividing the CAR_i by its standard deviation, which is equal to $[(T-2)/(T-4)]^{0.5}$ ” [1997, p. 629]. Here such assumption was the case and therefore the calculation formula for $ACAR$ was as follows:

$$ACAR_t = \frac{1}{n} * \frac{1}{\left[\frac{T-2}{T-4} \right]^{0.5}} * \sum_{i=1}^n CAR_{it}$$

where:

n – the number of observations.

The variance of $ACAR_i$ is given by the formula [MacKinlay 1997]:

$$var(ACAR_t) = \frac{1}{n^2} * \sum_{i=1}^n \sigma_i^2$$

where:

σ_i^2 – the variance in observation i .

The null hypothesis stated that innovation announcements had no impact on stock returns. In such a case “the distributional properties of the abnormal returns can be used to draw inferences over any period within the event window” [MacKinlay 1997, p. 21]. Inferences about the ACAR performed to test the null that the abnormal returns are zero could be drawn using:

$$ACAR \sim N[0, var(ACAR)]$$

The null hypothesis that the abnormal returns were zero was tested using the following formula [McWilliams and Siegel 1997]:

$$Z = ACAR_t * n^{0,5}$$

Under the null hypothesis the cumulated abnormal returns of all the events should be normally distributed with approximately the same number of positive and negative CARs. The significant variation from the normal distribution signified that the event of interest had a significant effect on stock prices. In here the results achieving at least a 0,1 level of significance will be studied in detail, as $p < 0,1$ is the generally accepted minimum significance level [Leontiades and Tezel 1980; Smit 2006].

Long-term buy-and-hold abnormal returns

The research covered not only the short-term effects of innovation announcements but also the long-term. It seems that there are two main approaches to performing such study: buy-and-hold abnormal returns (BHAR) and calendar-time portfolio [Khotari and Warner 2006]. Both possess advantages and drawbacks. However one of the main objectives was to test the conceptual model constructed in the literature studies. It was possible only through employing the BHAR method. As Sorescu, Shankar and Kushwaha state: “a drawback of the calendar-time portfolio method is that it does not produce separate measures of abnormal returns for each event. Instead stocks must first be grouped into a portfolio and a single measure of abnormal returns is obtained for the entire group. Because of this grouping it is not possible to use a cross-sectional regression model to analyse the relationships between abnormal returns and event-specific independent variables” [2007, p. 475]. At the same time there are numerous examples of running cross-sectional regression in order to test econometric models with the use of BHAR method [Funke 2008; Peng 2008; Holler 2011].

The idea behind BHAR is to measure the average multiyear or multi-month “return from a strategy of investing in all firms that complete an event and selling at the end of a pre-specified holding period” [Mitchell and Stafford 2000, p. 296] in comparison to the portfolio of reference. It was assumed that the method follows investor experience better than monthly rebalancing [Khotari and Warner 2006]. The correctness of BHAR-based inference depends largely on the choice of the firm, portfolio or index of reference. In the research firms’ BHARs were calculated against the main stock index. Such an approach seemed to be a common practice. 6-month and 3-month BHARs were calculated.

Once the matching indexes were selected the reasoning based on BHAR was straightforward. For a single event firm T-month BHAR was defined as:

$$\text{BHAR}_{i(t,T)} = \prod_{t=1}^T (1 + R_{i,t}) - \prod_{t=1}^T (1 + R_{B,t})$$

where:

$\text{BHAR}_{i(t,T)}$ – the buy-and-hold abnormal return for firm i in the period between months t and T ,

$R_{i,t}$ – the return of the firm i in month t ,

$R_{B,t}$ – the return on the matched (benchmark) portfolio in month t .

The BHAR method employs geometric rather than arithmetic returns to calculate the overall return over the event period. The average BHAR – ABHAR was calculated for the sample of events as the value-weighted average [Mitchell and Stafford 2000]. The formula was as follows:

$$\text{ABHAR} = \sum_{i=1}^N w_i * \text{BHAR}_i$$

where:

ABHAR – the sample average of the i individual BHARs,

w_i – value weight based on the market capitalization of the event firms.

The statistical significance of the results obtained through the BHAR method was tested. However the character of the distribution of BHARs prevented the use of an unchanged, conventional t-test. Because the distribution of BHARs did not correspond to the distributional assumptions underlying the conventional

t-test, the test statistic was likely to be misspecified [Pojezny 2006]. Lyon, Barber and Tsai [1999] indicated that positive skewness of the distribution of BHAR leads to negatively biased test statistics.

The test statistics in the traditional t-test is as follows:

$$t = \frac{ABHAR}{(\sigma_{BHAR}^2)^{0,5} / n}$$

where:

n – the number of observations,
 σ_{BHAR}^2 – the variance of BHAR.

The variance used in the denominator stands for the cross-sectional sample variance of BHAR. It is given by the following formula:

$$\sigma_{BHAR}^2 = \frac{\sum_{i=1}^n (BHAR_i - ABHAR)^2}{n - 1}$$

where:

$BHAR_i$ – the abnormal buy-and-hold return for security i .

The traditional t-test accounts for two harmful correlations. The first one is the correlation between firm and benchmark returns. The second one includes the correlation between various stock returns in the sample. Cowan and Sergeant [2001] proposed the “two groups difference of means test”, which overcomes these issues. According to the authors’ simulation study the use of the modified test produced better-specified results than the use of standard paired difference t-test. Therefore the test statistic was formulated as:

$$t = \frac{ABHAR}{\left(\frac{\sigma_i^2}{n} + \frac{\sigma_{\text{benchmark}}^2}{n}\right)^{0,5}}$$

where:

σ_i^2 – variance of security i ,
 $\sigma_{\text{benchmark}}^2$ – variance of the benchmark index.

In the case of any missing data the abnormal returns for particular observations were calculated with the use of the Carhart four-factor model. The procedure was the same as the one described in the previous sub-chapter.

Event windows

In order to select the appropriate short-term event windows the statistical significance of standardised abnormal returns in the period from ten days before the event to ten days after was performed. Table 22 reports the values of the abnormal returns and the statistical significance of their SARs.

Table 22. Changes in market value of equity in particular days in +/- 10 days event window

Day	Changes in market value of equity	Z test for significance
-10	0,0550%	0,662
-9	-0,1091%	-1,184
-8	0,0522%	1,473
-7	-0,0203%	-0,121
-6	0,1868%	1,393
-5	-0,2265%	-1,123
-4	-0,0112%	-0,348
-3	0,1540%*	1,645
-2	-0,1181%	-1,460
-1	0,1009%	1,375
0	0,1434%*	1,925
1	0,1313%	0,852
2	0,0580%	0,554
3	-0,0262%	-0,187
4	-0,1739%*	-1,655
5	0,0946%	0,169
6	0,1492%*	1,647
7	-0,0359%	-1,083
8	0,1915%**	1,961
9	-0,0797%	0,117
10	0,0202%	0,610

Significance: ** $p < 0,05$ * $p < 0,1$

Source: own development

The abnormal returns were measured over 14 different event windows. The windows were as follows:

Event day.

- 0/+1 days.
- 0/+2 day.
- 0/+4 days.
- 0/+8 days.
- -6/-1 days.
- +/- 1 days.
- -1/+2 days.
- +/- 2 days.
- +/- 4 days.
- +/- 6 days.
- +/- 8 days.
- 3 months.
- 6 months.

The graphical representation of the short-term event windows and the estimation period is presented in Figure 9.

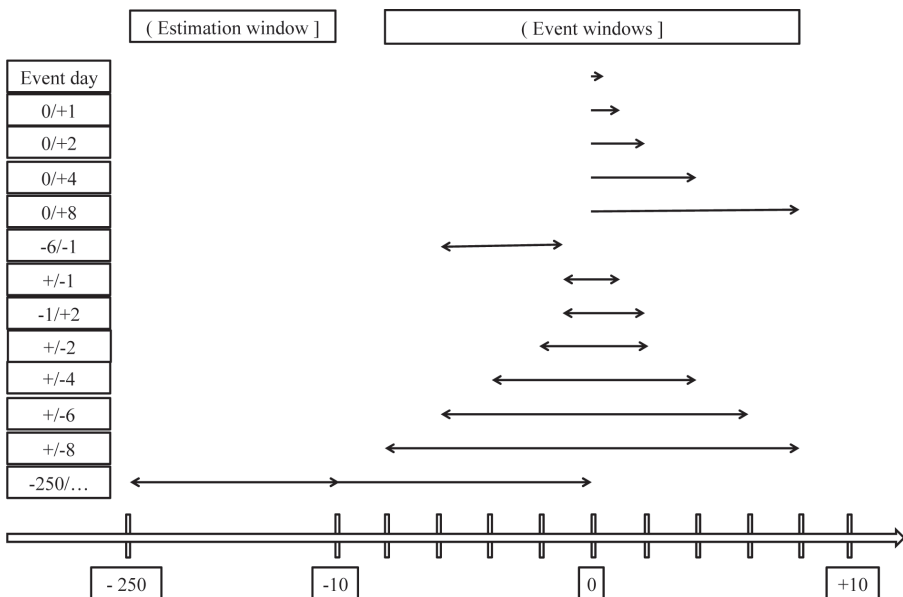


Figure 9. Estimation period and short-term event windows

Source: own development

The first event window covered event day (or announcement day) – the day on which the information was released. The determination of such a window is strongly rooted in the assumption of high market efficiency which results in immediate investor reaction to the incoming event. The third event window covered also two days following the announcement day. Therefore the event window was denoted “0/+2”. The inclusion of the “+1” day following the announcement allowed the capturing of the effects of the announcements published too late to be incorporated during the announcement day [MacKinlay 1997]. The inclusion of the “+2” day allowed the capturing of the whole positive abnormal change in market value of equity occurring directly after the event. The next event windows included the event day and the four and eight days following. Thus they were denoted “0/+4”, and “0/+8”. The choice of such windows was determined by the occurrence of statistically significant abnormal returns in days “+4”, and “+8”. In these cases the assumption of immediate investor reaction was relaxed. Furthermore long windows were proven to be of high validity in previous empirical research [Nicolau and Santa-Maria 2013b]. The next event windows covered both: the period before and the period after the day of the event. They were determined in order to capture the leakage and dissemination effects [Geyskens, Gielens and Dekimpe 2002; McWilliams and Seigel 1997]. Such an approach allowed the determination of the existence of potential insider information. The “+/-1” days and “+/-2” days event windows were reported statistically significant in previous research [Zach, Krizaj and McTier 2015]. Longer windows (“+/-4” days, “+/-6” days, and “+/-8” days) were set to capture the statistically significant excess returns on particular days. The sixth window was set entirely in the period preceding the event to separate the potential before-event investor reactions due to the above mentioned leakage and dissemination effects.

An important remark is that the event windows cover only the trading days. Thus the number of calendar days may vary. For the +/- 1 days event window the number of trading days equals three. However if the announcement comes right before a non-trading day the number of calendar days extends to four. It is important during weekends and holidays. If the announcement comes on a non-trading day the first trading day after the non-trading period is treated as the event day. The focus only on trading days is in line with the extant literature [MacKinlay 1997].

The use of longer event windows in the event-studies is problematic due to two facts: confounding effects are more likely to occur and the parameters α and β are assumed to remain constant during the event window which is less probable in long windows [McWilliams and Seigel 1997]. The use of the buy-and-hold

method allows the study of long-term periods. Such periods proved statistically significant for excess returns in previous empirical research [Peng 2008]. Also the measurement of the effects of events in the long term is a widely used research practice [Khotari and Warner 2006]. In the present research the long-term periods were set a priori. The research covered the periods of three and six months following the event – Figure 10.

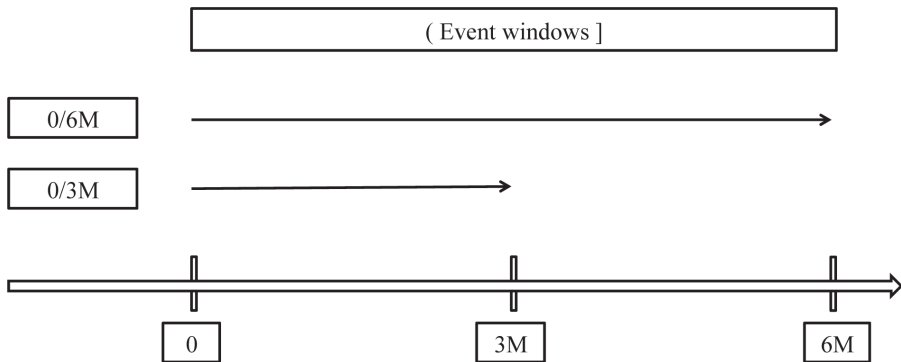


Figure 10. Long-term event windows

Source: own development

The changes in the market value of equity were represented by abnormal returns calculated with the use of event-study and buy-and-hold abnormal returns. Furthermore fourteen short- and long-term event windows were created to determine the impact of innovation announcements of tourism enterprises.

4.3.2. Independent variables

This research aimed at determining the statistically significant predictors of the changes in the market value of equity of tourism enterprises. As discussed in Chapter 3 at this point the research included 19 variables. Two kinds of variables were employed – quantitative variables and qualitative variables. The inclusion of qualitative variables was important because it allowed the inclusion of innovation characteristics. Here regression is employed to analyse data. The joint use of both variable types in the regression was possible. However the inclusion of qualitative variables required their modification [Górecki 2010].

In the case of using qualitative variables in research in economics the variables may not be represented by the real numbers. In this research qualitative variables were as follows: patents, CSR, type, degree of novelty involved, source,

stage, communication and industry. The impact of each qualitative predictor on the dependent variable was represented by a number of binary variables. The general rule indicated that for a qualitative predictor with m categories, $m-1$ binary variables were introduced in the regression. One of the categories was omitted. This category transferred its effect on the intercept. The omitted category was called the category of reference [Górecki 2010].

Therefore the three-category variable “degree of novelty involved”, was introduced in the regression as two binary variables with one category of reference:

$$y_i = \alpha + \beta_1 * Q_1 + \beta_2 * Q_2 + \dots$$

where:

- α – intercept,
- β_1 and β_2 – parameters,
- Q_1 and Q_2 – binary variables representing incremental and new to the company innovation.

The parameters β_1 and β_2 stand for the differences between the radical innovation (the voluntarily omitted category of reference) and the two remaining categories – Q_1 and Q_2 .

Based on the above considerations all eight qualitative variables with m categories employed in the research were re-coded to $m-1$ binary variables. The procedure resulted in introducing into the regression such binary variables as:

- Patent (patented),
- CSR (elements of CSR),
- Type (process),
- Type (marketing),
- Type (organisational),
- Type (distributional),
- Degree of novelty involved (incremental),
- Degree of novelty involved (new to the company),
- Source (collaboration),
- Source (copied),
- Stage (after commercialisation),
- Communication (first announcement),
- Industry (food and beverage serving activities),
- Industry (passenger transport),
- Industry (travel agencies and other reservation service activities),

- Industry (cultural activities),
- Industry (sports and recreational activities),
- Industry (other country-specific tourism characteristic activities).

The number of binary variables derived from “industry” variables did not equal the number of tourism activities specified by UNWTO [2010] since none of the companies represented the category “retail trade of country-specific tourism goods”.

Furthermore one interaction variable was included. It covered the interaction between a firm’s R&D intensity and innovativeness (R&D*INNOV). It is assumed that research and development impacts on the abnormal changes in market value of equity differently in firms with relatively low innovativeness with respect to their R&D intensity and firms with relatively high innovativeness in relation to their R&D intensity. It is due to the fact that innovativeness does not always require a high R&D spend. The firms with relatively high innovativeness in relation to their R&D intensity have the most effective innovation policies and are rewarded by the market.

Moreover one variable representing the higher-order effects is introduced. The variable “R&D intensity” was tested for its non-linear effects. Thus an additional variable was introduced in the model – R&D². The variable represented the quadratic effects. It was assumed that the diminishing marginal returns on research and development occur. Thus the relationship is curvilinear, which in the light of previous research, should be captured by the negative parameter of the second-order effect. Ehie and Olibe developed a similar concept [2010].

Despite considerable attempts to gather all the data, in the case of two observations missing variable’s values occurred. In these cases the missing data was refilled. The appropriate procedure was employed. In the first step each observation with some missing variables’ values was attributed to other three observations (with all the required variables adequate) based on the level of dependent variables. In the second step the missing value was refilled with the average level of the missing variable in the three selected observations. Such a procedure allowed the maintenance of the high level of precision in missing variable estimation.

Summary – variables

In the present research 12 different short-term event windows and two long-term ones were selected. Such a number resulted from the analysis of the excess

returns in the period of 21 days surrounding the event (innovation announcement release). The long-term event windows were determined a priori. The estimation period which preceded the event windows accounted for 250 days.

Short-term abnormal changes in market value of equity were calculated with the use of an event-study method. Expected returns were calculated using the Carhart four-factor model which is the extended version of the Fama and French three-factor model. Abnormal returns were standardised and aggregated through time and through observations. The procedure allowed the testing of their statistical significance. Long-term abnormal changes in market value of equity were calculated with the use of the buy-and-hold abnormal returns method. The statistical significance of the long-term BHARs was tested with the use of two groups difference of means test, which is more accurate than the traditional t-test.

Both quantitative and qualitative variables were included in the model representing the relationship between innovation announcements and the market value of the equity of tourism companies. Qualitative variables with m categories were recoded to $m-1$ binary variables. The remaining category formed the category of reference. Finally 18 binary variables were determined. Furthermore the model covered the 2-way interaction effect of the R&D intensity and innovativeness variables and the higher-order effects for the R&D intensity variable. In order to account for these two effects two additional variables were determined.

4.4. Data analysis

After the methods of testing the statistical significance of the abnormal changes in market value of equity were presented the next step is to deliver the methods of determining the predictors' statistical significance. The data analysis was divided into two sections – descriptive statistics and regression. The tools of descriptive statistics were used to precisely describe the data, especially the abnormal returns resulting from innovation announcements. Regression, on the other hand, was employed to evaluate the possibility of predicting abnormal changes in MV of equity based on the set of data collected. Furthermore the joint use of response surface and hierarchical regression allowed the testing of the hypotheses on significant predictors of the changes in market value resulting from innovation announcements.

4.4.1. Descriptive statistics

In order to summarize the data the methods of descriptive statistics were employed. The structure of the sample was described using the following groups of measures [Sobczyk 2006]:

1. Central tendency (arithmetic mean, median, first and third quartiles).
2. Dispersion (min, max, interquartile range, typical area of variability, variance, standard deviation, coefficient of variation).
3. Skewness (skew coefficient, quartile measure of skewness).
4. Peakedness (kurtosis).

Each of the above groups of measures aimed at delivering different informative values. The measures of central tendency determined central values of probability distribution. They allowed the indication of the values around which the changes in market value of equity concentrate. The dispersion (variability) measures described how stretched or squeezed was the distribution. They indicated the degree of differentiation of the changes in MV. The skewness measures showed the asymmetry of the probability distribution. They indicated the direction of the differentiation of the changes. The measures of peakedness reflected the flat or peaked character of the distribution of the changes in the market value of equity.

4.4.2. Regression

Response surface regression

Multiple regression was employed for the in-depth analysis of the impact of innovation announcements on the market value of equity of tourism enterprises. The author's model was tested empirically. The analysis allowed the testing of the significance of the predictors of the changes in the market value of equity.

Linear regression assumes that the dependent variable Y is a function of a set of k independent variables (X_1, X_2, X_3, \dots). The regression model may be presented in the form of the equation [Berry and Feldman 1985]:

$$E(Y_j) = \alpha + \beta_1 X_{1j} + \beta_2 X_{2j} + \dots + \beta_k X_{kj} + \varepsilon_j$$

where:

- α – intercept,
- $\beta_1, \beta_2, \text{ and } \beta_k$ – population parameters,
- X_{ij} – values of j_{th} observation of the variable X_i ,
- ε_j – error term.

Response surface regression is the combination of polynomial regression and factorial regression [Edwards 2007]. The idea behind polynomial regression is to cover the main effects and higher-order effects for the continuous independent variables. In the present research the second-order effect will be introduced for the R&D intensity variable.

The squared polynomial regression for one continuous predictor variable R&D includes the main effect of R&D and its quadratic effect (i.e. second order). The following formula applies:

$$E(Y_j) = \alpha + \beta_1 R\&D_j + \beta_2 R\&D_j^2$$

The parameter β_1 measures the effect of the change of R&D assuming all the other variables remain constant, which is not the case here (if R&D changes, $R\&D^2$ changes also). In this case the derivative is calculated to overcome the problem:

$$\frac{\partial E(y_i|x'_i)}{\partial R\&D} = \beta_1 + 2R\&D\beta_2$$

Therefore the marginal effect of the variable R&D equals $\beta_1 + 2 * R\&D * \beta_2$. In the result the impact of the variable of interest on the dependent variable depends on the level of R&D intensity.

Factorial regression accounts for interaction effects. Full factorial regression design includes the products of the independent variables. Here interaction effect of R&D intensity (R&D) and innovativeness (INNOV) variables will be verified. The factorial regression design for two independent variables R&D and INNOV covering their main (first-order) effects and their interaction effect is presented by the following formula:

$$E(Y_j) = \alpha + \beta_1 INNOV_j + \beta_2 R\&D_j + \beta_3 (R\&D_j * INNOV_j)$$

Being a combination of the above regressions quadratic response surface regression contains “the same effects of polynomial regression designs to degree 2 and additionally the 2-way interaction effects of the predictor variables” [StatSoft 2016b]. The regression equation including the two above described independent variables R&D and INNOV is as follows:

$$E(Y_j) = \alpha + \beta_1 R\&D_j + \beta_2 R\&D_j^2 + \beta_3 INNOV_j + \beta_4 (R\&D_j * INNOV_j)$$

In the present study abnormal returns represent the changes in market value of equity. Therefore later in the chapter the dependent variable will be denoted $E(MV_j)$ instead of $E(Y_j)$. Adopting abnormal returns as the dependent variable in the context of regression analysis is advised by McWilliams and Siegel who state that: “the researcher should regress the abnormal returns on some measure of firm diversification” [McWilliams and Siegel 1997, p. 638]. McKinlay also argued that “a cross-sectional regression model is an appropriate tool to investigate this association. The basic approach is to run a cross-sectional regression of the abnormal returns on the characteristics of interest” [1997, p. 33].

17 variables were initially selected as predictors of the changes in market value of equity. After re-coding the qualitative variables, and including the higher-order and interaction effects, the number of variables included in the model was 29. Such a model may be presented in the form of the following equation:

$$\begin{aligned}
 E(MV_j) = & \beta_0 + \beta_{1j}SIZ + \beta_{2j}IND(FBS) + \beta_{3j}IND(PT) + \beta_{4j}IND(TA) \\
 & + \beta_{5j}IND(CA) + \beta_{6j}IND(SPRT) + \beta_{7j}IND(OTCA) + \beta_{8j}GWTH \\
 & + \beta_{9j}OPEXP + \beta_{10j}VOL + \beta_{11j}TCD + \beta_{12j}LVR + \beta_{13j}ROE + \beta_{14j}R\&D \\
 & + \beta_{15j}INNOV + \beta_{16j}PAT + \beta_{17j}CSR + \beta_{18j}TYPE(PROC) \\
 & + \beta_{19j}TYPE(MRKT) + \beta_{20j}TYPE(ORG) + \beta_{21j}TYPE(DSTR) \\
 & + \beta_{22j}DNI(INC) + \beta_{23j}DNI(NC) + \beta_{24j}SRC(COLLAB) + \beta_{25j}SRC(CPD) \\
 & + \beta_{26j}SGT + \beta_{27j}COM + \beta_{28j}R\&D * INNOV + \beta_{29j}R\&D^2 + \varepsilon_j
 \end{aligned}$$

where:

SIZ	– firm size,
IND (FBS)	– industry category food and beverage serving activities,
IND (PT)	– industry category passenger transport,
IND (TA)	– industry category travel agencies and other reservation service activities,
IND (CA)	– industry category cultural activities,
IND (SPRT)	– industry category sports and recreational activities,
IND (OTCA)	– industry category other country-specific tourism activities,
GWTH	– firm growth,
OPEXP	– firm operational experience,
VOL	– volume,
TCD	– total cash dividend,
LVR	– leverage,
ROE	– return on equity,

R&D	– firm R&D intensity,
INNOV	– firm innovativeness,
PAT	– patent (patented),
CSR	– elements of CSR,
TYPE (PROC)	– process innovation type,
TYPE (MRKT)	– marketing innovation type,
TYPE (ORG)	– organisational innovation type,
TYPE (DSTR)	– distributional innovation type,
DNI (INC)	– incremental degree of novelty involved,
DNI (NC)	– new to the company degree of novelty involved,
SRC (COLLAB)	– source category collaboration,
SRC (CPD)	– source category copied,
SGT	– after commercialisation stage,
COM	– communication category first announcement,
R&D*INNOV	– interaction effects between R&D intensity and innovativeness,
R&D ²	– square of the R&D variable,
β_0	– intercept,
$\beta_1 - \beta_k$	– population parameters, ε – error term.

Further analysis of the model covered the use of hierarchical regression. It allows the testing of the hypotheses on the most important predictors of the changes in market value of equity. The predictors achieving the significance of $p < 0,1$ will be considered as statistically significant, as it is the minimum accepted significance level [Leontiades and Tezel 1980; Smit 2006].

Hierarchical regression

Hierarchical regression relies on the strategy of cumulatively entering predictors according to specified hierarchy. The consecutive models created in this procedure are separate but related [Acock 2008]. In the present research four models were created. After each addition the coefficient of determination was calculated.

The first group of predictors (first model) includes control variables. These variables are related to the dependent variable but are not the variables of interest. They are entered to actually remove their effect from the variables of interest [Jeger, Susajn and Mijoc 2014]. Eight control variables were selected. They relate to changes in the market value of equity but do not relate to innovation. Based on the literature the selected control variables were: size, industry, growth, operational experience, volume, total cash dividend, leverage and ROE.

The second and further groups of variables introduced into the regression encompass the variables of interest. The consecutive groups represent different substantial values. Each addition results in the creation of an additional model [Mostafa 2006]. After controlling for the eight variables above the second group of predictors included company-level innovation-related variables – R&D intensity and innovativeness. Thus model 2 covered 10 variables in total (control and company-level innovation-related).

The third model included all the above descriptors and the innovation-level variables: patent, CSR, type, degree of novelty, source, stage and communication. Model 3 comprised 17 variables (control, company-level innovation-related and innovation-level).

The fourth model added also the interaction and second-order effects. Two variables were introduced: R&D* INNOV and R&D². Thus model 4 covered 19 variables (control, company-level innovation-related, innovation-level and interaction and second-order).

4.4.3. Multiple regression assumptions

In order to guarantee the adequacy of reasoning six assumptions concerning multiple regression were verified. The assumptions covered: no multicollinearity, linearity, homoscedasticity, independence, lack of outliers and normal distribution of residuals [Berry and Feldman 1985; Keith 2015; StatSoft 2016a].

Assumption 1 – No multicollinearity

Multiple linear regression assumes no multicollinearity in the data. It means that the predictors are independent from each other. Multicollinearity usually occurs when there is too little data compared to the number of parameters. It results in the lack of a unique solution for the vector's parameters β_1 [Keith 2015]. One of the measures of multi-collinearity is the variance inflation factor (VIF). This factor measures how much the variance of a regression coefficient increased due to the correlation between one variable and others. The use of VIF is common practice in research [Ehie and Olibe 2010]. The value of VIF surpassing 10 indicates multicollinearity problems. The second measure of multicollinearity is the tolerance for which critical value matches 1/10. It measures the influence of an independent variable on all the other variables. Here both measures were employed. The results indicated that no multicollinearity occurs in the data. The results are delivered in Appendix 3.

Assumption 2 – Linearity

In the case of multiple linear regression the dependent variable is a linear combination of independent variables and regression coefficients. Linearity restriction is imposed on the parameters, not on the independent variables, which may be transformed if needed. If the linearity assumption is ignored the coefficient of determination, regression coefficients and standard errors may be biased. The linearity assumption was verified with the use of scatter plots [Keith 2015]. The scatter plots plotted the variables of interest and indicated the possible non-linear effect in the case of one variable – “R&D intensity”. Therefore an additional variable – $R\&D^2$ was introduced in the model.

Assumption 3 – Homoscedasticity

Homoscedasticity represents the constant variance. It stands for the equality of the error terms along the regression line. In other terms dependent variables have the same error variance regardless of the values of the independent variables. Thus for the k independent variables, for any two sets of values, the variance of the error term is constant, $\text{var}(\varepsilon_j) = \sigma^2$. Heteroscedasticity problems are characteristic for the cross-sectional data. They result in the wrong specification of the mean squared error for the model [Keith 2015]. The PP-plots were plotted for the ± 1 days and 6 months event windows. The plots indicate that there is no tendency in the error terms and no heteroskedasticity. Figure 11.

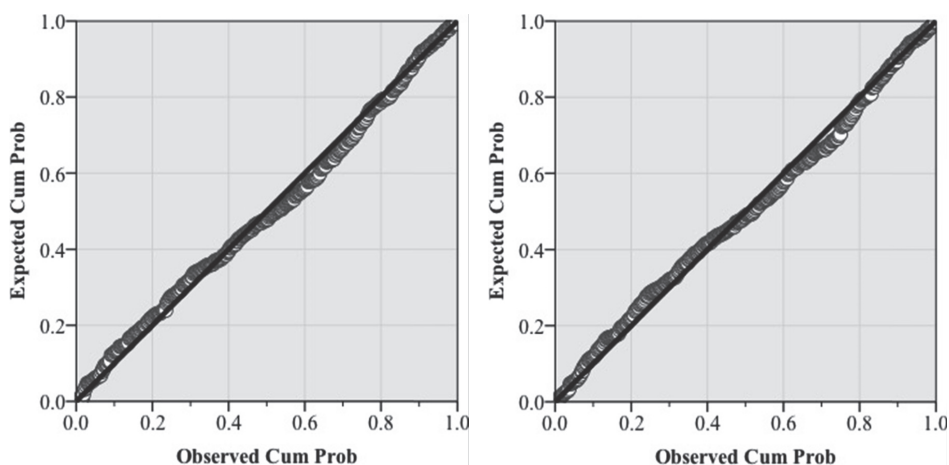


Figure 11. Normal PP-plots of regression standardised residuals in ± 1 days and 6 months event windows

Source: own development

Furthermore the presence of heteroscedasticity was tested with the Breusch-Pagan test [Verbeek 2008]. The test divides the data into high and low values to see if the samples are significantly different. Its result indicated no heteroscedasticity issues. The test statistic for the +/-1 days event window equalled $F(29, 368) = 0,947$, $p = 0,547$ and for the 6 months event window it matched $F(29, 368) = 1,271$, $p = 0,162$. It prevents the rejection of the null hypothesis of homoscedasticity and therefore it was concluded that homoscedasticity is present in the model.

Assumption 4 – Independence

Independence signifies that the errors of independent variables are not correlated with each other. Autocorrelation issues are characteristic for the time-series data. Autocorrelation was tested using the Durbin-Watson (D-W) test. The procedure tests the null hypothesis that the residuals are not linearly autocorrelated. The test statistic assumes values between 0 and 4. The values between 1,5 and 2,5 indicate no autocorrelation in the data [Keith 2015]. In this research the D-W test was performed for +/- 1 days and 6 month event windows. The results were 1,92 and 1,83. The results indicated no autocorrelation issues.

Assumption 5 – Lack of outliers

Multiple linear regression is sensitive to outliers. Such observations have a significant impact on the slope of the regression line. In the research a rigorous check for the outliers was performed – a casewise diagnostic. By definition it enumerates all the cases for which the absolute standardized value of the listed variable exceeds three. It covered all the 14 event windows. The procedure resulted in indicating 2 outliers. Precise data is delivered in Table 23.

Table 23. Casewise diagnostics

Event window	Case no	Std. Residual	Abnormal change in market value of equity	Predicted Value	Residual
0/+1 days	375	3,128	0,09	0,0140	0,0759
3 months	56	-3,591	-0,49	0,0589	-0,5524

Source: own development

The outliers were checked individually and they resulted from erroneous data. They were eliminated and replaced with two randomly drawn observations. The procedure was repeated and no further outliers were found.

Assumption 6 – Normal distribution of residuals

The normality of residuals is one of the key assumptions of multiple linear regression. In the research the Kolmogorov-Smirnov (KS) test was employed as well as the Shapiro-Wilk test (even though it is mostly used for small samples). The KS-test tests the normality of distribution by comparing standardised samples to the standard normal distribution. The high values of p-values signify that the data comes from a normal distribution. Table 24.

Table 24. Tests of normality

Event window	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df.	p-value	Statistic	df.	p-value
+/- 1 days	0,043	398	0,078	0,994	398	0,118
6 months	0,045	398	0,050	0,996	398	0,416

Source: own development

The chosen alpha level equalled 0,05 as it is the standard choice. The p-values surpassing 0,05 in both tests indicate that null hypothesis and that the residuals are normally distributed and may not be rejected. It is important to notice that normality of residuals is not required for unbiased estimates of the regression coefficients.

Chapter summary

This research focused on the impact of innovation on the market value of tourism enterprises. The subject for analysis was the change in market value of equity. The research covered innovation announcements from all the tourism enterprises listed on the main markets of the 32 most important stock exchanges in the European Union. The time frame ranged from February 2011 to February 2016.

The total number of tourism enterprises was 111 however the final analysis covered only 88 of them due to the fact that some companies did not release any innovation announcements or delivered imprecise information. In the research the total of 9,000 announcements was verified. The verification procedure resulted in pinpointing 932 innovation announcements applicable from the point of view of this research and consistent with the adopted definition of innovation. In order to determine the size of the sample three points of view were employed:

the power of the chosen methods to detect abnormal returns, the applicability of the model verification methods and the ability to generalize the results. The sample covering 398 observations was drawn randomly from the sampling frame.

The short- and long-term changes in the market value of equity were calculated using two methods: event-study and buy-and-hold abnormal returns. In the short term expected returns were calculated with the use of the Carhart four-factor model [1997]. The abnormal returns were standardised and cumulated. Their statistical significance was tested with the use of average cumulated abnormal returns [McWilliams and Siegel 1997]. In the long term the statistical significance of the buy-and-hold abnormal returns was tested with the use of two groups difference of means test [Cowan and Sergeant 2001]. Based on the significance of the abnormal returns in particular days surrounding the event 12 short-term event windows were identified. Furthermore two long-term windows were specified.

The methods of data analysis were divided into descriptive statistics and regression. The descriptive statistics included the measures of central tendency, dispersion, skewness and peakedness. These measures were employed to describe the abnormal returns observed in short and long event windows. The purpose of using regression was to verify the statistical significance of the predictors of the market value of equity changes. Independent variables covered qualitative and quantitative predictors. The qualitative variables with m categories were recoded into $m-1$ binary variables. The use of response surface regression permitted the inclusion of the main effects and the higher-order effects and the 2-way interaction effects of the predictor variables. Hierarchical regression allowed the testing of the hypotheses on the predictors of changes in the market value of equity. Furthermore six assumptions for multiple regression were identified and tested – no multicollinearity, linearity, homoscedasticity, independence, lack of outliers and normal distribution of residuals.

Chapter 5

Results and discussion

Introduction

The previous chapters focused on building a firm conceptual background for the present research. After the discussions on innovation and market value, the conceptual model was created and the methods for empirical research were determined. This chapter focuses on the results of the empirical study. All the hypotheses were tested and the results are presented in relation to evidence reported in extant literature. The research was important due to the gap concerning the relationship studied in the context of tourism enterprises.

The main objective of the research was to indicate and measure long- and short-term effects of innovation on the market value of tourism enterprises. In order to achieve such a purpose the concept of abnormal returns was employed. The calculations allowed the indication of changes resulting from innovation announcements. The hypotheses 1-4 were tested. Due to the heterogeneity of changes in the market value of equity an in-depth analysis covering the predictors of market value was performed. At this step the research aimed at verifying empirically the author's model explaining the relationship between innovation and the market value of tourism enterprises. The hypotheses 5 to 10-2 were tested. The analysis was divided into short term and long term.

The first important conclusion stemming from the research is that the impact of innovation announcements on the market value of equity of tourism enterprises is positive and statistically significant. Such a result was obtained in both short- and long-term studies. Due to the statistical significance of the long-term result it was concluded that the market does not incorporate immediately and fully the new information into the stock prices. The statistical insignificance of the changes in market value of equity in the period preceding the event day failed

to reject the null of no leakage and dissemination effects. Furthermore it was demonstrated that the positive changes in market value resulting from successful innovation announcements are bigger in absolute values than the negative changes resulting from unsuccessful ones.

Statistical analysis indicated that the number and magnitude of positive market value changes surpass those of the negative ones in both short and long term. The distribution of abnormal changes in market value of equity was right-skewed in almost all the analysed event windows. The long right tail indicated that it was more likely to experience high positive rather than high negative changes in the market value of equity. The leptokurtic distribution of both short- and long-term returns demonstrated that in both cases more variance resulted from infrequent, extreme changes in MV.

The results of the hierarchical regression analysis suggest that innovation-level variables predict the changes in market value of equity above and beyond the effect of the control variables in short and long terms. The innovation-related company-level variables do so in the short term. The research was unable to reject the null of no impact of interaction and second-order effects on the change in market value of equity.

The chapter is structured as follows. First, the changes in the market value of equity are presented and their statistical significance is discussed. The subchapter is divided into short and long terms. The main results are represented graphically. Second, the measures of descriptive statistics are employed to describe and summarise the data on the changes in the market value of equity. Each subchapter is internally divided into the measures of a central tendency, dispersion, skewness and peakedness. Third, the results of the hierarchical regression analysis are stated. The first subchapter presents the models developed in hierarchical regression. The next subchapters deliver the verification of the author's model in short and long terms.

5.1. Changes in market value of equity

In this sub-chapter the results of the verification of the first four hypotheses will be reported. The first hypothesis indicated the positive relationship between innovation announcements and the market value of tourism enterprises. It was tested in both the short and long term. The measure of abnormal return represented the difference between the actual and expected returns. In the short term the event-study method was employed. In the long term the research relied on

buy-and-hold abnormal returns. The test for the statistical significance of the long-term changes in market value of equity were employed to test H2 stating that the impact of innovation announcements on the market value of equity of tourism enterprises is immediately and fully incorporated in stock prices. In order to test the third hypothesis stating that no information leakage and dissemination occur in the period preceding the announcement, the statistical significance of the changes in MV in particular days and windows preceding the announcement was tested. The hypothesis H4 stating that positive changes in market value resulting from the successful innovation announcements are bigger in absolute values than the negative changes resulting from the unsuccessful ones was verified with the use of a t-test. The analysis tested for significant differences between two means. All the calculations were performed with the use of the IBM SPSS Statistics version 23.

5.1.1. Short term

In the short term the impact of innovation announcements on the changes in the market value of equity was verified in the period of 21 days surrounding the event. Statistical significance was tested in the case of both single days, and event windows. The procedure allowed the testing of hypotheses 1, 3 and 4.

In the period of 10 days preceding the announcement the number of positive and negative changes in MV was equal. The strongest abnormal increase in the market value of equity was observed six days before the announcement. It equalled 0,19%. The strongest abnormal decrease in MV occurred five days before the release and equalled -0,23%. It is important to notice that the abnormal change in market value of equity was statistically significant only in “day -3”. All the other results were statistically insignificant. The values of the abnormal changes in MV in particular days are presented in Table 25.

Table 25. Abnormal changes in the market value of equity in the period preceding the innovation announcement

Day	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
ARs (%)	0,06	-0,11	0,05	-0,02	0,19	-0,23	-0,01	0,15*	-0,12	0,10

Significance: ** $p < 0,05$ * $p < 0,1$

Source: own development

On the day of the announcement and during the ten days following most abnormal changes in market value of equity were positive. In the case of only four days the market value of equity decreased. The strongest increase occurred eight days after the release. The strongest decrease took place four days after the event. Four of the results were statistically significant. Table 26.

Table 26. Abnormal changes in market value of equity on the event day and in the period following it

Day	0	1	2	3	4	5	6	7	8	9	10
ARs (%)	0,14*	0,13	0,06	-0,03	-0,17*	0,09	0,15*	-0,04	0,19**	-0,08	0,02

Significance: ** $p < 0,05$ * $p < 0,1$

Source: own development

Based on the tables 25 and 26 it may be concluded that the increase in market value of equity occurs mainly in the period following the announcement. The result is generally in line with the research of Nicolau and Santa-Maria [2013b] who concluded that the statistically significant increase in the market value of equity occurs in the period following the event. It is important to notice that authors assessed the abnormal returns' statistical significance on particular days in the period of only 11 days surrounding the event (from day -5 to day +5). The authors observed an important pattern. The changes in the market value of equity were positive during the event day. In the days +1 to +3 negative values occurred. In the days +4 and +5 the positive abnormal returns were calculated. It indicates that the initial increase in the market value of equity was followed by a negative correction and then by a further increase. In the research of Nicolau and Santa-Maria [2013b] the statistically significant returns occurred exactly on day +5. A similar pattern may be observed in the present research. The initial increase (days 0, +1, and +2) is followed by a negative correction (days +3 and +4), and then by a further increase. In the context of the pattern discussed the abnormal changes on particular days do not give the full informative value. In order to reflect the overall changes in market value the daily abnormal returns must be cumulated over time. Figure 12 shows the cumulated abnormal returns in the period of 21 days surrounding the event. The Figure is complemented by the two day moving average line which makes the abnormal returns smooth.

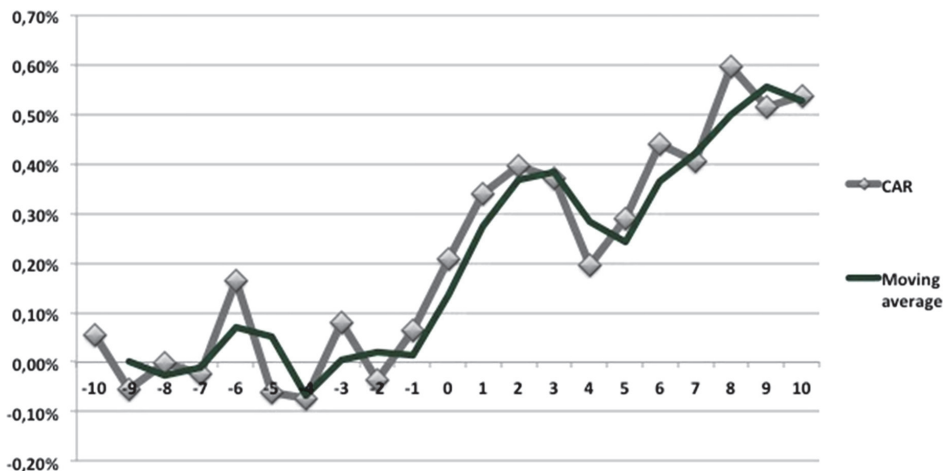


Figure 12. Cumulated abnormal returns (CARs) in the period of 21 days surrounding the event

Source: own development

As may be seen on the Figure 12 the market value of equity increases strongly in the period following the innovation announcement. The left-hand side of the graph is relatively flat. It signifies that positive and negative changes are almost equal. The right-hand side of the graph is dominated by two sharp increases. The first one occurs in the period from day “-1” to day +2. The second ranges between 5 and 9 days following the event. The graphical representation confirms the general increase in the market value of equity in the period after the event with a negative correction in it. The results support H1 by indicating the short-term positive change in the market value of equity.

It is worth indicating that the sharp increase in the market value of equity in the period right after the announcement is in line with previous research confirming market efficiency [Fang and Lee 2013]. In this context the innovation announcement hits the market, investors include it in their valuations and the market value of equity changes [Munir et al. 2012]. Importantly, in general the market treats innovation announcements as positive information. At the moment of the innovation announcement the impact of the innovation on the company’s future cash flows is unknown. Investors must anticipate. In most cases of innovation announcements they anticipate that the benefits of implementation outweigh the costs which leads to the positive abnormal changes in the market value of equity.

An important fact concerning the increase in MV occurring in the period between day -1 and day +2 is that it starts one day before the release. At first

glance such a situation violates the assumptions of market efficiency and indicates leakage and dissemination effects which were proven in some previous research [Geyskens et al. 2002]. However the key consideration here is the statistical significance of the abnormal changes in the market value of equity on particular days. As may be seen in table 25 the +0,10% increase occurring one day before the announcement is statistically insignificant. It prevents the rejection of the null of no leakage and dissemination effects. It indicates also that the market statistically significantly reacts to innovation announcements on the day in which they occur. The results support hypothesis H3 in neglecting the occurrence of leakage and dissemination effects.

In the context of leakage and dissemination effects one additional comment is necessary. As it may be seen in Table 27 the inclusion of the “day -1” increases the statistical significance of the event windows. The +/- 1 days event window possesses a higher value in the Z-test than the 0/+1 event window and the -1/+2 event window carries a higher value in the Z-test than the 0/+2 days’ event window. The positive abnormal return occurring on “day -1” augments the cumulated abnormal returns in the +/-1 days and -1/+2 days event windows. It does so despite its statistical insignificance. The increase in the cumulated abnormal changes in the market value of equity is the reason behind the fact that windows covering “day -1” posses higher values in the Z-test. In the context of leakage and dissemination effects the comparison with the previous research is hindered as the researchers did not report the statistical significance of the abnormal changes in market value of equity on particular days. Therefore, in the context of tourism enterprises, the results of Zach, Krizaj and McTier [2015], who proved the statistical significance of the +/- 1 days, +/- 2 days and +/- 5 days event windows, have limited informative value.

As it was stated above, in the present research abnormal changes in the market value of equity resulting from innovation announcements were measured in event windows. The analysis of the statistical significance of the abnormal changes in MV during the 21 days surrounding the event allowed the determination of 12 short-term event windows ranging from 1 to 16 days. In order to verify which event windows reflect best the impact of innovation announcements the statistical significance of the abnormal returns cumulated in particular windows was tested. The procedure allowed the comparison of event windows between one another.

In the short term abnormal returns were standardised and cumulated through time and observations. The null that the cumulated abnormal returns were 0 was tested with the use of a Z-test. The results of the test and are delivered in Table 27.

Table 27. Statistical significance of the particular event windows in the short term

No	Event windows	Z-test
1	0 day	1,337
2	0/+ 2 days	2,227**
3	0/+ 4 days	0,638
4	0/+ 8 days	1,090
5	-6/- 1 days	0,565
6	-1/+2 days	2,594**
7	0/+ 1 day	2,498**
8	+/- 1 day	2,939***
9	+/- 2 days	1,553
10	+/- 4 days	0,734
11	+/- 6 days	0,943
12	+/- 8 days	1,036

Significance: ***p < 0,01; **p < 0,05; *p < 0,1

Source: own development

Based on Table 27 it may be seen that the cumulated abnormal changes in the market value of equity were significant in four event windows. All the windows were concentrated directly around the event day. The only result significant at the p -level < 0,01 occurred in the +/-1 days event window. The inclusion of the day +2 to represent the whole direct increase in MV did not improve the significance of the results. Furthermore limiting event-windows to the period directly after the release resulted in the decrease of the statistical significance of CARs. It has already been discussed in the context of leakage and dissemination effects and the statistically insignificant increase in MV in the “day -1”. The statistical significance of the event windows supports further the hypothesis H1 in the short term.

In the context of tourism Nicolau and Santa-Maria [2013a] tested nine event windows ranging from two to eleven days. The authors found that a statistically significant increase in the market value of equity occurs only in the 0/+3 event window thus directly after the announcement. The result is similar to the specification of event windows in the present study. It seems that the authors captured the upward pressure occurring right after the announcement. Zach, Krizaj and McTier [2015] reported statistically significant results in three event windows in

the context of “market performance” innovation (i.e. entrance to the new markets) in tourism. The authors reported the decrease in market value of equity ranging from $-0,6\%$ in the ± 1 days event window to $-1,4\%$ in the ± 5 days event window. However in the case of longer windows the authors did not deliver any information on supporting events which is essential and may impact heavily on the statistical significance of results [McWilliams and Siegel 1997]. The specification of long event windows seems contrary not only to the specification in this research but also to most previous research. In the context of services, Son et al. [2011] used only the ± 1 days event window. The researchers found statistically significant abnormal returns. It is in line with the present research where the ± 1 days event window achieved the highest value in the Z-test. Also referring to services Filson [2002] employed the $-2/+1$ days event window and found statistically significant results. The extension of the ± 1 days event window to additionally include the day -2 is not supported by the results of the present research but the general concentration on the days directly surrounding the event window is a similarity.

In general the increase in the market value of equity resulting from innovation announcements observed in this research is in line with previous research. However the magnitude of the increase requires further discussion. In comparison to previous studies in tourism the increase in the market value of equity in the present research was relatively small. Nicolau and Santa-Maria [2013a] reported a $1,54\%$ increase in the period of three days following the announcement. Such an increase is significantly higher than the $0,43\%$ obtained in the $-1/+2$ days event window here. In comparison to previous research on the service sector the results obtained are similar. In previous research none of the statistically significant short-term abnormal changes in the market value of equity exceeded 1% . Geyskens, Gielens and Dekimpe [2002] studied the abnormal changes in MV in the period of 11 days surrounding the event. Statistically significant results occurred on the event day and on day $+1$. They equalled consecutively $0,35\%$ and $0,36\%$ which determines a $0,71\%$ increase in the market value of equity in the $0/+1$ event window. The value of cumulated abnormal returns reported by Son et al. [2011] equalled $0,83\%$ in the ± 1 event window. Geyskens, Gielens and Dekimpe [2002] covered 93 announcements and Son et al. [2011] included 183 observations. In the light of above results it seems that the high increase reported by Nicolau and Santa-Maria [2013a] was the specificity of the particular sample studied by the researchers. Nicolau and Santa-Maria [2013a] covered 24 innovation announcements. It is important to notice that one research indicated a decrease in market value due to the implementation of innovation [Zach,

Krizaj and McTier 2015]. Such a result is contrary to the previous and present research. It delivers a negative value for entrance to a new markets and will be further referred to in section 5.3 Empirical verification of the model.

The fourth hypothesis was tested with the use of a t-test. The analysis allowed the comparison of the means of the absolute values of the positive and negative cumulated abnormal changes in the market value of equity. There was a statistically significant difference between the groups ($t(396) = 2,573$, $p < 0,01$). The descriptive statistics disaggregated between the absolute values of positive and negative returns are delivered in Table 28.

Table 28. Descriptive statistics for +/- 1 days event window

	N	Mean absolute value	Std. Deviation	Std. Error
Negative	185	0,0198	0,0165	0,00121
Positive	213	0,0243	0,01981	0,00136
Total	398	0,0222	0,01846	0,00093

Source: own development

The mean of the positive abnormal changes in the market value of equity in the period of three days surrounding the event equalled 2,43%. The mean decrease in the market value of equity was $-1,98\%$. The results indicate that the positive changes in the market value of equity resulting from successful innovation announcements are bigger in absolute value than the negative changes resulting from the unsuccessful ones. The result supports H4 in the short term.

5.1.2. Long term

The impact of innovation announcements on the market value of equity of tourism enterprises was tested also in the long term. It allowed the testing of H1, H2, and H4. In the present study the buy-and-hold abnormal returns were calculated for each month in the period of 6 months following the announcement release. The value of the BHARs for the first month equalled almost 3%. It signifies that during one month after the announcement the market value of equity increased by 3% in comparison to the portfolio of reference. The value for month 2 reflects the period between month 0 and month 2. It equals almost 2%. It signifies that during two months after the release the MV of equity increased by 2% compared to the portfolio of reference. Therefore for an investor it was better to buy

a stock, hold it for a month and sell it, than to buy it and hold it for two months before selling it. The results are shown in the Figure 13. In addition to the line representing BHARs the Figure includes the 2-month moving average.

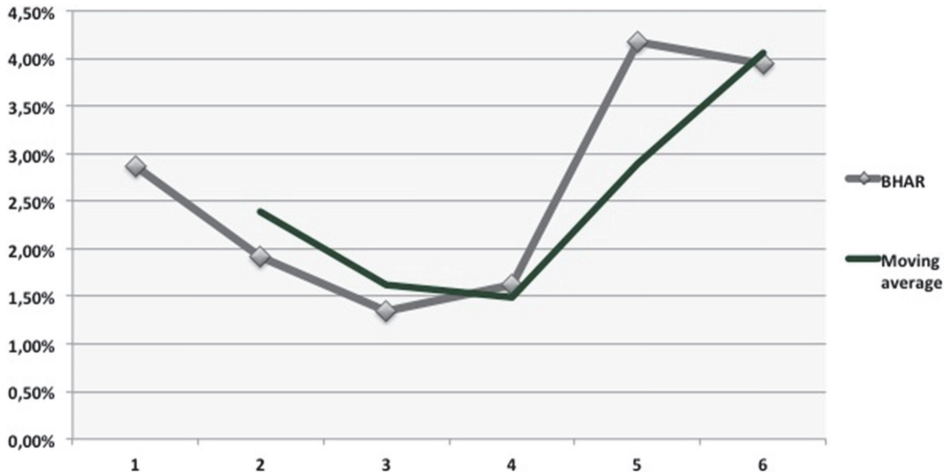


Figure 13. Buy-and-hold abnormal returns

Source: own development

As it may be seen on the Figure 13 innovation announcements result in positive long-term buy-and-hold abnormal returns. The market value of equity of the companies releasing innovation announcements increased in comparison to the portfolio of reference. In the period between month 0 and month 3 the abnormal changes in the market value of equity equal almost 1,5%. Over six months the abnormal changes in MV increase to almost 4%. The results support hypothesis 1 by indicating the long-term positive relationship.

The results are partially in line with previous research. Peng [2008] calculated the abnormal returns over seven different periods. Three of the periods were shorter than one year (1 months, 3 months, and 6 months) and thus important from the point of view of the present research. The author used two methods: buy-and-hold abnormal returns and average cumulated abnormal returns. In the 3 month period (using share index as reference) he reported 1,32% (BHAR) and 1,25% (CAR) increases in market value. The results are similar to the results of this research. In the 6 month period (using the share index as a reference) Peng reported 0,76% (BHAR) and 1,35% (CAR) abnormal returns. Similarly to this research the results are positive. However their magnitude is smaller. It is

important to notice that Peng's results in the 3-month and 6-month periods were statistically insignificant.

The abnormal change in the market value of equity fluctuates in time. The total increase in the market value of equity in relation to the portfolio of reference is higher in the period of one month than in three months. The BHARs and the 2-month moving average are U-shaped. The total increase in the market value of equity in comparison to the portfolio of reference is the highest for the period of one month after the release and for the period 5 months after the announcements.

In relation to hypothesis 2 the statistical significance of the long-term abnormal changes in the market value of equity was tested. As it was mentioned before buy-and-hold abnormal returns were calculated over two periods here. They were determined a priori and covered three and six months after the innovation announcements. Such a choice is in line with previous research. Khotari and Warner [2006] delivered a comparison between periods shorter than 12 months and longer than a year. The authors indicated that the power to detect abnormal returns is higher in the shorter periods and the specification is more likely to be good. Ehie and Olibe [2010] used a yearly perspective in the study on the association between R&D investment and market value of US firms. The reliance on yearly data was supported also by Ho, Fang and Hsieh [2011]. Thus the long-term impact of innovation on the market value of tourism enterprises was tested in 3 and 6 month periods. In the case of both buy-and-hold abnormal returns were positive. In order to test the statistical significance of the long-term abnormal returns in the two groups a difference of means test was employed. The results are reported in Table 29.

Table 29. Statistical significance of the particular event windows in long term

No	Event window	Two groups difference of means test
1	6 months	2,500**
2	3 months	2,131**

Significance: ***p < 0,01; **p < 0,05; *p < 0,1

Source: own development

As may be seen in the Table 29 the abnormal changes in the market value of equity were statistically significant in the case of both periods. The highest statistical significance was achieved for the six month period. Such results seem to be contrary to the assumptions of market efficiency. Statistically significant

abnormal changes in the market value of equity occur in the periods exceeding by far the short-term event windows. A similar concept was observed in previous research [Malkiel 2003; Abergel and Politi 2012]. The evidence does not support H2 as it indicates that the immediate (short-term) reaction does not accurately incorporate the incoming information. However it requires further discussion.

The results of the statistical analysis of the different event windows in the short-term study indicated that the market incorporated information contained in the innovation announcements within the few days around the event day. The results observed in the long-term periods indicated that the initial reaction did not account for the entire effect of the announced innovation and that in the long term it was adjusted. Such a situation indicated the violation of market efficiency as investors did not value the announced innovation correctly.

The important consideration here is that in the present research the abnormal changes in the market value of equity were presumed to result from innovation announcements. At the moment of the announcement's release the impact of innovation on companies' cash flow is unknown. The investors must anticipate. In their initial reaction they tend to be positive, which is in line with the long-term results. But in the few days surrounding the event they tend to underestimate the positive effect of the announced innovation. The vital issue here is the cause of this inefficiency. The statistically significant cumulated abnormal returns concentrate around the event day and the increase in MV is observed. However investors need to account for the risk of imprecise information delivered in the announcement. It seems that they remain cautious and predict a moderate impact of the innovation. Thus they undervalue it. They may not have the precise confidence in the announcements. Furthermore innovation announcements may deliver insufficient data for the estimation of the impact of innovation on future company cash flows, which prevents a precise market reaction.

In conclusion the long-term impact of the announced innovation on the market value of the equity of tourism enterprises is positive. The initial reaction to the announcements is positive but requires further adjustment over a long term. The results counter the research supporting market efficiency [Munir et al. 2012; Fang and Lee 2013]. In this context the previous research concluded that the inefficiency may result from limits of arbitrage [Shleifer and Vishny 1997] and investors' information processing bias [DeBondt and Thaler 1985]. At the same time Khotari and Warner indicate that "behavioural biases might be persistent and arbitrage forces might take a long time to correct the mispricing" [2006, p. 24]. In the context of the present research the initial lack of precision may result from the complex nature of innovation.

With reference to the fourth hypothesis, in the long term the difference between absolute values of positive and negative abnormal changes in market value of equity was statistically significant ($t(396) = 2,031, p < .01$). The descriptive statistics are presented in Table 30.

Table 30. Descriptive statistics for a 6 month period

	N	Mean	Std. Deviation	Std. Error
Negative	171	0,1444	0,12489	0,00955
Positive	227	0,1778	0,14703	0,00976
Total	398	0,1635	0,13878	0,00696

Source: own development

The mean positive abnormal changes in market value of equity matched 17,78% in the 6-month period. The mean decrease in market value of equity equalled 14,44%. Such results support H4 in the context of the long-term relationship.

Summary – significance

The impact of innovation announcements on the market value of the equity of tourism enterprises is positive and statistically significant. The abnormal changes in the market value of equity cumulated over the +/- 1 day event window were significant at 0,01. The ARs cumulated over 0/+2 days event window, and the long-term event windows, were significant at the 0,05. The long-term results indicated that firms that release innovation announcements experience statistically significant, positive abnormal changes in the market value of equity in the period of 6 months following the release. Therefore the empirical evidence supports hypothesis H1. At the same time the statistically significant abnormal changes in the market value of equity in the long term indicate that the impact of innovation on the market value of tourism enterprises is not immediately and fully incorporated in stock prices. The initial reaction is adjusted in the long term. Thus, based on the evidence, hypothesis H2 is not supported. It is important to notice that an abnormal change in the market value of equity in the -6/-1 event window was positive but insignificant. The abnormal returns on the day directly preceding the event were statistically insignificant. Such results failed to reject the null of no

leakage and dissemination effects. Thus hypothesis H3 is supported. The negative changes in market value resulting from unsuccessful innovation announcements were smaller in absolute values than the positive changes resulting from the successful ones. The difference was statistically significant in both short and long terms. The evidence supports H4.

5.2. Descriptive statistics

The publications reporting previous research did not cover the statistical analysis of the abnormal changes in the market value of equity. A description of the data with the use of the tools of descriptive statistics allows the organisation and summarising of numerical information [Lee et al. 2000; Tudor 2008]. Statistically significant abnormal changes in the market value of equity occurred in both long- and short-term event windows. In the present chapter the measures of a central tendency, dispersion, skewness and peakedness were employed to describe the abnormal changes in market value of equity calculated in the statistically significant event windows. The figures will cover the most important event windows from the point of view of statistical analysis ± 1 day and 6 months. All the calculations were performed with the use of IBM SPSS Statistics version 23.

5.2.1. Short term

The first part of the present sub-chapter presents the analysis of the abnormal changes in MV of equity in four short-term event windows: $0/+2$, $-1/+2$, $0/+1$ and ± 1 days. From the point of view of the effects of innovation it was important to observe the magnitude and the number of positive and negative abnormal returns. The highest average positive abnormal return occurred in the $-1/+2$ event window and equalled 2,71%. The highest negative AR occurred in the same window and was $-2,20\%$. In the case of all the event windows the number of announcements resulting in positive abnormal changes in the market value of equity exceeded the number of the releases resulting in negative ones. The most positive abnormal changes in the MV of equity were observed in the ± 1 and $-1/+2$ event windows in which positive ARs represented 53,5% of all the observations. The precise data is delivered in Table 31.

Table 31. Number and magnitude of positive and negative abnormal changes in the market value of equity

Event windows	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Positive abnormal changes in MV	2,43% (207)	2,43% (213)	2,71% (213)	2,02% (212)
Negative abnormal changes in MV	-1,92% (191)	-1,98% (185)	-2,20% (185)	-1,73% (186)

Source: own development

It means that investing in innovation is more likely to result in positive changes in market value where the magnitude surpasses the absolute value of potential negative returns. It delivers further support for the positive relationship between innovation and the market value of tourism enterprises.

Central tendency

The values around which the abnormal changes in market value of equity concentrate in particular periods are crucial from the point of view of this research. In the +/- 1 day event window the arithmetical mean equalled 0,38%. In the period of -1/+2 days which reflects the total increase in the market value of equity surrounding the event the CAR was 0,43%. The median and the first and third quartiles were indicated. The values are reported in Table 32.

Table 32. Descriptive statistics of the abnormal changes in the market value of equity in short-term event windows

Event windows	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Arithmetical mean	0,34%	0,38%	0,43%	0,27%
First quartile (Q₁)	-1,39%	-1,28%	-1,60%	-1,20%
Median (Me)	0,12%	0,21%	0,24%	0,10%
Third quartile (Q₃)	1,96%	2,14%	2,28%	1,58%

Source: own development

The median was positive in all the event windows. It was higher in the ones covering also the period preceding the announcement. As far as the first and the third quartiles are concerned the situation was similar. Taking into consideration the day -1 resulted in the increase of their values. Based on the above evidence it may be concluded that in all the event windows there is 25% chance that the abnormal return falls at least by 1,2%. Despite the overall conclusion

that innovation impacts positively on the market value of equity the possibility of such loss exists. In order to represent the distribution of the ± 1 day event window abnormal changes in the market value of equity a histogram was plotted (Figure 14). The bars represent the frequency of the observations in the different abnormal returns' intervals. The shape of distribution was compared to normal distribution.

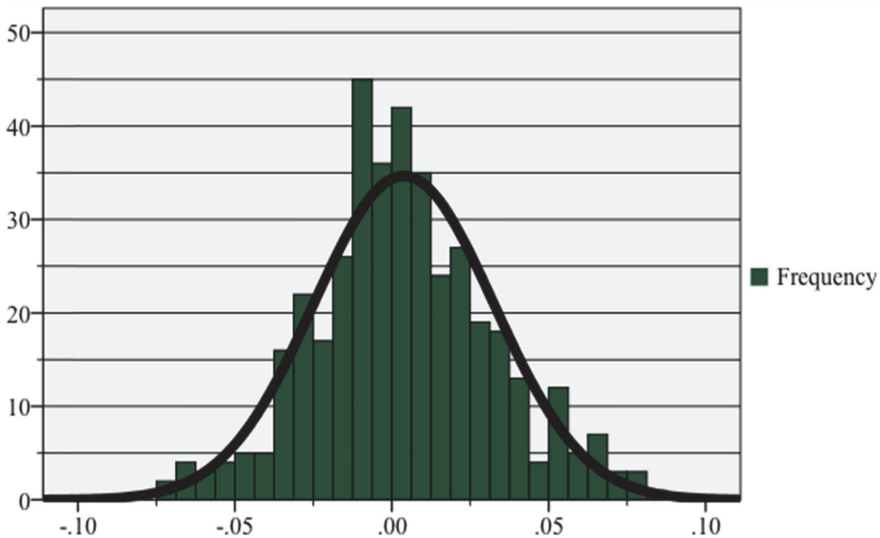


Figure 14. The frequency of abnormal changes in the market value of equity in the ± 1 day event window

Source: own development

The abnormal changes in the market value of equity concentrated in the central groups which contained more than one third of all observations. The four central bars represent this. The Figure indicates that there is 90% chance that the magnitude of abnormal changes in market value of equity will be smaller than 5%. The skew was small and the right tail was slightly longer. Skewness will be analysed in detail further in the chapter.

Dispersion

From the point of view of the present research the degree of differentiation of the abnormal changes in MV of equity was important. The highest single-observation loss in the market value of equity occurred in the case of the $-1/+2$ day event window and equalled $-8,09\%$. Furthermore the highest gain in MV was

9,87% and took place in the same window. It represents the highest gain that the announcing company may expect and the highest potential loss. It is important to notice that the length of event windows indicated the number of trading days. Thus they could actually cover an extensive number of calendar days (in most cases the $-1/+2$ event window covered 6 calendar days due to the inclusion of non-trading days). Next the typical area of variability was calculated. From the point of view of the companies releasing innovation announcements this measure is important as half of the observations fall between the calculated values. In the present research, typical area of variability was calculated with the use of the following formula:

$$Me - Q < X_{typ} < Me + Q$$

where:

Me – median,

Q – semi-interquartile range.

Interquartile range is the range of the middle 50% of the abnormal returns. In the three event windows the inter-quartile range approximated 3,5%. In the $0/+1$ day event window it was almost 2,8%. The data calculated for all the event windows is delivered in Table 33.

Table 33. Minimal and maximal values of the abnormal changes in the market value of equity in four event windows

Event windows	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Min	-6,30%	-7,44%	-8,09%	-5,55%
Max	8,75%	8,36%	9,87%	9,03%
Inter-quartile range	3,36%	3,41%	3,88%	2,78%
Typical area of variability – high	1,80%	1,92%	2,18%	1,49%
Typical area of variability – low	-1,56%	-1,50%	-1,70%	-1,29%

Source: own development

The typical values of the abnormal changes in the market value of equity in the event windows studied are likely to be positive. Typical observations in the $+/-1$ day event window are reflected in a typical area of variability. They are expected to fall between 1,92% and -1,5%. The above results indicate that after

eliminating the extreme 25% of positive and 25% of negative abnormal changes in MV the typical values are more likely to be moderate and result in a positive market value change.

Next, the variance and the standard deviation were calculated to check how much the values were spread. On average the difference from the mean ranged from 2,5% in the shortest event window to 3,2% in the longest. However to make the results comparable the standard deviations need to account for the differences in the levels of the abnormal returns. The relationship between the absolute measures of variability and the average level of abnormal changes in the market value of equity was observed. The relative standard deviation (coefficient of variation) was calculated. The following formula was used:

$$V = \frac{\sigma}{\overline{AR}}$$

where:

σ – standard deviation,

\overline{AR} – Arithmetic mean of the abnormal returns

The data is delivered in Table 34.

Table 34. The variance, and the standard deviation in four event windows

	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Variance	0,0008	0,0008	0,0010	0,0007
Standard deviation (σ)	0,0283	0,0286	0,0321	0,0256
Coefficient of variation	8,2940	7,4988	7,4570	9,4820

Source: own development

The dispersion of abnormal changes in the market value of equity in relationship to their values was the smallest in the event windows including day -1. Thus the longer the event window the smaller was the coefficient of variation. It was due to the fact that in longer event windows the abnormal returns were higher.

Skewness

In the next step the asymmetry of probability distribution was covered. The direction of variables' differentiation was verified with the use of the skewness

coefficient based on the third central moment and the quartile measure of skewness. It was calculated with the use of the following formula:

$$\gamma = \frac{\frac{1}{N} * \sum_{i=1}^N (AR_i - \overline{AR})^3}{\sigma^3}$$

where:

γ – skew coefficient,

N – number of observations.

In all the event windows the right skew was observed. The absolute values of the skew coefficient below 1 signified a weak asymmetry in all the event windows. The most right-handed asymmetry was observed in the 0/+1 day event window. The inclusion of the day –1 decreased the values of skew coefficient. The quartile measure of skewness (A_s) complemented the skew coefficient by determining the strength and the direction of the asymmetry between the third and first quartiles which allowed the assessment of the skew excluding the extreme values. The following formula was employed:

$$A_s = \frac{Q_3 + Q_1 - 2 * Me}{2 * Q}$$

where:

A_s – quartile measure of skewness,

Q_1 and Q_3 – first and third quartile,

Me – median,

Q – semi-interquartile range.

Similarly to the skew coefficient the results indicated the right skew. However smaller absolute values indicate that the skewness of the distribution was the result of the abnormal changes in the market value of equity beyond the third and first quartiles. Table 35.

Table 35. The skew coefficient

	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Skew coefficient	0,4497	0,1668	0,2001	0,5981
As	0,0992	0,1293	0,0525	0,0701

Source: own development

In order to represent the phenomenon graphically box plots were plotted for all the four event windows. The boxes include the inter-quartile range. The whiskers extend from the upper and lower edges of the box to the maximal and minimal values. The extreme observations with values beyond 3 times the inter-quartile range did not occur in the data set. Figure 15.

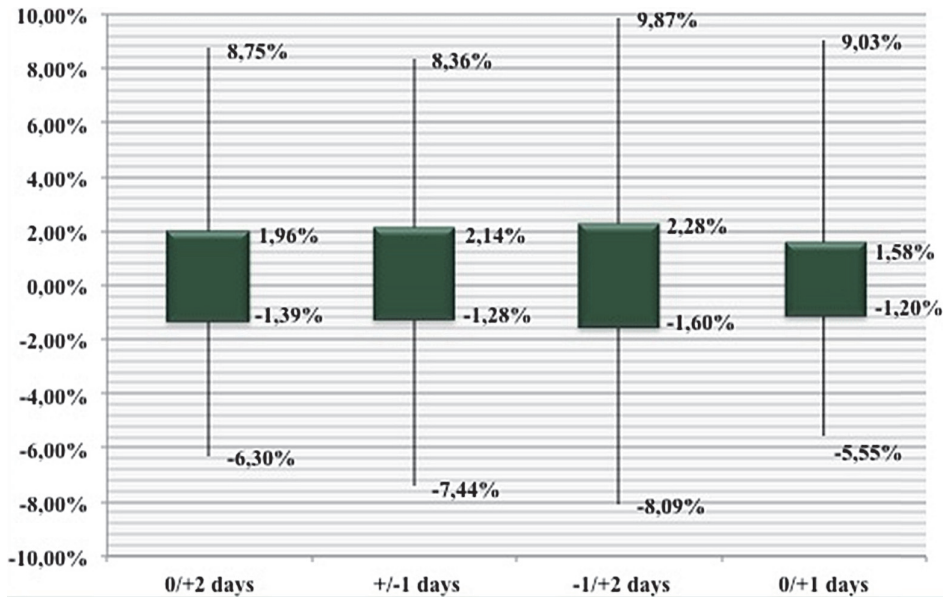


Figure 15. Box plots for short term event windows

Source: own development

The result contributed to the analysis of the difference between the positive change in market value resulting from successful innovation announcements and the negative change resulting from an unsuccessful one. The right skew indicates that it was more likely to experience high positive change in the market value of equity than to experience a high loss.

Peakedness

Here the measure of kurtosis was employed to assess the peaked or flat character of the distribution. Kurtosis measures the heavy tails of the distribution. Its high values indicate that more variance results from infrequent extreme abnormal returns. The values surpassing three signify the peaked distribution (leptokurtic);

the values below three indicate the opposite (platokurtic). Kurtosis was calculated using the following formula:

$$K = \frac{\frac{1}{N} * \sum_{i=1}^N (AR_i - \overline{AR})^4}{\sigma^4}$$

where:

K – kurtosis.

The calculation indicated peaked distribution. It means that there were more outliers than would have occurred if the distribution was normal. It was especially visible in the 0/+1 day event window. The inclusion of the day –1 reduced the values of kurtosis. The data is reported in the Table 36.

Table 36. Kurtosis in the four event windows

	0/+2 days	+/- 1 day	-1/+2 days	0/+1 days
Kurtosis	3,3490	3,1764	3,2453	4,0805

Source: own development

In all the event windows studied the distribution of abnormal returns was peaked in comparison to normal distribution. The extreme values contributed to the total variance.

5.2.2. Long term

In the long-term study the values in both periods were statistically significant. The results for both of them will be shown. The figures will be plotted for the period of 6 months which was more important from the point of view of statistical significance. Similarly to the previous sub-chapter this one is internally divided into the measures of: central tendency, dispersion, skewness and kurtosis.

In the 6 month event window the average positive abnormal changes in market value of equity approximated 18%, whilst the average negative AR was 14,7%. In accordance with the predictions the number of innovation announcements resulting in positive abnormal returns exceeded the number of the observations resulting in negative ones. It was especially obvious in the case of the 6 month event window where the positive abnormal changes in the market value

of equity occurred in 57,8% of the observations. These results are in line with the short-term ones. The precise data is included in Table 37.

Table 37. The number of positive and negative abnormal changes in the market value of equity

Event windows	6 months	3 months
Positive abnormal changes in MV	17,78% (230)	12,55% (206)
Negative abnormal changes in MV	-14,70% (168)	-10,47% (192)

Source: own development

It means that in the long term innovation is likely to result in positive abnormal changes in market value of equity whose magnitude surpass the absolute value of negative returns. The result is in line with the short-term result.

Central tendency

In the case of the three-month event window the arithmetical mean of the increase in the market value of equity in relationship to the portfolio of reference was 1,35%. The addition of the subsequent three months resulted in achieving the level of 3,94%. In the case of both windows the model indicated that the values repeated three times, thus its informative value was limited. The values of the first, second, and third quartiles were computed. The precise data is delivered in Table 38.

Table 38. Descriptive statistics of the buy-and-hold abnormal returns in long-term event windows

	6 months	3 months
Arithmetical mean	1,35%	3,94%
First quartile	-7,51%	-9,75%
Median	0,49%	3,56%
Third quartile	9,73%	15,28%

Source: own development

The median equalled 0,49% and 3,56% respectively. The highest absolute values of the three quartiles were computed for the 6 month event window. It signifies that the positive impact of innovation on market value was stronger in

the longer period. Based on the above calculations it may be seen that there is 25% probability that abnormal changes in the market value of equity fall beyond 7,5% in three months and 9,5% in a half-year. From the point of view of the implementing company the possibility of such losses need to be accounted for despite the overall conclusion indicating the positive effects of innovation.

The histogram was plotted for the 6 month buy-and-hold abnormal returns (Figure 16). The bars represent the frequency of the observations in different abnormal return intervals. The distribution was compared to the normal distribution.

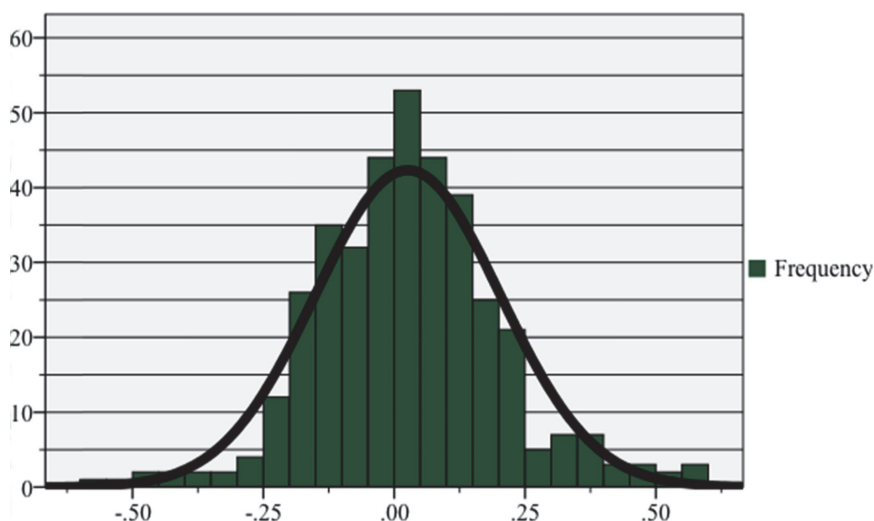


Figure 16. The frequency of buy-and-hold abnormal returns in the 6 month event window

Source: own development

The percentage changes in the market value of equity in the case of three quarters of the observations equalled a dozen or so. The eight central bars represent this. In the case of the remaining observations the changes were relatively large. Most tourism enterprises are relatively small and their abnormal stock returns are more volatile than those of large companies. It is in line with previous research indicating that stock prices of small cap companies are volatile [Pratt and Grabowski 2010]. Furthermore some of the companies were listed on the small capital markets with low liquidity which represented the lack of ability to facilitate the stock buy/sell offers without causing severe changes in its price. Low market liquidity may be the cause of significant changes in the market value

of equity. Such conclusions are in line with the previous empirical research on the subject [Drobotz 2000]. Thus high volatility of the extreme observations was the case for small, dynamic companies listed on the small capital markets. The changes of the market value of equity of large tourism companies were moderate.

In accordance with the short-term study a slight right skew may be seen on the graph. It signifies that positive long-term abnormal changes in MV of equity occurred more frequently than the negative. Skewness will be analysed in detail further in the chapter.

Dispersion

The highest loss in market value of equity occurred in the 6 month event window. It equalled -56% . On the other hand the highest increase in buy-and-hold abnormal returns approximated 59% . The highest potential gain during three months was 49% , the highest potential loss in this period equalled -49% . Next the typical area of variability was calculated. In the case of the 6 month event window 50% of all observation fell between $16,07\%$ and $-8,95\%$. Therefore the half-year typical area of variability was $25,02\%$. It shows that the degree of differentiation of the buy-and-hold abnormal returns was reasonable. The precise data is delivered in the Table 39.

Table 39. Minimal and maximal values of the abnormal returns in long-term event windows

	6 months	3 months
Min	$-56,05\%$	$-49,36\%$
Max	$59,08\%$	$49,02\%$
Interquartile range	$25,02\%$	$17,25\%$
Typical area of variability – High	$16,07\%$	$9,11\%$
Typical area of variability – Low	$-8,95\%$	$-8,14\%$

Source: own development

The results contribute to the discussion on the difference between the results of successful and unsuccessful innovation announcements. Similar to the short-term results, they indicate that the positive returns tend to be greater in absolute values than the negative ones.

Next, variance and standard deviation were calculated. The highest values were obtained in the case of the six month event window. On average the values

differed from the mean by 21%. In the three month event window the standard deviation was 15%. The measures were complemented by a relative standard deviation as they did not account for the average level of abnormal returns. The coefficient of variation was calculated. Table 40.

Table 40. The variance and the standard deviation in long-term event windows

	6 months	3 months
Variance	0,0445	0,0235
Standard deviation	0,2107	0,1533
Coefficient of variation	5,35	11,37

Source: own development

In conclusion the values of the half-year buy-and-hold abnormal returns ranged typically between 16% increase and 9% decrease. In the three-month period the values were 9% and -8%. The dispersion of results was moderate as the coefficient of variation was 5,35 in the 6-month period.

Skewness

In the long-term study the same methods were applied as in the short-term one. The results of the skew coefficient indicated a right skew. However its absolute values were relatively small which indicated that the asymmetry was small. In the case of the six-month event window the skew coefficient was 0,0991. In the case of the three-month event window it was slightly higher at 0,1297.

Similarly to the short-term study the results of the quartile measure of skewness indicated that the asymmetry of distribution resulted from the values beyond the first and third quartiles. In the case of the half-year period the value of -0,063 was calculated. Such a result indicated the barely observable left skew of the abnormal changes in the market value of equity between the first and the third quartiles. In the case of the three month event window the opposite was the case. The result was 0,072. The above considerations were complemented by a graphic component. Two box plots were plotted, one for each of the periods. Figure 17.

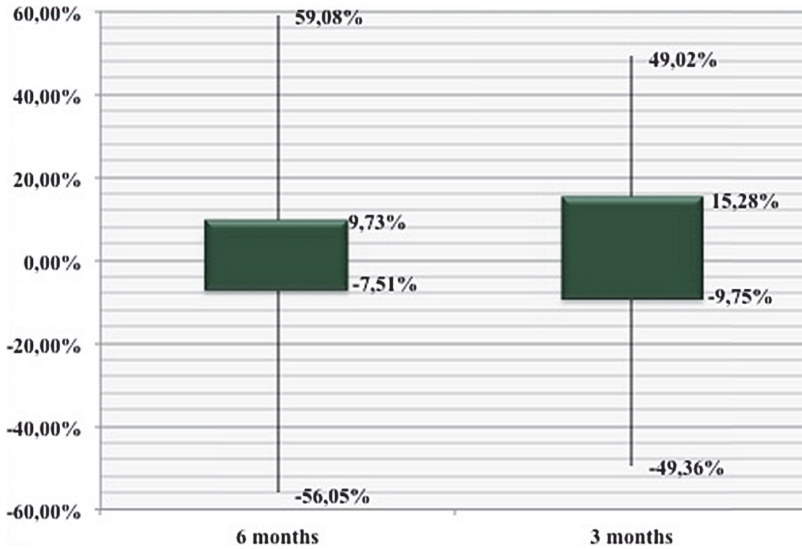


Figure 17. Box plots for long-term periods

Source: own development

Most importantly from the point of view of the tourism companies releasing innovation announcements a slight right skew was indicated. The positive changes of MV resulting from innovation announcements were more likely to occur than the negative ones.

Peakedness

It was important from the point of view of the present research to measure the heavy tails of the probability distribution and verify the portion of variance resulting from infrequent extreme abnormal changes in MV of equity. Similarly to the short-term study the measure of kurtosis was used to describe the distribution of the buy-and-hold abnormal returns.

In the case of long-term event windows the measure of kurtosis surpassed three. The result for the six month event window equalled 3,3279. The result for the three-month event window was 4,1052. The leptokurtic distribution was observed in both cases. In both cases there were more extreme observations than would have been if the distribution was normal.

Summary – statistical analysis

The comprehensive statistical analysis contributed to deepening the knowledge on changes in the market value of equity in tourism enterprises resulting from innovation announcements. The investigation delivered in the present sub-chapter covered all the statistically significant short- and long-term event windows. It included the measures of central tendency, dispersion, skewness, and peakedness.

It was demonstrated that the number of positive market value changes resulting from innovation announcements surpasses the number of negative ones in both short and long terms. Also the absolute values of positive abnormal changes in the market value of equity are higher in both terms. The positive values of arithmetical means, modes and medians delivered further support for the positive relationship between innovation and the market value of tourism enterprises. The typical areas of variability were moderate and were 3,42% in the +/- 1 day event window and 25,02% in the half-year period. The distribution of abnormal changes in market value of equity was right-skewed in almost all the cases. It indicated that it was more likely to experience high positive change in the market value of equity resulting from innovation announcements than to experience high market value loss. It delivered further support for the predominance of the positive changes in market value of equity resulting from successful innovation announcements over the negative changes resulting from unsuccessful ones. The analysis indicated leptokurtic distribution in the case of all event windows. It demonstrated that in both short- and long-term abnormal returns more variance results from infrequent extreme abnormal returns.

5.3. Empirical verification of the model

The analysis reported in the previous sub-chapters indicated the positive impact of innovation on the market value of tourism enterprises. Due to the heterogeneity of abnormal changes in the market value of equity it was concluded that the relationship is not straightforward. The occurrence of both positive and negative abnormal changes in MV indicated that a series of variables determine the changes in market value. Such a situation required further investigation which resulted in the creation of author's model representing the relationship. In the

present sub-chapter the results of the verification of the author's model will be reported. The hypotheses 5 to 10-2 will be tested in both short and long term.

The conceptual model encompassed a set of 19 variables. Eight variables were introduced as control variables and eleven as the predictors of the change in the market value of equity. The hypotheses concerning the predictors were tested with the use of hierarchical regression. The dependent variables differed in the short- and long-term studies. They represented the most important event windows from the point of view of statistical significance. Therefore in the short term the dependent variable was the ± 1 day event window and in the long term it was the 6 month buy-and-hold abnormal return.

There are numerous model-testing procedures described in the extant literature. In this research hierarchical regression was chosen because it is the appropriate tool for evaluating the contribution of selected predictors. It relies on the sequential process of entering predictors in consecutive steps. The researcher relying on previous scientific evidence determines the order of entry. Thus the order of the entry is based on theory. In this context the hierarchical regression surpasses the stepwise procedures in which the algorithm decides the order of the variables' inclusion. Stepwise procedure starts with computing the model with only one predictor which is the most strongly correlated with the dependent variable. In the consecutive steps more variables are added based on the inclusion criteria (e.g. the statistical significance at the level of $p < 0,1$). The reliance on the algorithms instead of previous scientific evidence brought about strong criticism of stepwise regression [Lewis 2007].

In determining the statistical significance of categorical variables the categories were treated jointly. If one category was statistically significant at 0,1 the variable was treated as significant. Such an approach is in line with the previous considerations and conceptually correct [Cohen 1991]. It is important to notice that the inclusion into the regression of the statistically insignificant categories does not worsen the estimates of the whole regression model [Górecki 2010]. All the calculations were performed with the use of IBM SPSS Statistics version 23.

5.3.1. The models

In order to test the author's model four different models were specified. The consecutive models covered the gradual addition of control variables, company-level innovation-related predictors, innovation-level predictors and second-order and interaction effects. The models allowed the testing of the hypotheses 5 to 10-2. Table 41 provides the data on the included variables and the tested hypotheses.

The first specified model covered only the control variables. In the systematic studies of literature eight such variables were identified (size – SIZ, industry (food and beverage serving – FBS, passenger transportation – PT, travel agencies – TA, cultural activities – CA, sport and recreation – SPRT, other country-specific tourism characteristic activities – OTCA), growth – GWTH, operational experience – OPEXP, volume – VOL, total cash dividend – TCD, leverage – LVR, return on equity – ROE). They relate to the changes in the market value of equity. Their inclusion was necessary to remove their effect from the variables of interest. The estimation of the first model was the first step in hierarchical regression. The estimates were treated as the point of reference.

The second model covered the firm-level innovation-related variables – R&D intensity (R&D) and innovativeness (INNOV). Even though these variables concern the company as a whole they refer directly to innovation. Thus they are important from the point of view of the impact of innovation on the market value. Furthermore both variables differ from innovation-level variables as they deliver informative value on different level. Their introduction in a separate step is justifiable. The estimation of the second model constituted the second step in the hierarchical regression. It allowed the testing of the three hypotheses.

The third models complemented the above set of variables by adding the innovation-level predictors. Thus at this step seven variables were introduced (patent – PAT, elements of CSR – CSR, type (process – PROC, marketing – MRKT, organisational – ORG, distributional – DSTR), degree of novelty (incremental – INC, new to the company – NC), source (collaboration – COLLAB, copied – CPD), stage – SGT, communication – COM). The variables were crucial from the point of view of the present research concentrating on the impact of innovation on the market value of equity of tourism enterprises. The estimation of the model was the third step of the hierarchical regression. It allowed the testing of eight hypotheses.

The fourth model covered interaction and second-order effects in addition to the previously included variables (squared R&D intensity – $R\&D^2$, interaction between R&D intensity and innovativeness – $R\&D*INNOV$). The inclusion of such effects in the last step is in line with literature [Acock 2006]. The estimation of the fourth model was the final step of the hierarchical regression which allowed the testing of the three hypotheses.

Table 41. The variables included in the consecutive models

Model	Variables	Hypotheses
1	SIZ, IND(FBS), IND(PT), IND(TA), IND(CA), IND(SPRT), IND(OTCA), GWTH, OPEXP, VOL, TCD, LVR, ROE	-
2	SIZ, IND(FBS), IND(PT), IND(TA), IND(CA), IND(SPRT), IND(OTCA), GWTH, OPEXP, VOL, TCD, LVR, ROE, R&D, INNOV	H5, H9-1, H9-2
3	SIZ, IND(FBS), IND(PT), IND(TA), IND(CA), IND(SPRT), IND(OTCA), GWTH, OPEXP, VOL, TCD, LVR, ROE, R&D, INNOV, PAT, CSR, TYPE(PROC), TYPE(MRKT), TYPE(ORG), TYPE(DSTR), DNI(INC), DNI(NC), SRC(COLLAB), SRC(CPD), SGT, COM	H6, H8-1–H8-7
4	SIZ, IND(FBS), IND(PT), IND(TA), IND(CA), IND(SPRT), IND(OTCA), GWTH, OPEXP, VOL, TCD, LVR, ROE, R&D, INNOV, PAT, CSR, TYPE(PROC), TYPE(MRKT), TYPE(ORG), TYPE(DSTR), DNI(INC), DNI(NC), SRC(COLLAB), SRC(CPD), SGT, COM, R&D2, R&D*INNOV	H7, H10-1, H10-2

Source: own development

5.3.2. Short term

The verification of the author's model started with the estimation of model 1. The market value change in the +/- 1 day event window was taken as the dependent variable. The most important results provided by the 4 models are summarised in the Table 42. The data on the single variables is provided in Table 43. The first table compares the models with each other. The second one carries data on the statistical significance of the selected predictors.

The values of coefficients of determination reflect the percentage of variability that may be accounted for by all the predictors together. The changes from one model to another indicate how much predictive power was added by the addition of another variables.

Table 42. Models summary

Model	R	R ²	Adj. R ²	Std. Error	F	Sig.	Change (Δ) Statistics				
							ΔR^2	ΔF	df1	df2	Δ Sig.F
1	0,524	0,275	0,25	0,02798	2,424	0,004	0,275	2,424	13	384	0,004
2	0,56	0,314	0,287	0,02771	2,782	0	0,039	4,792	2	382	0,009
3	0,618	0,382	0,336	0,02741	2,337	0	0,068	1,704	12	370	0,064
4	0,623	0,389	0,34	0,02738	2,269	0	0,007	1,301	2	368	0,273

Source: own development

The regression on the first model was run to predict the changes in the market value from the control variables. The variables did statistically significantly predict the changes in MV, $F(13, 384) = 2,424$, $p = 0,004$, $R^2 = 0,275$, $R^2_{adj} = 0,25$. The statistically significant prediction of the model is in line with the expectations and previously reported studies [Son et al. 2011; Dotzel, Shankar and Berry 2013; Meng, Zhang and Wei 2015]. The result is treated as the point of reference for further reasoning in the short-term investigation. As the present research is performed in the context of tourism it is worth indicating that none of the variables covering tourism activities was statistically significant. It means that investors were more concerned by the abnormal changes in the market value of equity of the companies than by their type.

In relation to the fifth hypothesis stating that innovation-related company-level variables predict the changes in the market value of equity above and beyond the effect of the control variables the regression was run on the second model. Similarly to the first model the variables statistically significantly predicted the changes in market value of equity $F(15, 382) = 2,782$, $p = 0,000$, $R^2 = 0,314$, $R^2_{adj} = 0,287$. In the context of hypothesis testing the change in statistics between the first and the second model are of interest. The coefficient of determination increased by 0,039, which indicates that the inclusion of R&D intensity and firm innovativeness allowed a prediction of almost 4% more of the variance in changes in the market value of equity from the dependent variables. Importantly the R^2 increase was statistically significant. The evidence supports H5.

Further analysis of the result of the regression run in the second model allowed the testing of the two hypotheses referring directly to the effects of R&D intensity and firm innovativeness. Table 43 provides the data on the statistical significance of the single predictors. In the case of model 2 it may be seen that firm innovativeness was statistically insignificant. R&D intensity was significant at 0,01 level.

In the case of R&D intensity the calculated β parameter was positive. It signifies that the stronger the firm's R&D intensity the greater is the change in the market value of equity, which is with accordance with the hypothesis 9-1. High R&D intensity reflects a firm's involvement in innovation practices. It results in building new knowledge, creating innovation stimulating culture and increasing the chances for successful development and implementation. In the present research it was observed that the market rewarded R&D intensive tourism companies by positive changes in market value of equity. The above evidence supports H9-1. The results are in line with the previous research. Khansa and Liginlal indicated that firm's R&D expenses yields positive returns in terms of the market

value of equity changes [2009]. The research of Ehie and Olibe reaffirmed the positive effect of R&D expenditures on market value [2010]. The authors reported that R&D intensive firms increase the innovative capabilities and reap better performance in the marketplace.

Surprisingly the effect of a firm's innovativeness was positive but barely observable, and statistically insignificant. It means that even if a firm announced an innovation within the past year this fact did not support the positive perception of the announced innovation. Investors focused solely on the current announcement and the historical innovation releases had no effect on the perception of the current release. The previous research reported the statistically significant positive relationship [Dotzel, Shankar and Berry 2013]. However it utilised different proxies for innovativeness or concentrated solely on one innovation type. Cho and Pucik employed an innovativeness score rating [2005] to measure a firm's innovativeness and Dotzel, Shankar and Berry concentrated only on e-innovativeness [2013]. The clue to the insignificance of the results in present research are delivered by Hall, Jaffe and Trajtenberg who demonstrated in the context of patents that the premium in market value is linked to the future citations rather than those received in the past [2005]. In this research it was demonstrated that the innovation announcements are treated separately and the past innovation releases does not impact on the present effects of innovation announcements. Based on the evidence the hypothesis 9-2 stating that firm's innovativeness is positively related to the changes in the market value of equity resulting from innovation announcements is not supported.

In relation to hypothesis 6 the regression was run on the third model. The independent variables predicted the changes in the market value of equity in a statistically significant way, $F(27, 370) = 2,337$, $p. 0,000$, $R^2 = 0,382$, $R^2_{adj} = 0,336$. The inclusion of innovation-level variables resulted in the increase of the coefficient of determination by 0,068. The increase of R^2 was statistically significant. The results show that almost 7% more of the variance in changes in market value of equity may be explained by the third model in comparison to the second. In comparison to the model covering the control variables the total increase is almost 11%. The evidence is crucial from the point of view of the impact of innovation on the market value of tourism enterprises. The addition of the innovation-level variables predicts the changes in market value of equity above and beyond the effect of the previously included predictors. The result is in line with previous research [Hall, Jaffe and Trajtenberg 2005; Khansa and Liginlal 2009; Nicolau and Santa-Maria 2013a; Zach, Krizaj and McTier 2015]. The evidence supports hypothesis 6 – innovation-level variables predict the changes in market

value of equity above and beyond the effect of the control and innovation-related company-level variables.

The above results are especially important as they prove that changes in market value resulting from innovation announcements may be predicted to some extent. However these general considerations require in-depth analysis. In the third model seven innovation-level variables were introduced. As may be seen in Table 43 their estimated parameters differed from one another. The variables will be analysed one by one.

Table 43. Models' specification

	Model 1	Model 2	Model 3	Model 4
(Constant)	0,002	0	0,015**	0,014**
SIZ	0,637	-0,227	-0,587	-0,947
IND(FBS)	-0,006	-0,005	-0,007	-0,006
IND(PT)	0,001	0,003	0	0,069
IND(TA)	-0,002	-0,001	-0,004	-0,003
IND(CA)	-0,006	-0,005	-0,01	-0,009
IND(SPRT)	-0,004	-0,003	-0,005	-0,005
IND(OTCA)	0,026	0,023	0,024	0,02
GWTH	0,006**	0,007**	0,007**	0,007***
OPEXP	0,150	0,136	0,124	-0,101
VOL	-0,164**	-0,178**	-0,193**	-0,184**
TCD	-0,141	-0,188*	-0,229**	-0,211*
LVR	0***	0**	0***	0***
ROE	-0,005**	-0,005**	-0,006***	-0,006***
R&D		0,128***	0,143***	0,187**
INNOV		0	0,001	0
PAT			0,002	0,003
CSR			-0,002	-0,001
TYPE(PROC)			0,001	0,001
TYPE(MRKT)			-0,008*	-0,007*
TYPE(ORG)			-0,011*	-0,01*

TYPE(DSTR)			-0,002	-0,002
DNI(INC)			-0,004	-0,003
DNI(NC)			-0,001	-0,001
SRC(COLLAB)			-0,006*	-0,006*
SRC(CPD)			-0,004	-0,003
SGT			0,009**	0,008*
COM			0,011**	0,011**
R&D*INNOV				0,012
R&D²				0,062

***p < 0,01; **p < 0,05; *p < 0,1

Source: own development

The first innovation-level variable under investigation is patent. Hypothesis H8-1 stated that there is a positive effect of patents on the changes in market value resulting from innovation announcements. The category of reference was “not patented”. Based on the evidence it may be seen that patent protection had a positive effect on the dependent variable. However the result was relatively small. It indicated that the market did not place much weight on such protection. In the case of tourism enterprises scarce innovation contains technologically advanced solutions. From the technological point of view most innovation in tourism is relatively simple. On one hand patent protection is not essential, on the other patent procedures incurs costs. As a result the market seems to value patent protection positively but the premium is minimal. The hypothesis may not be supported as the results are not statistically significant. The small impact of patents is to some extent in line with the work of Hjalager who indicated that much could be gained from licencing and certification but in many cases in tourism patents are not feasible [2002]. Thus patenting activity is performed to a small extent.

The second innovation-level variable is CSR. The negative value of β was calculated for the “elements of CSR” category which is in contradiction to the initial statement that innovation’s CSR elements contribute positively to the changes in market value resulting from innovation announcements. The importance of social responsibility in today’s economies forces companies to implement responsible practices. The mass implementation of socially responsible solutions raised the question of the superficiality of these actions. The evidence

in the present research indicates that the market treated the social responsibility aspects of innovation with caution. The observed negative effect was relatively small and statistically insignificant. Hypothesis H8-2 was not supported. Luo and Bhattacharya [2006] provide another clue in relation to the above results. Their research linked corporate responsibility, consumer satisfaction and market value. They demonstrated that in companies with low innovativeness levels, CSR actually decreases the level of consumer satisfaction and harms market value. The right order is to prompt innovativeness first and then to focus on social responsibility. This explanation holds for tourism companies in the light of the above documented low innovativeness levels.

Hypothesis H8-3 referred to the greater effect of product innovation on the changes in market value resulting from innovation announcements in relation to that of other innovation types. Leaving product innovation as the category of reference allowed such a comparison. The effect of process innovation in relation to product innovation was barely observable and statistically insignificant. Also distributional innovation did not differ from product innovation in a statistically significant way. It means that the market did not significantly differentiate these three categories. The result obtained for marketing innovation was statistically significant and the calculated β was negative. In line with the initial prediction the effect of marketing innovation was negative in comparison to product innovation. The possible explanation is that a new product has the direct potential to increase sales and impact positively on the company's cash flow. In the case of marketing innovation the effect may require some time to occur. The parameters calculated for organisational innovation were also statistically significant, and negative. In many cases organisational changes require a certain amount of time to be implemented and thus the effects may not be visible straight away. In this context investors may evaluate the pieces of information on organisational innovation reservedly. Also the estimation of the effects of marketing and organisational innovation requires some knowledge of the company which may constitute a barrier for some investors. The evidence supports H8-3. The results are in line with the author's prediction but are in contradiction with the previous research. Nicolau and Santa-Maria concluded that the effects of process and marketing innovation are significantly greater than those of product/service and organisational innovation. The possible explanation of the difference is the different scope of the researches. In the present study all types of tourism enterprises were included. As far as hotel enterprises are concerned the asset intensity is high as is the level of fixed costs. In this context cost reduction is of great value. Cost reduction is the primary function of process innovation [Tidd 2001]. In the

hotel industry the importance of process innovation holds. However in tourism enterprises in general product innovation was proven to carry more positive results because it directly boosts sales and profits which impacts positively on the company's cash flow and as a result on its market value.

The hypothesis 8-4 concerned the positive relationship between the degree of novelty and the changes in market value resulting from innovation announcements. The radical innovation category was used as the category of reference. The negative values of β signify that the effect of radical innovation was positive in relation to the incremental innovation and new to company innovation. The risk of implementing breakthrough innovation is as high as are the potential benefits from implementation. It was stated previously that according to the market in the case of innovation announcements the benefits outweigh the risk, however in the case of radical innovation the difference is the strongest. It means that investors are willing to take more risk, expecting higher returns. Despite the above considerations the hypothesis may not be supported as the results are not statistically significant. The negative parameters calculated for incremental and new to the company, innovation are in accordance with previous studies. Weiermair indicated that in the case of tourism enterprises most companies pursue the strategies of minor upgrades [2004]. The relative rarity of pioneering new products allows companies to differentiate and as a result increase market value.

In respect of hypothesis 8-5 stating that the effect of innovation developed in-house on the changes in the market value of equity resulting from innovation announcements is smaller than that of innovation from other sources two binary variables referring to the source of innovation were introduced into the model. The "developed in-house" category was left as the category of reference to test if the effect of this on changes in market value resulting from innovation announcements is smaller than that of innovation from other sources. In the present study the negative values of β parameter were calculated for innovation developed in collaboration and copied. The value for the collaboration category was statistically significant. The results are in contradiction to the initial prediction. The market did not reward in the short term the benefits of sharing knowledge and experience between companies and the reliance on such new paradigms as open innovation in the short term. The results indicate that in the short term the market perceived self-developed innovation more favourably. The result is surprising in the context of tourism enterprises characterised by their low expenditure on innovation. One possible explanation is that innovation developed in the company is perfectly known, understood and forms the company's internal knowledge asset. It is less likely that unpredicted issues occur in the process of implementation. Thus it is

valued positively by the market in relation to copied solutions which were developed elsewhere. Some previous research shared such conclusions. Filson reported positive parameters for the development of innovation without collaborations or acquisitions [2002]. Hypothesis 8-4 is not supported.

The next variable covered by the third model was “stage”. Hypothesis H8-6 stated that a positive relationship exists between the innovation stage and the changes in market value resulting from innovation announcements. The results of the present research indicate that it is just the case. The calculated value of β parameter for the “commercialisation” stage category was positive. It shows that the market reacts better to an innovation that is already implemented than for an innovation that is still under development. It may be due to the fact that the outcomes of the development process are characterised by high uncertainty. The result was statistically significant at the level of 0,05. The hypothesis 8-6 is supported. The result is consistent with the research of Kelm, Narayanan and Pinches who showed that the market reacts positively to development-stage announcements only for the companies with high technological capabilities [1995]. It is not the case of tourism enterprises. For the other companies, (including tourism), the market waits for the proof in the form of the introduction of the innovation before it responds.

The last innovation-level variables covered by model 3 was communication. The initial prediction stated that the effect of the first innovation announcement on the changes in the market value of equity is greater than that of the second and further announcements. The positive value of β calculated for the first announcements indicate that indeed it impacts stronger on changes in market value. In this light it may be concluded that the informative value of the announcements beyond the first one was limited. The information included in second and further releases in comparison to the information delivered in the first one was limited and resulted in significantly smaller market reaction. The result was statistically significant at 0,05. Based on the evidence H8-7 may be supported. The result is in line with the literature documenting anticipated announcements. The more the release is anticipated the smaller the market reaction at the moment of announcement [Graham, Koski and Loewenstein 2006]. In this context the news carried by the second and further announcements may be treated as already anticipated to some extent. Thus their impact on the market value of tourism enterprises is relatively smaller.

The last model specified in the research covered two additional variables representing the interaction effect between R&D intensity and innovativeness and the second-order effect of R&D intensity. The results of the regression run for

model 4 indicated that the set of variables statistically significantly predicted the changes in the market value of equity, $F(29, 368) = 2,269$, $p = 0,000$, $R^2 = 0,389$, $R^2_{adj} = 0,34$. Most importantly the change in the coefficient of determination was 0,007 and was statistically insignificant. It means that the set of variables did not predict the changes in the market value of equity above and beyond the effect of the previously introduced variables. Based on the evidence hypothesis 7 is not supported. The evidence is in contradiction to the previous research [Ehie and Olibe 2010] but requires further discussion. Further analysis of the single variables included in model 4 allowed the testing of hypotheses 10-1 and 10-2.

In respect of hypothesis 10-1 stating that there is an interaction effect between R&D intensity and innovativeness in the context of the changes in the market value of equity resulting from innovation announcements the variable representing the interaction between R&D intensity and innovativeness was introduced. The calculated value of the β parameter was positive but statistically insignificant. This research does not support the existence of such an interaction. Hypothesis 10-1 is not supported. There was no proof in the data that the positive effects of innovativeness are stronger in companies without excessive expense on R&D. As discussed previously in the context of innovativeness the market, whilst accounting for the current release, is not willing to additionally incorporate any reward for the previous actions concerning innovation.

The last variable included in the models represented the second-order effect of R&D intensity. The calculated parameter was positive but statistically insignificant. Thus the evidence does not support the existence of the negative effect. Hypothesis 10-2 stating that there is a negative effect of the squared R&D intensity on the changes in the market value of equity resulting from innovation announcements is not supported. Such a result is in contradiction to the previously reported results. Ehie and Olibe found in their study a curvilinear relationship between R&D investment and firm value [2010]. The authors used the measure of squared R&D investment. The possible difference in the outcomes may result from the different approach to R&D expenditures in the two approaches. In this research the R&D expenditure was divided by total net sales to form the relative measure of R&D. Based on the research of Ehie and Olibe it may be assumed that diminishing marginal returns to R&D intensity exist. However the increase in R&D is very often linked to the increase in sales (which leads to the creation of additional funds). The proportional increase of both total net sales and R&D expenditure does not change the ratio of R&D intensity. The present research suggests the proposition that the second-order effect is lost if the R&D expenditures are presented in relation to total net sales.

5.3.3. Long term

In the long-term study the 6-month change in the market value of equity constituted the dependent variable due to its high level of statistical significance. Similarly to the short-term study in the long-term one four previously specified models were employed. Table 44 and Table 45 summarise the most important results delivered by the regressions' run on the consecutive models. Table 44 contains the comparison of the models between each other. Despite the characteristics of each model the change statistics are shown. Table 45 comprises the β parameters calculated for single variables.

In the present research it was observed that the coefficients of determination were generally smaller in the long term than in the short term. It is not surprising in the light of the literature. In previous research the reliable evidence of long-term abnormal performance was relatively small [Mitchell and Stafford 2000]. The portion of variance explained in the four models used was slightly smaller in the long than in the short term.

Table 44. Model summary

Model	R	R ²	Adj. R ²	Std. Error	F	Sig.	Change (Δ) Statistics				
							ΔR^2	ΔF	df1	df2	$\Delta \text{Sig.F}$
1	0,512	0,263	0,238	0,20694	2,193	0,009	0,263	2,193	13	384	0,009
2	0,517	0,268	0,239	0,2072	1,965	0,017	0,005	0,516	2	382	0,597
3	0,577	0,333	0,284	0,20607	1,704	0,017	0,065	1,35	12	370	0,088
4	0,578	0,334	0,281	0,20652	1,593	0,029	0,001	0,203	2	368	0,817

Source: own development

In the first model the regression was run to predict the changes in market value from the control variables. The set of statistically significantly variables predicted the changes in market value $F(13, 384) = 2,193, p = 0,009, R^2 = 0,263, R^2_{\text{adj}} = 0,238$. The above result was the first step in the hierarchical regression. In the consecutive steps it constituted the point of reference. It is important to notice that the coefficient of determination was smaller than in the short-term study. Due to the present research focusing on tourism it is worth indicating that in the long term the changes in the market value of equity resulting from innovation announcements were greater in companies managing “food and beverage activities” and “other tourism activities” than in accommodation companies.

The result may be explained by the six consecutive years of real growth (from 2009) in the gastronomic sector with no signs of slowing [Duff&Phelps 2015]. The dynamism is exceptional in comparison with accommodation companies. Furthermore the existing scientific research on the millennials and the future of tourism indicates that food is currently at the very top of the hierarchy of vacation needs [Catlett and Allen 2015].

Model 2 added the firm-level innovation-related predictors to the regression. The whole set predicted the changes in the market value of equity in a statistically significant way $F(15, 382) = 1,965$, $p = 0,017$, $R^2 = 0,268$, $R^2_{adj} = 0,239$. In relation to model 1 the increase in the coefficient of determination was relatively small at 0,005 which means that the inclusion of the two variables explained the 0,5% of variance above and beyond the prediction of the control variables. The increase in the coefficient of determination was statistically insignificant. The result is in contradiction with initial expectations and requires further discussion. The evidence does not support hypothesis 5. Further analysis of the results delivered by the regression run on the second model allowed the testing of hypotheses 9-1 and 9-2 referring directly to R&D intensity and innovativeness.

In the light of the statistical insignificance of the R^2 change the insignificance of the two additional variables is not surprising. As may be seen in the Table 45, the β parameter calculated for R&D intensity was positive. It is in line with the results of the short-term study and in line with the initial prediction. However the positive effect of R&D intensity is small and statistically insignificant. The research was unable to reject the null of no effect of R&D intensity on the change in the market value of equity. The result allowed the proposition that in the long term the market rewarded R&D intensive firms by an increase in the market value of equity, but in to a relatively small extent. Based on the above evidence hypothesis 9-1 is not supported. According to previous research tourism in general is not an R&D intensive sector [Sequeira and Campos 2007]. The evidence from the long-term research suggests that such activity was treated with caution. Osawa and Yamasaki indicated that the difficulty in linking R&D to market value stems from the lack of definite means to quantify the total effects of R&D [2005]. In the long term the market tended to reward the R&D intensity hesitantly.

In respect of hypothesis H9-2 stating that firm innovativeness is positively related to the changes in market value resulting from innovation announcements the research does not deliver supportive evidence. The parameter calculated for the innovativeness variable was negative and statistically insignificant. It means that the research was unable to prove a statistically significant effect of

innovativeness on the change in the market value of equity. In comparison to the results of the short-term study the β parameter changed sign. However in both cases the absolute value of the parameter was close to zero. Thus the difference between the short-term and long-term studies was actually small. Based on the long-term evidence hypothesis 9-2 is not supported.

The third model introduced the innovation-level variables to the regression. The regression was run and the variables statistically significantly predicted the changes in market value $F(27, 370) = 1,704$, $p = 0,017$, $R^2 = 0,333$, $R^2_{adj} = 0,284$. The change in the coefficient of determination was 0,065 and most importantly the increase was statistically significant. The inclusion of innovation-level variables allowed the prediction of the changes in the market value of equity 6,5% above and beyond the effect of previously included variables. The third model explained 33% of the variance of the abnormal changes in the market value of equity. In comparison to model 1 the predictive power of the model increased by 7%. The statistical significance of the change in R^2 supports hypothesis 6. The results are in line with those obtained in the short-term study.

The further analysis of the regression run on the third model allowed the testing of hypotheses H8-1 to H8-7. The relevant data is delivered in the Table 45.

Table 45. Models specification

	Model 1	Model 2	Model 3	Model 4
(Constant)	0,029	0,035	-0,04	-0,038
SIZ	-0,517	-0,568	-0,504	-0,463
IND(FBS)	0,12***	0,126***	0,108**	0,108**
IND(PT)	0,042	0,046	0,033	0,034
IND(TA)	0,043	0,047	0,022	0,022
IND(CA)	0,053	0,051	0,059	0,059
IND(SPRT)	-0,025	-0,026	-0,04	-0,041
IND(OTCA)	0,227**	0,218*	0,209*	0,215*
GWTH	-0,016	-0,014	-0,016	-0,017
OPEXP	0,001	0,001	0,001	0,001
VOL	-0,263	-0,269	0,543	0,242
TCD	-0,082	-0,087	-0,096	0
LVR	-0,002**	-0,002**	-0,002*	-0,002*

ROE	0,022	0,022	0,026	0,026
R&D		0,025	0,027	0,046
INNOV		-0,002	-0,001	-0,001
PAT			0,031	0,035
CSR			-0,011	-0,01
TYPE(PROC)			0,034	0,034
TYPE(MRKT)			0,009	0,009
TYPE(ORG)			-0,053*	-0,052*
TYPE(DSTR)			0,03	0,033
DNI(INC)			-0,009	-0,003
DNI(NC)			0,000	0,004
SRC(COLLAB)			0,088***	0,088***
SRC(CPD)			0,07**	0,064**
SGT			-0,029	-0,027
COM			0,046*	0,046*
R&D*INNOV				-0,048
R&D²				-0,012

*** p < 0,01; ** p < 0,05; * p < 0,1

Source: own development

The first of the innovation-level variables was patent. The long-term evidence indicates that there is a positive effect of patents on the changes in the market value resulting from innovation announcements. The value of the β parameter was positive, but insignificant. It allowed the presumption that in the long run the market rewarded the patent activity of tourism enterprises to a small extent. Nevertheless the benefits of patent protection seemed to outweigh the costs. Due to the statistical insignificance of the result the evidence does not support hypothesis 8-1. The calculation in the long-term study is in accordance with the short-term one. However the absolute value of the parameter increased which means that in the long term the perception of patent protection was even better than in the short run. Thus the benefits of patent protection are more likely to occur over time.

The second innovation-level variable introduced in the third model was CSR. Similarly to the study performed in the short term the negative value was calculated for the β parameter. The result was statistically insignificant. It indicated that in the long term the market perceived innovation with no elements of CSR better than the one possessing such elements. The evidence suggests that the market saw CSR practices as superficial and did not reward it. The research was unable to reject the null of no effect of CSR on the change in market value of equity. Based on the long-term evidence hypothesis 8-2 was not supported.

In regard to hypothesis 8-3 four binary variables were introduced into model 3. The β parameters for process, marketing and distributional innovation were positive but all three were statistically insignificant. The only statistically significant variable represented organisational innovation. In this case the calculated parameter was negative. It means that product innovation in relation to organisational innovation resulted in positive changes in the market value of equity. According to the results of this research the benefits of new products outweighed the benefits of new organisational solutions. The long-term result is in line with the short-term one. Organisational innovation may be difficult to assess without the precise knowledge of the company's internal environment. It may constitute a barrier in the evaluation of its effects. It is not the case of new products which may be assessed more easily. The evidence supports hypothesis 8-3.

Hypothesis 8-4 referred to the effect of the degree of novelty. The β parameter calculated for the binary variable representing incremental innovation was negative. The parameter for innovations new to the company was zero. Both were statistically insignificant. Based on the values of the parameters it could be assumed that in the long run the market rewarded breakthrough changes which allowed companies to differentiate themselves from competitors. However the statistical insignificance of the results does not deliver strong support for such reasoning. The research was unable to reject the null of no effect of degree of novelty involved in the change in the market value of equity. The evidence does not support hypothesis 8-4. The results of the long-term study are in line with the results obtained in the short term.

The next variable covered by the model was the source of innovation. In the short-term study it was demonstrated that innovation developed in-house impacts positively on the market value of equity of tourism enterprises in comparison with innovation from other sources. In the long-term investigation the calculated values of β parameters were positive and significant. Thus the long-term result contradicts the short term one. Importantly the collaboration category was significant at 0,01 and the copied category at 0,05. It seemed that in the

long term investors rewarded attitudes characteristic for contemporary business activities. The result is in accordance with the previous research. The active usage of inflows and outflows of knowledge to accelerate innovation is at the very heart of open innovation. Businesses use internal and external ideas and paths to the market to advance innovation. The openness is reflected in the placing of external and internal innovation on the same level [Chesbrough, Vanhaverbeke and West 2006]. Innovation developed in collaboration and copied from others indicate that companies are willing to benefit from the knowledge and experience of collaborators and use the experiences of previous implementers. In the long term the market rewarded the usage of external sources of innovation which supports hypothesis 8-5. It seems that in the short term the market was less concerned about the source of innovation and rewarded the simplest, internal source of innovation. However in the long-run the collaborative structures were more efficient in increasing the market value of equity of tourism enterprises.

In respect of hypothesis 8-6 stage variable was introduced into the model. In the long-term study the commercialisation stage category had a negative value. It shows that the market perceived innovation under development better than the commercialised one. The market rewarded the possibility of future improvement in company's cash flows. The evidence does not support H8-6. The results are in contradiction to the short-term study. However no conclusive remarks may be made here as the long-term result was statistically insignificant. The research was unable to prove a statistically significant effect of this stage on the change in the market value of equity.

The last variable introduced into the model was communication. In the long-term study it was demonstrated that effect of the first innovation announcements on changes in market value is greater than that of the second and further announcements. The positive β parameter demonstrates this. Importantly the period between the announcements exceeded three months in most cases. In the long run the variable was statistically significant. Based on the above evidence hypothesis 8-7 is supported. The result is in line with the short-term research. It was able to prove the statistically significant effect of communication on the change in the market value of equity.

In the fourth model the regression was run to predict changes in market value from the variables representing interaction between R&D intensity and innovativeness, second-order effect of R&D intensity and all the previously included variables. The whole set statistically significantly predicted the changes in MV, $F(29, 368) = 1,593$, $p = 0,029$, $R^2 = 0,334$, $R^2_{adj} = 0,281$. Importantly from the point of view of the present research the increase in the coefficient of

determination was statistically insignificant. Such a result does not support hypothesis 7 and the set of variables did not predict the changes in the market value of equity above and beyond the effect of the previously introduced variables. The result is in line with the short-term study.

The in-depth analysis of the fourth model allowed the testing of H10-1 and H10-2. The β parameter calculated for the R&D intensity and innovativeness interaction term was negative and statistically insignificant. Thus the data did not deliver support for the existence of such an interaction. Hypothesis 10-1 was not supported. The results of the parameter reported in the short-term study were positive. However the important consideration here is the small absolute value of the calculated parameters. It means that the actual difference between the short-term and the long-term results was minimal.

The last variable included represented the second-order effect of R&D intensity. Similarly to the previous variable the β parameter was negative and statistically insignificant. The research was unable to reject the null of no negative effect of $R\&D^2$ on the change in the market value of equity. Hypothesis 10-2 was not supported. The results of the long-term study are in line with the results obtained in the short term.

The results reported in this sub-chapter allowed for the testing of the hypotheses 5-10-2 related to the conceptual, author's model. The prediction power of innovation-level, innovation-related at company-level and interaction and second-order effect variables above and beyond the effect of the control variables was verified. Furthermore the significance of the single predictors were tested in short and long terms.

Chapter summary

The purpose of the research reported in the present chapter was to indicate and measure the long- and short-term effects of innovation announcements on the market value of equity of tourism enterprises. The research aimed also at verifying empirically the model explaining the relationship between innovation announcements and the market value of equity of tourism enterprises. Not all the research hypotheses were supported but the lack of statistical significance and the opposite findings provide equally interesting insights from the point of view of implications for theory.

The analysis showed the positive statistically significant changes in the market value of equity of tourism enterprises resulting from innovation announcements.

Whilst previous research in tourism was inconclusive in this matter the present findings showed a similarity to the overall findings for the service industry. Innovation announcements turn out to have a statistically significant positive effect on the market value. The research demonstrated that the positive changes in market value resulting from successful innovation announcements are greater in absolute values than the negative changes resulting from the unsuccessful ones. It indicated the generally positive effects of innovation announcements and at the same time their heterogeneity. The results suggest that the assumption of innovation impacting positively on the market value of equity has to be adopted with caution. Such an assumption may not be adopted regardless of the circumstances. The number of announcements resulting in a decrease in the market value of equity indicated the necessity for including predictors in the estimation of the effects of innovation announcements. No evidence supported the existence of leakage and dissemination effects in the period preceding the event day. It was observed that the short term market reaction is adjusted over time. The statistically significant long-term buy-and-hold abnormal returns indicated this. The results play down the role of market efficiency assumptions in analysing the effects of innovation announcements. It turns out that in order to capture the entire impact of innovation announcements a long horizon is required.

In regard to the verification of the author's model 14 hypotheses were tested. It was proven that innovation-level variables predict the changes in the market value of equity above and beyond the effect of the control variables. The inclusion of innovation-related company-level variables into the model caused a statistically significant increase in the coefficient of determination only in the short term. The research did not support the hypotheses on the significance of second-order and interaction effects. The relationship is more complex than the simple modelling would suggest. The precise definition of innovation appears to be a necessity in modelling its effects. Also the analysis may not be detached from the characteristics of the implementing companies. The simplified approaches based on single predictors are likely to produce imprecise results.

In line with the initial prediction the protection of innovation through patents was suggested in both the short and long term. The lack of significance of the patent variable points to the fact that patents should not be overvalued in the case of tourism. The research implies that the focus should be placed on other tools such as licencing and certification. The difficulty of patent activity in tourism stems from the high number of incremental and non-technological improvements.

The research indicated the high positive effects of product innovation. The finding shed light on the perception of different types of innovation by investors.

It turns out that new products and services, which may impact directly on sales revenues, are highly rewarded by the market. The focus of investors on the company's cash flow is in line with the initial prediction. In the case of innovation in tourism the market preferred immediate results to time consuming improvements.

The market seems to reward a high degree of novelty involved in both the short and long terms. In tourism radical innovation is relatively rare in comparison to incremental change and new to the company innovation. The research implies that it may constitute a vehicle of differentiation. The innovation's degree of novelty may be important in analysing the company's position vis a vis their competitors.

The positive effect of the first innovation announcement is stronger than the effects of second and further announcements. For instance it may be related to the highest informative value of the first announcement. It appears that further announcements were solely of a complementary character. The result delivers important insights into analysis focusing on the content of the announcements but requires more research.

In line with the predictions R&D intensive companies experienced higher positive effects of innovation announcements. It seems that the market positively perceives active involvement in innovation activity. Such companies are presumed to increase their chances for successful development and implementation. Also the statistical significance of short-term results indicates the importance of the characteristics of the implementing company from the point of view of investors.

The research demonstrated the lack of statistical significance of the interactions between R&D intensity and innovativeness. It appears that the market considers these two variables separately. The interaction between the input and the output of innovation activities seems to be a complex phenomenon and requires further investigation.

The research demonstrates that no definite conclusion may be drawn on the effect of the source of innovation. In the short term investors reward innovation developed in-house, in the long term they attribute more value to innovation developed in collaborative structures and copied. The research suggests that the nature of the collaboration is the factor differentiating the perception of innovation by investors. It is likely that the collaboration category is internally divided and the different kinds of cooperation with other organisations impact differently on the perception of investors.

Inconclusive results are delivered for the stage of innovation. In the short term the market focuses on the commercialised innovation and in the long term it concentrates on the innovation under development. In the short term the result

was statistically significant which indicates that in the case of non-innovative tourism enterprises investors wait for the confirmation of the company's activities in the form of actual commercialisation. It is probable that the development stage is internally divided and that different levels of advancement impact on investors' perception differently.

The study indicates that the impact of a company's innovativeness is not evident. The short-term positive effects are different from the long-term negative ones. It appears that the simple measure representing the number of past innovation announcements is not sufficient. It is likely that past innovation activity needs to be evaluated through the characteristics of innovation indicated here.

In the long term the results indicate the diminishing marginal effect of R&D intensity, in the short term the effects of squared R&D intensity are the opposite. In both cases the outcomes were statistically insignificant. The intensity of R&D in tourism enterprises is small. It appears that generally tourism companies spend too little on research development to clearly capture the diminishing marginal effects.

Contrary to expectations the research demonstrated the negative effects of CSR in both the short and long term. Whilst the negative effects of the elements of CSR seem counterintuitive they suggest a perception of CSR as superficial. It implies that with regard to CSR activities tourism companies need to be perceived as of low-innovative. In the case of companies demonstrating low innovativeness the actual decrease in the market value of equity resulting from an innovation announcement with elements of CSR should be considered.

In most cases the results were in line with extant literature. The outcomes of the model testing are shown in Table 46.

The results encompassed also statistical analysis. The right skewed distribution of abnormal changes in market value of equity indicated that it was more likely to experience high increase in market value than high loss. The leptokurtic shape of the distribution signified that more variance resulted from infrequent extreme abnormal returns. The total number and magnitude of positive changes in market value were greater than the negative ones. Furthermore it was demonstrated that in the long term companies managing food and beverage serving and other tourism activities experienced higher growth in market value resulting from innovation announcements than accommodation companies. Thus it must be borne in mind that in the long term tourism companies displayed statistically significant differences in changes in the market value of equity which suggests that they do not form a unified group. It seems that there is a premise for treating companies managing different types of tourism activities separately and accounting for the possible differences.

Table 46. Outcomes of model testing

H	Hypothesised effect	Observed effect		Verification status	
		Short term	Long term	Short term	Long term
H1	Positive	Positive (significant)	Positive (significant)	Supported	
H2	Insignificant	–	Positive (significant)	Not supported	
H3	Insignificant	Positive (insignificant)	–	Supported	
H4	Positive	Positive (significant)	Positive (significant)	Supported	
H5	Positive effect on R ²	Positive (significant)	Positive (insignificant)	Supported	Not supported
H6	Positive effect on R ²	Positive (significant)	Positive (significant)	Supported	
H7	Positive effect on R ²	Positive (insignificant)	Positive (insignificant)	Not supported	
H8-1	Positive effect of patent	Positive (insignificant)	Positive (insignificant)	Not supported	
H8-2	Positive effect of CSR	Negative (insignificant)	Negative (insignificant)	Not supported	
H8-3	Positive effect of product innovation	Positive (significant)	Positive (significant)	Supported	
H8-4	Positive effect of radical innovation	Positive (insignificant)	Positive (insignificant)	Not supported	
H8-5	Negative effect of innovation developed in-house	Positive (significant)	Negative (significant)	Not supported	Supported
H8-6	Positive effect of commercialisation stage	Positive (significant)	Negative (insignificant)	Supported	Not supported
H8-7	Positive effect of first announcements	Positive (significant)	Positive (significant)	Supported	
H9-1	Positive effect of R&D intensity	Positive (significant)	Positive (insignificant)	Supported	Not supported
H9-2	Positive effect of innovativeness	Positive (insignificant)	Negative (insignificant)	Not supported	
H10-1	Positive effects of interaction	Positive (insignificant)	Positive (insignificant)	Not supported	
H10-2	Negative effect of R&D ²	Positive (insignificant)	Negative (insignificant)	Not supported	

Source: own development

The purpose and the hypotheses in the present research were based on theoretical concepts but they bear several implications for practical usage. First, the research delivers supportive evidence for managers considering innovation projects in tourism enterprises. In most cases the decision to develop and implement innovation resulted in positive outcomes. Second, it was ascertained that new and significantly improved products should constitute the basis of innovation activities in tourism companies. The communication policy should focus on the first announcement of the innovation as it produces significantly greater market reaction than the second and further releases. Also it seems reasonable to communicate the implementation of an innovation instead of its development as the market rewards highly advanced innovation. Furthermore managers should consider substantial spending on R&D activity as it seems beneficial. It was proved that high spending on R&D in relation to sales generates positive market reaction. Lastly, it seems that in the long term managers should not avoid the development of innovation within collaborative structures.

The research was important due to the research gap concerning the relationship between innovation and the market value of tourism enterprises and theoretically related variables. The research allowed the verification of the author's model by testing all the stated hypotheses. Six of the hypotheses were supported whilst eight of them were not. In the case of four the results differed in the short and long term and thus they were supported only partially. At the stage of data analysis the research did not face any major limitations.

Conclusions

In contemporary economics companies operate in a fast changing environment which forces them to adapt constantly. The never ending development seems to constitute the necessary condition for achieving the ultimate purpose of a company's function – the maximization of shareholder wealth. Company value is the greatest overall measurement of its efficient functioning. Thus numerous approaches to value were created. For public companies the market value of equity changes constantly and is publicly available. Companies actively support the increase in the market value of equity by releasing positive news. In this context the role of innovation announcements is crucial for all companies. Issues concerning innovation are strongly embedded in the current worldwide scientific discussion. However different sectors are unequally represented. The discussion on innovation in low-tech industries and services has received relatively little scholarly attention. Tourism represents both categories. The investigation of innovation in tourism is especially essential for the economy of the European Union as the sector contributes significantly to GDP generation, employment and investment. Increasing the knowledge of innovation in tourism is of vital theoretical and practical importance. Thus it was addressed in the present book.

The research problem in the present book was expressed in the following question: what is the relationship between innovation announcements and the market value of equity of tourism enterprises?

The main objective of the research was to measure the short- and long-term impact of innovation announcements on the market value of equity of tourism enterprises. Research aimed also at creating and verifying empirically the model explaining the relationship between innovation and the market value of tourism enterprises.

The research contributed to the knowledge on innovation in tourism in two ways. First, the author's model representing the relationship was created. Second, the empirical research allowed the measurement of the effects of innovation

announcements and the verification of the significance of the predictors of the market value of equity.

In this research a systematic model-building procedure was applied. It relied on summarizing the existing scientific evidence on the relationship studied in order to build a comprehensive framework whilst also adding the author's propositions of predictors in the next step. In order to build the exhaustive design the method of systematic literature studies SALSA was employed. The study covered the period between 2000 and 2015. It used five scientific databases. The precise four-step procedure including content analysis and meta-synthesis resulted in the indication of two innovation-level, two firm-level innovation-related and five control variables important in the context of the relationship studied. Seven theoretically related predictors proposed by the author complemented this sound conceptual framework. In total the model accounted for eleven predictors: patent, CSR, type, degree of novelty involved, source, stage and the communication of innovation, R&D intensity and the innovativeness of the implementing company, squared R&D intensity and the interaction between R&D intensity and innovativeness. It covered also 8 control variables: industry, size, volume, total cash dividend, operational experience, leverage, return on equity and growth.

The empirical research covered all the tourism enterprises listed on the main markets of the most important stock exchanges in the European Union in the period between February 2011 and February 2016. There were 111 such companies. The abnormal changes in the market value of equity resulting from innovation announcements of tourism enterprises constituted the subjects of analysis. Content analysis of the 9,000 innovation announcements resulted in creating the sampling frame of 985 releases referring to innovation consistent with the definition adopted in the present research. The research was performed on the representative sample of 398 observations.

As Berk et al. state the total market value of a firm's equity equals the number of its shares times their current market price [2014]. If the number of shares is constant the change in their price becomes the right proxy for the changes in MV [Damodaran 2012]. In the present study the abnormal change in the market value of equity constituted the dependent variable. In line with the above considerations and previous research it was operationalized as the abnormal return. It was calculated in the short and the long term. In the short term the event-study method was employed. In the long term the buy-and-hold abnormal returns method was used. The expected returns in the short-term study were computed using the Carhart four-factor model [1997]. The abnormal returns were cumulated over the event windows and standardised which led to more powerful tests.

The statistical significance of the changes in the market value of equity was tested using the Z-test and the two groups difference of means test.

In order to test the author's model response surface regression and hierarchical regression were employed. The first one relies on introducing higher-order and interaction effects. The second one allows the testing of scientific hypotheses on the significance of particular predictors by building successive regression models, each adding new variables. The statistical analysis of the changes in the market value has hardly been reported in previous research. Such a study was performed here. It included the methods of descriptive statistics: central tendency, dispersion, skewness and peakedness.

The first result of the empirical research reported in the book is the indication of the positive relationship between innovation announcements and the market value of equity of tourism enterprises. In the short term the effect concentrated in the event windows directly surrounding the event. In the ± 1 day event window, the statistically significant increase in market value of equity was 0,38%. In the 6-months period it was 3,94%.

The outcomes demonstrated that the initial reaction to the innovation news was adjusted in time. In the short term the market tended to undervalue the announced innovation. The difference in short- and long-term changes in the market value of equity and the statistical significance of the second suggested that the investors did not incorporate the new information immediately and fully. It means that the assessment of the effects of innovation announcements on the market value of equity of tourism enterprises should be considered over a longer period.

The research did not deliver supportive evidence for the existence of leakage and dissemination effect. The significant changes in MV occurred in the period following the announcement. The fluctuations of market value of equity in the two days directly preceding the release and in the $-6/-1$ day event window were statistically insignificant. There is a small risk of significant fluctuations resulting from investors' aggressive trading prior to the announcement and unwinding part of the acquired position after it.

The positive effects of successful innovation announcements were greater in number and magnitude than the negative effects of unsuccessful ones. The difference was statistically significant. In the ± 1 day event window a typical change in market value of equity fell between 1,92% and $-1,5\%$. In the half-year period the typical area of variability ranged between 16,07% and $-8,95\%$. The distribution of changes in the market value of equity was right-skewed. It indicated that it was more probable to experience a high positive change in the

market value of equity than to experience high loss. The leptokurtic character of the distribution showed that more variance resulted from infrequent extreme abnormal returns.

The heterogeneity of the changes in the market value of equity required further explanation. In order to study the relationship between innovation announcements and the market value of equity of tourism enterprises the author's model was tested. The statistical significance of the groups of predictors and of the single predictors was verified.

The outcomes of the analysis performed with the use of hierarchical regression indicated that innovation-level variables predict the changes in the market value of equity above and beyond the effect of the control and innovation-related company-level variables. The company-level innovation-related variables increased significantly the model's predictive power in the short term.

In line with the initial hypothesis the research demonstrated that the effect of product innovation on the changes in market value resulting from innovation announcements was greater than that of other innovation types. New products may directly increase sales and impact positively on the company's cash flow. Furthermore it pointed out the positive effect of the first innovation announcement in relation to second and further releases. The informative value of the announcements beyond the first one was relatively small and caused little market reaction. In the context of market reactions the delivering of new information is essential. Moreover it was ascertained that in the short term the market rewarded the high advancement of the announced innovation and the high R&D intensity of the announcing company. In the case of hardly innovative tourism enterprises the market responded slightly to the development news and waited for the proof in the form of the innovation introduction. The high level of R&D intensity allowed tourism companies to differentiate themselves and increase innovative capabilities which was positively perceived by investors. In the long term investors acknowledged the positive effects of developing innovation in collaborative structures as it allows companies to benefit from the experience of collaborators and diminishes the risk.

Furthermore the research delivered some inconclusive indications typified by the statistically insignificant results. The market positively received patented innovation in comparison to the non-patented one but the effect of such protection was relatively small. Patents are especially important for highly advanced technological innovation which is rare in tourism. Besides investors seemed optimistic about the innovation's degree of novelty involved. In line with the hypothesis they rewarded radical innovation as it carries higher potential benefits

but the result was statistically insignificant. In the case of tourism dominated by minor upgrades investors treated radical innovation carefully and followed the “high risk – high return” strategy to a small extent. In line with the prediction in the long term the market seemed to reward highly R&D intensive tourism companies but the result was statistically insignificant.

Moreover the research did not deliver supportive evidence for the existence of the second-order effect of R&D intensity and the interaction between R&D intensity and innovativeness. The inclusion of such variables did not predict changes in the market value of equity above and beyond the effect of the control variables. In the long term the diminishing marginal returns to R&D intensity were suggested but the effect was statistically insignificant. It may result from the level of expenditure on R&D in tourism which is too low to strongly advocate the diminishing marginal returns.

In addition to the above outcomes the research delivered some unexpected results. It seemed that innovation without the elements of CSR was perceived better than innovation carrying such elements. The results were statistically insignificant. First, the CSR elements may have been perceived as superficial. Second, some previous research suggested that in non-innovative companies the concentration on social responsibility instead of enhancing innovativeness leads to a decrease in consumer satisfaction and in turn in market value [Luo and Bhattacharya 2006]. It seems to be the case in tourism.

The number of innovation announcements released within a year before the event day did not have any impact on the reaction to the current announcement. Investors did not perceive companies reporting numerous innovations better. In the case of tourism enterprises it may result from the relatively high number of minor upgrades. It seems that their implementation did not guarantee the perception of the company as innovative. Each innovation announcement was evaluated irrespectively of such defined innovativeness. The results were statistically insignificant.

The research did not deliver the supportive evidence for the market to reward the reported high advancement of innovation in the long term. The results were inconclusive due to their statistical insignificance. The research indicated that in the long term the stage of innovation at the moment of release was less important than in the short term. One possible explanation is that the period of six months following the development release might cover also the actual implementation.

In the short term the effect of innovation developed in-house on the changes in market value resulting from innovation announcements was minimally greater

than that of innovation from other sources. The calculated parameter and thus the actual difference were small. In the long term investors did not appreciate tourism companies' own efforts.

The research question was positively answered by indicating the positive impact of innovation announcements on the market value of equity of tourism enterprises. Based on the empirical study all the hypotheses were verified. The study was burdened with several limitations. The research relied on specialist databases. As far as data accessibility is concerned the small amount of information inaccessible through databases required it to be collected directly from companies. Moreover the choice of linear regression modelling might not necessarily allow the capture of all possible effects. Besides which although the advantages of covering the period of relative stability have been discussed in the book the determination of the time frame prevents the generalisation of results in a period of major economic downturns. The research covered comprehensive announcements reporting innovation consistent with the definition adopted. As discussed in the book such an approach offered numerous benefits. However the omission of imprecise, incomplete and partial releases may be considered a certain limitation as this kind of information may also stimulate market reaction to some extent.

In the light of the results of the present research it seems that a promising direction for further research is the in-depth, qualitative analysis explaining why and how the predictors influenced the market value of equity. It should cover the reasons behind the statistical significance of the predictors demonstrated in this research. Also the growing potential of alternative trading systems suggests the need for the replication of the study in this context. It is especially important for tourism enterprises which are mainly relatively small. Furthermore it seems important to compare the effects of innovation on tourism companies with the effects on other low-tech companies. It could deliver insights into the discussion on the specificity of tourism companies. In the light of the results obtained in this study it seems necessary to deepen the research on the interaction between innovation and corporate social responsibility. The qualitative analysis of the possible synergic effects appears to be a valuable course for further investigation. Value is the most comprehensive measure of company activity. However it is not the only one especially since companies in different periods may pursue different strategies (e.g. profit maximization). The effects of innovation on different financial measures seem to be an important direction for further research.

The research contributed to the current scientific discussion on innovation in services with special regard to innovation in tourism. It complemented the

broader knowledge on the efficiency of capital markets by providing a conceptual overview and empirical evidence. The research introduced the author's model representing the relationship between innovation announcements and the market value of equity of tourism enterprises. Thus it added to the understanding of the predictors of the market value of equity. The research was based on a representative sample and provided firm support for previous research indicating the positive effects of innovation on tourism companies.

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Appendices

Appendix 1. Search procedures in the context of tourism and services

Table A1. Search procedure. Step 1

Innovation			
	Tourism	Hospitality	Travel
Market value	6	2	4
Firm value	7	3	0
Stock price	1	1	3

Source: own development

Table A2. Search procedure. Step 2

Improvement			
	Tourism	Hospitality	Travel
Market value	11	5	13
Firm value	1	1	1
Stock price	0	1	3

Source: own development

Table A3. Search procedure. Step 3

Modernisation			
	Tourism	Hospitality	Travel
Market value	0	0	0
Firm value	1	1	0
Stock price	0	0	0

Source: own development

Table A4. Search procedure. Step 4

Innovation		
	Services	Service industry
Market value	100	4
Firm value	26	0
Stock price	20	0

Source: own development

Table A5. Search procedure. Step 5

Improvement		
	Services	Service industry
Market value	88	1
Firm value	14	2
Stock price	31	0

Source: own development

Table A6. Search procedure. Step 6

Modernisation		
	Services	Service industry
Market value	11	0
Firm value	4	0
Stock price	2	0

Source: own development

Appendix 2. Systematic literature study on the classification of innovations

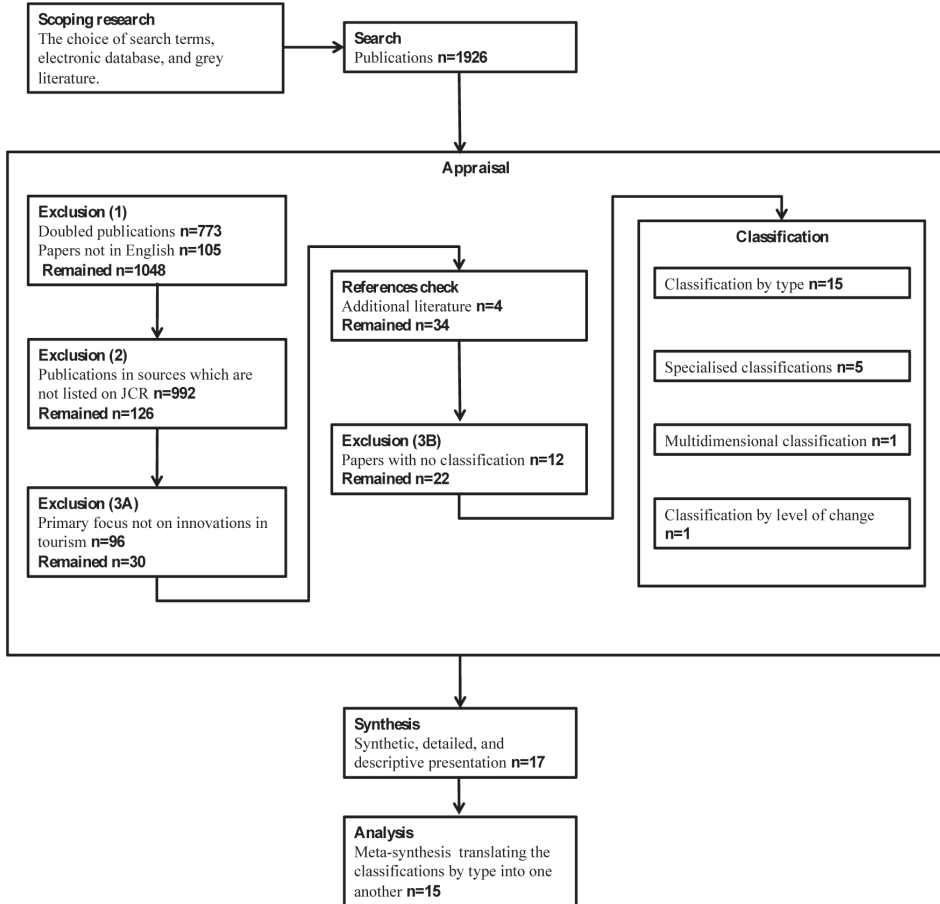


Figure A1. Systematic literature study concerning the types of innovation in tourism

Source: own development



Dawid Szutowski Ph.D. is a research scientist with significant research experience in economics and finance. He is also a business practitioner providing businesses with advisory and operational assistance in R&D and innovation management. He focuses much of his research on the relationship between innovation and market value and its implications for company management. He is a prolific author, having written a book and published more than 40 articles in academic journals. Two-time recipient of the Academic Doctoral Scholarship from the Polish National Bank, he was also awarded three half-year international scholarships at: Université de Picardie Jules Verne, France; Nanjing University School of Business, China and Okan Üniversitesi Istanbul, Turkey. He was an investigator and principal investigator in two international research projects and the head of a research grant on the impact of innovation on the market value of hospitality enterprises. Currently, he focuses on the financial management of innovation in European companies.

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