LUND UNIVERSITY
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Risk Preferences of Management Generations

AN EMPIRICAL ANALYSIS OF RISK BEHAVIOUR AND ITS IMPLICATIONS ON STRATEGIC MANAGEMENT

by

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2 June 2019

Degree Project, 15 credits (ECTS)

Master's Programme in International Strategic Management

Acknowledgements

We would like to thank all involved for their support of this study. First of all, we would like to thank our supervisor Ulf Ramberg for his support and guidance in writing this thesis. We appreciate the time he devoted to this work and are very grateful for the fruitful discussions. Moreover, we are also very grateful for the time our questionnaire participants have invested in making this study possible. Their input was extremely valuable and essential to make this study happen.

Abstract

Title: Risk Preferences of Management Generations - An Empirical Analysis of Risk Behaviour and its Implications on Strategic Management

Course: BUSN09 Business Administration: Degree Project in Strategic Management, Graduate level, 15 ECTS

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Key words: Risk Preferences, Generation X, Millennials, Generation Z, Risk Attributes, Risk-Taking, Strategic Management, Prospect Theory, Organizational Risk, Decision-making Under Risk

Purpose: The purpose of this paper is to examine the risk preferences of current and future management generations and its implications for strategic management.

Methodology: A quantitative research strategy has been chosen in order to fulfil the purpose of this study. The data collection has been gathered primarily through surveys and complementing secondary data. Subsequently, the gathered data has been analysed applying a deductive approach by using concepts of pattern matching and explanation building based on existing macroeconomic trends and literature.

Theoretical perspectives: The theoretical foundation of this study is based on Kahneman and Tversky's (1979) Prospect Theory. The theory postulates that individuals evaluate choices between alternative prospects based on perceived gains or losses in respect to a certain reference point, rather than to net asset levels. The framework is further set into context to the concept of risk.

Empirical results: The empirical results presented originate from 155 surveys completed by people of different age, gender, educational background and managerial experience.

Conclusions: We discover that male millennials are significantly more risk tolerant than any other generation-gender combination. Thus, our results suggest that not only age but also other characteristics such as gender, education and experience are attributable to certain risk preference tendencies. Our empirical results serve as the basis for the composition of top management teams and for systematically influencing managerial risk behaviour in order to effectively managing uncertainties and generating competitive advantages as a firm.

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List of Abbreviations

BE	Behavioural Economics
ISO	International Organization for Standardization
PT	Prospect Theory
TMT	Top Management Teams

1 Introduction

In the first chapter, background and problematisation are described in order to form a contextual understanding and thus the basis of this thesis. Following that, objective and purpose are defined, which then results in the research question. Delimitations are briefly presented and are followed by the outline of the thesis to complement this chapter.

1.1 Background

1.1.1 Risk and Survival

Risk and survival went hand in hand for much of human history. The lives of prehistoric humans were short and brutal, as searching for shelter and food left them physically vulnerable to prey and harsh weather. However, for much of early history, physical risks were often accompanied by material rewards (Damodaran, 2007). The risk-taking caveman got food, and the risk-averse ones starved to death (ibid.). While much of the risk to which people were exposed in prehistoric times was physical, thousands of years later the evolution of trading and financial markets has allowed physical and economic threats to be separated (ibid.). Since then, risk-taking and coping with uncertainties in competitive environments have been inherent to every business. In fact, they are the cornerstone for creating entrepreneurial progress and corporate value (Andersen, Garvey & Roggi, 2014).

1.1.2 Managerial Risk Taking and Strategic Management

Managerial risk-taking constitutes a central aspect of strategic management research (Pablo, Sitkin & Jemison, 1996; Pablo & Sitkin, 1992) and is one of the primary objectives of firms operating on an international level (Ghoshal 1987). It is inevitable that top managers in the business world will be confronted with uncertainty about organizations. Indeed, a managerial strategy would be of little value if it did not take into account the risk associated with such uncertainty (Hoskisson, Chirico, Zyung & Gambeta, 2016). In this context, the behaviour of

managers in taking on risks can ultimately affect the organisational risk, which is usually captured in the variance of the company's future income stream (Nickel & Rodriguez, 2002). Accordingly, the importance of managerial risk-taking must not be taken lightly, neither in theory nor in practice (Hoskisson et al., 2016), as the most recent deep recession demonstrate. This incident shows the dramatic repercussions that managerial risk-taking can have on businesses and the global economy, as the inadequate managerial risk-taking at Lehman Brothers, resulted in the largest-ever bankruptcy in U.S. history and initiated a global recession (Siepel & Nightingale, 2014). This perception is further supported by Tang and Zhen (2009), who stress the importance of considering managers' risk preferences as their strategic decisions directly determine the survival of companies.

Against this background, business activities must both be protected and improved against the risks and unpredictable disasters that might occur in an uncertain and unknown future. Hereby, proactive risk-taking is a prerequisite for effectively managing uncertainties and unpredictable conditions to shape corporate value for the future.

1.1.3 The Need for Risk-Taking in the Era of Digital Globalisation

Already Bettis and Hitt (1995) noted that the competitive landscape is evolving due to the effects of faster technological change and the introduction of new technologies in knowledge-intensive industries. Today's more rapidly digital world of globalisation is changing who participates, how business is done across borders, how fast competition evolves, and where the economic benefits flow (McKinsey & Company, 2016). Resulting from these development trends, the business environment is confronted with an increasing degree of risks and uncertainties as well as a decreasing ability to forecast future competitive conditions (Andersen, Garvey & Roggi, 2014). The mixture of changing dynamics within such complex systems can lead to non-linear and largely unpredictable outcomes, which are reflected in a general trend towards higher levels of environmental uncertainty and unpredictability that businesses must be able to cope with (Perrow, 2011). As such circumstances become a vital aspect of the competitive reality, management must be able to prepare their company for dealing with them (Andersen, Garvey & Roggi, 2014). The convergence of globalisation and digitalisation, therefore, requires business leaders and policymakers to re-evaluate their strategies (McKinsey & Company, 2016). This, however, cannot be tackled by protecting against adverse

environmental impacts alone but requires a willingness to take proactive risk initiatives as competitive advantage has to be obtained through a process of continuous risk-taking over potential new benefits (Chatterjee, Wiseman, Fiegenbaum & Devers, 2003). In fact, it is risk-taking that creates economic added value and forms the basis for survival (Andersen, Garvey & Roggi, 2014).

1.2 Problematisation

1.2.1 A New Generation of Risk-Averse Management

As Strauss and Howe (1991) propose, important historical events and societal changes can affect individuals in their formative years at the time of these events, and create different behavioural and psychological profiles for each generation. Accordingly, a generation's adolescence and young adulthood play a crucial role in developing their characteristics, values, and preferences (Young & Hinesly, 2012). Thus, a particular generation, which can also be referred to as *cohort,* is associated with distinct unique values and priorities that can persist throughout its lifetime (Jackson, Stoel & Brantley, 2011).

Today's management is mainly represented by three different generations. The largest living generation at present is the *Millennial* cohort (those aged between 25 and 35), which are the children of the Baby Boomers (aged between 52 and 70) and the younger siblings of the *Generation X*ers (aged between 36 and 51) (BlackRock, 2018). *Generation Z* is referring to those people who were born in the decade after the widely spread rise of the World Wide Web, from the mid-90s to the early 2000s (aged younger than 25) (BlackRock, 2018). Accordingly, Generation X represents more senior managers, while Millennials (also called Generation Y) represent the vast majority of prospective and young managers, followed by the so-called *Generation Z* (younger than 25) which will define the next generation of management.

Generation X

Generation X experienced great changes in their formative years, such as major social developments and revolts against the system, parents and cultural traditions (Kupperschmidt, 1998). Generation X is considered to be a cynical, materialistic generation without work ethic and unable to compete with the economic performance of their baby boomer parents (ibid.). As employees they are considered to be more loyal to individuals rather than to their company,

since they believe that firms cannot give employees the sense of security which creates loyalty (Sirias, Karp & Brotherton, 2007). In addition, Generation X is described as reactive, which results in a tendency to have low self-esteem and behaving risk-seeking (Reisenwitz & Iyer, 2009). This is also mirrored in Bauer, Collins and Richardson's (2001) study observing that Gen-Xers are found to be more willing to make risky investments than Millennials.

Millennials

In contrast to Generation X, Millennials can be characterised quite differently. Howe and Strauss (2003) argue that Millennials often struggle with independent thinking, decision-making, and risk-taking out of fear of making mistakes, as a result of having been sheltered, protected, and simultaneously pressured by their parents to succeed. Moreover, millennials are believed to have a high need for structure with a low tolerance for ambiguity (Bell, Connell & McMinn, 2011; Dickerson, 2007) and are, therefore, highly risk-averse (Sharf, 2014). In this context, a study conducted by Legg Mason (2018) disclosed that 85% of millennials considered themselves "conservative" when it came to risk tolerance in investment decisions, while a majority subset of that group described themselves as "very conservative." To put this into perspective, less than a third of the baby boomers surveyed posed as very conservative investors (ibid.). Further supporting the notion of risk-averse behaviour in investment decisions, BlackRock (2018) researchers report that in 2018, Americans hold an average of 58% of their assets in cash. This figure is 65% for millennial cohorts, which is significantly higher than the cash allocation for older age groups - Generation X (59%) and baby boomers (54%). Concluding, although believed to be innovative and team-oriented, Millennials may be significantly more risk-averse than previous generations (Krishna, 2018), which is why the influence of risk on this generation's decision makers might be significantly influenced.

Generation Z

Generation Z also referred to as "iGen", "Net Generation" and "Digital Natives" is affected the most from the changes in daily life caused by new technological trends, such as digitalisation (Jones & Shao, 2011; Twenge 2017). For simplicity reasons, Generation Z will in the following be referred to as *iGen*. Millennials and iGens share many common characteristics, especially a strong understanding of technology and a certain level of comfort with the global world. Nonetheless, iGens are likely to show some substantial behavioural deviations from Millennials due to their age in times of economic recession (Wood, 2013). Like their Generation X parents, iGen is considerably influenced by growing up in economically difficult times (ibid.). As a

consequence, character and mindset of iGens are different compared to previous generations (Novkovska & Serafimovic, 2018). Studies from both the recessions around the Great Depression and the 1970's find that children who grow up in recessions are often less self-confident, 'settle down' in low-paid jobs and are more afraid of financial difficulties (Wood, 2013). Following this, iGens are less optimistic about economic opportunity and, as a result, like to play it safe (Griffin, 2018). In line with this, Twenge (2017) concludes that iGen's expectations are generally lower and that they are not as confident as previous generations. Consequently, this cohort is considered to be very sensitive towards various economic and social risks and believed to be generally more risk-averse in certain areas than Millennials (Williams, 2014). However, this risk assessment has so far been based mainly on alcohol consumption (Strauss & Howe, 1991), participation in transport and day-to-day situation assessments (Williams, 2014) and is therefore subject to further discussions.

1.2.2 Risk Behaviour Altering Developments

Besides the generations related shift of risk preferences, other recent developments in times of digital globalisation can be observed that are subject to the discussion about influencing risk behaviour in companies. The most significant, namely increasing gender diversity in top management, increasing higher education, and the shift of required managerial capabilities will therefore be elaborated in the following.

Increasing Gender Diversity in Top Management Teams

The focus on women in management positions has risen again in recent years (Hillman, Shropshire & Cannella, 2007; Jurkus, Park and Woodard, 2011; Melero, 2011). While women continue to be under-represented as top managers and CEOs (ibid.), they account for almost 39% of all individuals employed in management occupations (Bureau of Labor Statistics, 2013), and the number of Fortune 500 companies with female CEOs has reached a historical peak of 33 (Sahadi, 2019). In this context, there is omnipresent, consistent research on gender differences in risk-taking in various contexts (e.g., lotteries, alcohol behaviour, prisoner's dilemma), which concludes that differences in strategic settings are at least partly due to gender differences in risk preferences and attitudes. The basic premise here is that women are more risk-averse than men (Byrnes, Miller & Schafer, 1999; Charness & Gneezy, 2012).

Increasing Higher Education

The current academic revolution is unprecedented (Altbach, Reisberg & Rumbley, 2019). Globalization has profoundly influenced higher education as to the extent, that information and communication technologies have created a universal vehicle for immediate access and simplification of scientific communication, the phenomenon of "massification" can be observed (ibid.). In this context, the European Commission has defined the "Europe 2020 Strategy" with the education target of achieving 40% of the 30-34-year-olds who have completed tertiary education by 2020 (European Commission, 2019). Mass higher education has developed into a global phenomenon, with enrolments rising from 100 million to 150 million in only one decade (Altbach, Reisberg & Rumbley, 2019). Against this background, researchers (e.g., Dwyer, Gilkeson & List, 2002; Grable, 2000; Jianakoplos & Bernasek, 1998) have found that the level of education is influencing the level of risk tolerance.

The Shift of Managerial Capabilities

Globalization and increased competitive pressure are redefining leadership and management (Taborda, 2000). As a consequence, more agile and flexible structures require managers to be moderators rather than controllers (ibid.). Following this, a new set of managerial capabilities is needed. While prior research suggests experience of decision makers seems to be a main mediator of risk behaviour (e.g. Dyer, Kagel & Levin, 1989; March & Shapira, 1987; Slovic, Fischoff & Lichtenstein, 1980), this development suggests that there will be a shift of the experience effects on risk behaviour, as managers might be less able to selectively focus on the evidence of their past ability to overcome obstacles, which according to March & Shapira (1987) promotes risk-accepting behaviour.

Taken together, prior research suggests that there might be a significant shift towards increased risk-aversion in young and future management generations. Moreover, current macroeconomic developments represent additional driving forces which are believed to further affect managerial risk behaviour and personal risk preferences. Since managerial risk-taking is core to ensure corporate survival by effectively coping with uncertainties and creating competitive advantage, the analysis of different managerial risk preferences, their influence factors, and development trends is seen as of central importance.

1.3 Objective and Purpose

The study seeks to empirically assess personal risk preferences, representing various individuals of Generations Y, X, and Z. This is done by taking one of the predominant research streams of decision making under risk, namely Kahneman and Tversky's (1979) Prospect Theory (PT) as a basis for the conducted study design.

Thus, **the purpose of this thesis is to examine the risk preferences of our current and future generation of managers and its implications for strategic management**. With this approach, we seek to assess whether their risk behaviour matches the growing challenges businesses are facing in times of digital globalisation, as proactive risk-taking is a prerequisite for effectively managing uncertainties and unpredictable conditions. In this context, we do not only intend to showcase the practical relevance of prospect theory for strategic decision making but also to contribute to the theory by providing empirical data on the correlation of risk-related attributes of the investigated sample groups. Finally, the results are used to derive implications for strategic management by interpreting the collected data against the latest trends in the global economy.

1.4 Research Question

To fulfil this purpose, the following research question shall be investigated and answered:

Which risk-taking behaviour can be observed among different generations? Which attributes thereby characterize individual risk preferences and based on this, which implications can be drawn for strategic management considering current economic trends?

In more detail, our empirical study is led by the following sub-questions:

- How do Generation X, Generation Y (Millennials), and iGens differ concerning their risk behaviour?
- Are there any general attributes (gender, age, educational background, managerial experience) that characterize risk takers or risk averters?
- How are these attributes affected by determinants described in prospect theory?

1.5 Delimitations

To provide the reader with a better understanding of the study's constraints, delimitations are set and elucidated in the following.

Sample Group

First, the conducted study primarily focuses on risk-taking behaviour of the Millennial generation (between 25 and 35 years old) and iGen (up to 25 years old). This is believed to mirror a comprehensive picture of young (Millennials) and future (iGen) managers and decision makers in today's business world. Second, the sample group mainly constitutes of people with European origin as we had easy access to national representatives on the one hand and aim to derive implications for mainly this region on the other. Third, the survey participants are mainly individuals with a high level of educational attainment. Therefore, only differences between subjects with an educational background in management sciences and those of other academic fields can be explored. Accordingly, a distinction between individuals with and without higher education cannot be made and therefore further diminishes observable differences of the comparison groups.

Risk Determinant Assessment with Prospect Theory Focus

Our study's focus on different risk preferences is based on Kahneman and Tversky's (1979) Prospect Theory. Therefore, prior studies conducted in this research stream have served as a basis for our survey design. Due to this fact, risk determinants which have been identified in other research streams have not been considered in this study. Therefore, our primary focus lies on risk influencing factors which Pablo and Sitkin (1992) describe as *individual* and *problem characteristics*. *Organizational characteristics* on the other hand, which according to Pablo and Sitkin (1992) deal with risk behaviour determinants defined by group compositions, cultural risk values (Douglas & Wildavsky, 1982; Hofstede, 1980), leader's risk orientation (Jackofsk, Slocum & McQuaid, 1988; MacCrimmon & Wehrung, 1986; Nutt, 1986; Schein, 1985) and organizational control systems (March & Shapira, 1987) were not in scope of this thesis.

Generalizability of Risk Preference Assessment Through Hypothetical Scenarios

The study's assessment of individual risk preferences is based on hypothetical scenarios of which most refer to risky choices concerning monetary outcomes. This poses the question to

which extent observed risk-taking behaviour in such financial choice scenarios can be generalized with respect to risk-taking behaviour in other situations. These scenarios bear the disadvantage of being hypothetical and comparing very different circumstances (MacCrimmon and Wehrung, 1990). Moreover, the self-rating characteristic of such scenarios even though offering the benefit of having people make a direct assessment, encounter the risk of misperceptions and misrepresentations that such assessments allow (ibid.). On the other hand, however, standardized and naturally occurring situations offer the advantage of being common across subjects and being based on solid theory, as well as real choices actually made by people. Levy (1992), therefore, concludes that risk-taking behaviour in hypothetical scenarios relating to risky decisions about monetary outcomes can be generalised to other forms of risk-based decision-making.

1.6 Outline of the Thesis

This thesis consists of five main chapters. Chapter one provided a general background, as well as the problematisation, research question, and the delimitations. Chapter two entails a comprehensive review of the existing literature within the field of risk and prospect theory. In the subsequent chapter three, a thorough introduction of the methodology, including the line of actions taken for the research process are presented and elaborated. Chapter four presents the results of the conducted research. Finally, chapter five completes the study by analysing and discussing the empirical results, elaborating on the research limitations, and ultimately presenting the conclusion, which entails the main findings, implications, and future research.

2 Theoretical Framework

This chapter illustrates the theoretical skeleton on which the thesis is based. The first part consists of an in-depth overview of the concept of risk, including definition, managerial risk-taking as central aspect of strategic management, and determinants of risk-taking behaviour. The second part provides a brief overview of Prospect Theory as the underlying basis for the following analysis of individual risk preferences.

2.1 Risk

2.1.1 Definition of Risk

The definition of risk has long been the subject of controversy and confusion (Fischhoff, Watson & Hope, 1984). Since the 18th century, the concept of risk is closely connected to the idea of unfavourable events (Smith, 1776). The first instances of risk in the business sphere occurred in the early twentieth century (Borghesi & Gaudenzi, 2013). Borghesi and Gaudenzi (2013), argue that the purpose of research was to identify techniques and procedures for the detection, measurement, and handling of risk in business decisions. At the beginning of the twentieth century, Knight (2012), Leitner (1915), Oberparletier (1930), Stadler (1932) and Willet (1901) were the first who considered risk as an independent subject of study. They classified ‘risk’ into the concept of measurable uncertainty, which is described as a (partial) lack of information of a system under consideration (Borghesi, 1979; Rowe, 1977).

Classical decision theory, on the other hand, defines risk as “the variance of the probability distribution of possible gains and losses associated with a particular alternative" (March 1987, p. 1404). In contrast, organizational researchers declare this to be an inadequate description that does not mirror how managers perceive risk (Camerer, MacCrimmon, Wehrung & Stanbury, 1988; March & Shapira, 1992). According to Camerer et al. (1988), and Yates and Stone (1992), risk can be understood as "the possibility of loss" (1992, p. 4), adequately matching the perspectives of managers in an organisation (Chiles & McMackin, 1996). These general concepts are adopted within an international and segmented view by the International

Organization for Standardization (ISO). In 2009, ISO defined risk as to the "effect of uncertainty on objectives". An effect may be positive, negative, or a deviation from the expected value and risk is often characterized by an event, a shift in circumstances or a consequence (ISO Guide 73: 2009, 2009).

2.1.2 The Ambivalent Nature of Risk

In line with managers' perception of risk as mostly associated with the possibility of loss (Camerer et al., 1988; Yates & Stone, 1992), the definition of risk as a mixture of danger and opportunity stresses on the notion, that in business life an opportunity is always associated with danger or threats (Andersen, Garvey & Roggi, 2014). However, risk represents both upward potential and downward risks, which is based on the fact that consequences of risky decisions can be considered either losses or gains, whereby in the presence of competitors, the loss by one entity may be inversely the gain by another entity (Borghesi & Gaudenzi, 2013). In this vein, Bannister and Bawcutt (1981), Carter (1979), Dickinson (2001) and Mowbray, Blanchard and Williams (1979) have defined risk by elaborating on the *dual character of risks*. According to them, risk is capable of producing alternatively either losses or gains e.g., through decisions and occurrences that have monetary consequences. The consequences of risk may be clustered as either negative, positive, or could lead to uncertainty (Borghesi & Gaudenzi, 2013; Rowe, 1977). While this is true in the case of two competing poker players, where it is evident that the gain by one player equals the loss of the other, this can also apply in socioeconomic contexts, such as running a business (Borghesi & Gaudenzi, 2013).

In summary, where there is a downside, there is an upside and vice versa. Booms and busts will keep coming and going, and robust companies must prepare for both (Andersen, Garvey & Roggi, 2014). Managers who are willing to take risks master risky situations with prudence and try to proactively deal with risks in good as well as bad times (ibid.). So while we call risk a general concept with many nuances, our perception of risk in this thesis is based on both opportunities and threats, ups, and downs.

2.1.3 Risk-Taking as a Central Aspect of Strategic Management

Risk is an essential attribute of all strategic decisions, as there is a degree of uncertainty inherent in every decision outcome while some outcomes are more preferable than others (Pablo, Sitkin & Jemison 1996; Pablo & Sitkin, 1992). The significance of risk for decision-making is underlined by its position in decision theory (Allais 1953; Arrow 1965), its status in managerial ideology (Peters & Waterman 1982), and the growing interest in risk assessment and management (Crouch & Wilson 1982). Risk-taking is, therefore, a crucial element of strategic management.

Risk-Taking and Competitive Advantage

Especially in times of rapid changes in technology and consumer preferences, a company's competitive advantage will depend less on breakthrough strategies than on coping with the uncertainty that arises from such environmental conditions (D'Aveni & Gunther, 1994; Chatterjee et al., 2003). The reason for this is that increasing competitive pressure and environmental changes combined will weaken downstream competitive advantages over time (Chatterjee et al., 2003). In other words, advantages resulting from product design, quality, and price, for example, need to be continuously replaced by new advantages for a company to defend its competitive position. Against this background, businesses need to continually look for new sources of advantage by taking continuous risks (ibid.). Through strategic risk-taking, companies discover opportunities to gain a competitive advantage over competitors. Thus, ongoing strategic risk-taking constitutes the permanent selection of strategic investments in potential new competitive advantages that come with significant uncertainty about their actual value. Such a steady pick of new strategic investments, thus either consists of the search for new revenue sources or new benefits to protect existing revenue sources (ibid.). Consequently, competitive advantage is created through a process of continuous risk-taking over potential new advantages (ibid.).

Risk-Taking and Firm Risk

When managers choose between strategic options on behalf of the company, they select between investments with different risk-return characteristics, hence, strategic decisions are those that consist of two factors influencing the future income stream of business. First, the expected cost of the initiative and, second, the expected return on the initiative (Chatterjee et al., 2003). This implies that choosing a strategic investment from the opportunities available to

a company eventually influences uncertainty about its future revenue stream. Thus, strategic decisions and managerial risk-taking go hand in hand, to the extent that they involve the selection of investments that have both risk and return characteristics. Taken together, the risk-return properties of the selected investments form a portfolio of risk (and return), which forms the corporate risk (ibid.).

In this context, the relationship between risk and return has been discussed by researchers in business administration, economics, and finance (Pablo, Sitkin & Jemison, 1996). Conventional economic wisdom suggests that risk and return are correlated in a positive way (Brealey & Myers, 1981). Nevertheless, risk since the 18th century has been predominantly associated with unfavourable events (Smith, 1776). In fact, managerial risk-taking can go wrong. For instance, the adverse performance effects of many acquisitions have been a source of concern (Haleblian, Devers, McNamara, Carpenter & Davison, 2009). Besides, unethical behaviour associated with risk-taking result in companies experiencing significant reputational damage or performance volatility (Baucus & Near, 1991; Harris & Bromiley, 2007; Mishina, Dykes, Block & Pollock, 2010; Troy, Smith & Domino, 2011; Zhang, Bartol, Smith, Pfarrer & Khanin, 2008). Nonetheless, it is vital to recognise the central importance of risk-taking, as proactive management of emerging risk events can create new opportunities. In this context, Knight (2012) already pointed out that such uncertain threats are a prerequisite for achieving excessive economic returns and consequently may stimulate economic growth and value creation. Concluding, the acceptance of uncertain conditions and the attempt to cope with them as part of a core business will boost the drivers of economic growth (Andersen, Garvey & Roggi, 2014). Accepting and dealing with uncertainties by taking risk is thus crucial to seizing new opportunities with the potential to generate higher returns (ibid.).

2.1.4 Determinants of Risk-Taking Behaviour

As demonstrated in a broad field of research, risk influences decision-making behaviour by shaping the perception of the decision-making situation, the assessment of alternatives, decisions made and other decision-related actions about risk (Hoskisson et al., 2016). Accordingly, one must understand how managerial risk preferences are formed in order to understand how strategic choices involving risk are made on behalf of the firm (Chatterjee et al., 2003). For a considerable time, scholars have been studying the factors that influence decision-making behaviour of individuals in risky contexts (e.g., Hogarth, 1987; Kahneman &

Tversky, 1979), which will be referred to as *risk behaviour* in the following. Accordingly, substantial theoretical and empirical literature exists on risk behaviour that elaborates on what factors influence and define risk preferences. Most research on decision-making behaviour in organizations focused on one or two determinants that directly influence risk. Pablo and Sitkin (1992), on the other hand, offer a more holistic overview. They categorize risk preference determinants into situational and constant factors, as well as into characteristics of the decision maker, the organizational context, and the problem itself.

Situational and Constant Factors

Situational factors are defined as elements that are varying and situation-dependent in influencing risk perceptions (Pablo & Sitkin, 1992). Illustrations of such factors are levels of organizational slack (Boulding, Cyert & March, 1964), problem framing (e.g., Kahneman & Tversky, 1979), reference points (e.g., Lopes, 1987; March 1988) and escalation of commitment (Brockner, 1992). Whereas factors like the individual dispositions (Laughhunn, Payne & Crum, 1980), national culture (Hofstede, 1980), and organizational culture (Morgan, 1986) can be considered *constant factors* and also contribute to determining individual risk preferences.

Characteristics of the Decision Maker, the Organizational Context, and the Problem

Moreover, Pablo, Sitkin and Jemison (1996) differentiate between three clusters of factors that influence a decision maker when choosing a more or less risky response to a problem (risk behaviour): characteristics of the *individual decision maker,* characteristics of the *organizational context,* and characteristics of the *problem* itself. The individual characteristics encompass risk preferences, risk perceptions, and risk appetite (Pablo, Sitkin & Jemison, 1996). The identified organisational characteristics consist of group composition, cultural risk values, risk orientation of managers, and organisational control systems (Pablo & Sitkin, 1992). Problem-related characteristics are problem understanding and problem design (Pablo & Sitkin, 1992). Although this list of determinants is not exhaustive, it constitutes the contemporary literature.

Despite the fact that there is an almost infinite number of potentially relevant individual-, organizational-, and problem-related characteristics, we seek to assess individual risk

preferences based on determinants defined in Tversky and Kahneman's (1979) prospect theory, which is why we will restrict our attention to these (see Chapter 2.4).

2.1.5 Risk Preferences of Demographic Subgroups

Even though some people are more risk-averse than others, influenced by the factors described above, prior research additionally dealt with the question of whether significant differences also can be observed across specific demographic subgroups. Hence, this section considers some of the most predominant experimental findings in this research stream.

Age

Partially contradicting the research stream on generations (as illustrated in 1.1.2), the general consensus suggests that risk aversion increases with age and that older subjects, therefore, tend to be more risk-averse than younger ones (Damodaran, 2007). Hereby, risk-aversion is observed to increases more among women than men (Ibid.). In line with this, Harrison, Lau and Rutström (2007) conducted experiment confirms that younger subjects (under 30 years) have much lower relative risk aversion compared to older subjects (over 40 years). MacCrimmon and Wehrung (1990) also observed that more mature decision makers (in terms of age and seniority) were consistently more risk-averse than those who were less mature. This leads to our first hypothesis:

> **Hypothesis**$_{(1)}$ *People in a higher age are more risk-averse than people at a younger age.*
>
> ⇒**H(0)** *There is no significant relationship between Generation X, Millennials, iGen and risk preferences.*

Gender

Furthermore, there seems to be some concurring evidence of women being more risk-averse than men (Damodaran, 2007). Byrnes, Miller and Schafer (1999) found in their conducted survey of 19 other studies that women are generally more risk-averse than men. Levy, Elron and Cohen (1999), as well as Dwyer, Gilkeson and List (2002), also suggest that women are less willing to take on investment risk and, as a consequence, earn lower returns. In the same vein, Charness and Gneezy (2012) argue that women invest less in risky assets than men and

therefore appear to be financially more risk-averse. In a partially contradicting research stream, Holt and Laury (2002) found that men, even though being less risk-averse with small bets, are as risk-averse than women if not more when facing more substantial, more weighty bets. Based on this, we hypothesise:

Hypothesis$_{(2)}$ *Women are more risk-averse than men.*

⇒**H(0)** *There is no significant relationship between gender and risk preferences.*

Education

Moreover, Dwyer, Gilkeson and List (2002) conducted research on risk-taking of individuals in mutual fund investment decision finds that well-educated investors are more inclined to take on risk than their less educated colleagues. Incorporating investors' knowledge contributes to taking risks beyond the level of general education. In addition, Grable (2000) investigated on risk preferences of university faculties and staff workers also concluding that individuals with higher attained education are more risk-seeking than others. Also, on a consumer level, Jianakoplos and Bernasek (1998) investigated household holders and observed that education increased the level of risk tolerance. These findings suggest that education in a certain area contributes to risk-seeking behaviour. On this basis, we proceed with the hypothesis:

Hypothesis$_{(3)}$ *People with an educational background in management are less risk-averse than people without an educational management background.*

⇒**H(0)** *There is no significant relationship between educational background and risk preferences.*

Experience

Also, Dyer, Kagel and Levin (1989) investigated whether experience with a particular asset class alters individual risk preferences. When comparing bids from naive student participants and industry experts from the construction sector for a common asset, they found that the student group was more risk-averse than the experts. March and Shapira (1987) further support this finding in their argumentation that more experienced decision makers may begin to focus selectively on the evidence of their past ability to overcome obstacles and may thereby be willing to take risks that less experienced persons would avoid. Moreover, Slovic, Fischoff and Lichtenstein (1980) argue that the experience of decision makers influences risk behaviour by

promoting a higher degree of confidence in extremely experienced or inexperienced individuals. Following these findings, we hypothesise the following:

> **Hypothesis(4)** *People with managerial experience are less risk-averse than people without managerial experience.*
>
> ⇒**H(0)** *There is no significant relationship between managerial experience and risk preferences.*

National Culture

Although experiments about risk preferences spanning around the globe from rural farmers in India to college students in the United States have been conducted, no significant differences in risk aversion based on culture or race have been observed (Damodaran, 2007). Accordingly, researchers such as Holt and Laury (2002) didn't find any race-based differences in risk aversion in their study. However, Zhuang and Hou (2014) observe in their analysis of risk preference of Chinese enterprise managers that senior managers' risk preferences are affected by neither their age, gender, nor their professional experience. This, while not directly contradicting the assumption of cultural indifference in risk preferences, suggests that there may be more explicit patterns of risk profiles when moving from an isolated consideration of single attributes to a multidimensional perspective correlating several attributes. Therefore, this study aims to assess the correlation between characteristics and risk determinants found in literature and research to derive a more holistic view of individual risk preferences.

2.2 Prospect Theory

2.2.1 An Introduction to Behavioural Economics

Long before Kahneman and Tversky's (1979) Prospect Theory, thinkers of the 18th and 19th centuries already conducted studies focusing on the psychological foundations of economic life. At the turn of the century, during the neoclassical revolution, scientists increasingly started trying to emulate the natural sciences, aiming to distance themselves from the hitherto "unscientific" field of psychology (Camerer, Loewenstein & Rabin, 2011). The theory of "bounded rationality", correlated with the work of Herbert Simon's in the 1950s, reflected the relevance of psychologically informed economics. Suboptimal decisions are arguably caused

by restrictions of human's ability to process information, as a consequence of knowledge (or information) limitation and computational capacities. Hence, it is vital for a better understanding of decision-making to analyse and understand people's minds in connection with the environment in which they emerged (Kahneman, 2003; Simon, 1982).

Behavioural economics (BE) can be ranked into the broader field of social and behavioural sciences. This includes cognitive and social psychology as well as neuroscientific developments. Therefore, this field of science is opening new and promising paths for BE, characterised by an advanced understanding of the human brain (Camerer, Loewenstein & Prelec, 2005). Furthermore, BE takes into account the psychophysical properties of preference and judgment by adopting the standard economic model. Thereby, limits on the rational calculation, willpower, and greed are created (Camerer, Loewenstein & Prelec, 2005; Mullainathan & Thaler, 2001; Rabin, 1998). In this vein, BE aims to come up with psychologically robust explanations for empirical findings that the basic model of economics has a tough time explaining (Camerer, Loewenstein & Rabin, 2011). From a methodological perspective, behavioural economics can be presumed a humble approach to economics, seeing adjacent sciences as trading partners, and respecting the comparative advantages of neighbouring social sciences (ibid.). The empirical regularity and constructs are thoughtfully explored by those adjacent fields that are considered to be an essential input, but often exceed the seduction of mathematically sophisticated economic theories which are empirically motiveless (ibid.).

2.2.2 Theoretical Background of Prospect Theory

Prospect Theory is a central theory in behavioural economics and describes how individuals make decisions between prospects involving risk and uncertainty. Up to the end of the 1970s, the behaviour of bounded rationality was perceived as chaotic and inappropriate for modelling (Wakker, 2010). Until then, expected utility theory was considered the best illustration of behaviour for decision-making under risk (Arrow, 1958; Friedman and Savage, 1948). Kahneman and Tversky (1979) then offered with their Prospect Theory a new systematic explanation of hitherto unexplainable behavioural anomalies. This meant a significant breakthrough in the area of behavioural economics. While being “systematic and tractable” (Wakker, 2010, p. 2) their work was the very first descriptive theory that specifically included irrational behaviour in an empirically realistic sense (Kahneman, 2003, p. 1456).

Prospect theory demonstrates that people when facing prospects involving risk and uncertainty do not think in terms of absolute results, but in terms of expected benefits in relation to a reference point such as current wealth (Schneider & Lopes, 1986). Further, it describes individuals facing prospects that involve gains as to be risk-averse while suggests that people in prospects involving losses behave risk-seeking (Kahneman & Tversky, 1979). This assumption is based on studies which have proven that an individual's choices between alternative prospects are not entirely based on the probability of outcomes but more on perceived gains or losses in respect to a particular reference point (ibid.).

According to PT (Kahneman and Tversky, 1979), risk preferences can be altered based on (1) loss aversion, (2) the decision-makers' framing of the problem, and (3) decision-makers' weighting of the probabilities of possible outcomes. Kahneman and Tversky (1979) therefore present a range of laboratory experiments including hypothetical scenarios of which most refer to risky choices in regard to monetary outcomes, but which nevertheless can be generalized to other forms of decision making under risk (Levy, 1992). Their most important findings will be presented in the following.

2.2.3 Most Important Findings of Prospect Theory

Reference Point

People think in gains and losses rather than in terms of their net assets. Therefore, they encode their decisions in relation to a specific *reference point*. In this context, Kahneman and Tversky (1979, p.273) suggest that "the carriers of value or utility are changes of wealth, rather than final asset positions that include current wealth." Even though acknowledging, that asset position generally matters, they argue that "the preference order of prospects is not greatly altered by small or even moderate variations in asset positions" (p.277). Usually, the reference point can be referred to as a certain status quo. However, this phenomenon can also be described as deviations from an aspiration level or another reference point that does not necessarily have to be the status quo (Levy, 1992). This discovery leads to the observation of framing effects of decision problems, which will be investigated further later on (Chapter 4.2.3).

Risk Preferences and Reflection Effect

Another critical notion of Kahneman and Tversky (1979) is that people perceive and treat losses and gains differently. As described above, they have observed that people tend to behave risk-

averse when facing gains and risk-seeking when facing losses. In one of their typical experiments, people were confronted with two decision scenarios. Decision scenario A consisted of either choosing a certain outcome of $3,000 versus gambling with 80% chance of $4,000 and a 20% chance of getting nothing. In Scenario B they were facing with the same but negative prospects, meaning either losing $3,000 for sure or gambling with 80% chance of losing $4,000 and a 20% chance of losing nothing. While the majority of respondents (80%) in scenario A chose a certain outcome over the gamble, 92% of the respondents in scenario B preferred the gamble to a certain loss. Concluding, in both scenarios, respondents tended to choose the option with the lower expected value, which is inconsistent with expected-utility theory (Kahneman & Tversky, 1979).

Even if experiments like these do not show conclusive evidence describing precisely how risk-averse or risk-acceptant people are, they suggest that individual utility functions are concave in the domain of gains while being convex in the domain of losses (also see IntroductionAppendix A - Utility Function). Kahneman and Tversky (1979) refer to this phenomenon as the *reflection effect around* the reference point. As a result, the sensitivity to changes in assets when moving further from the reference point (in both directions) decreases, which is inconsistent with a utility function which would be either purely concave or purely convex. This effect has been observed repeatedly for a variety of individuals and situations, as shown in Fishburn and Kochenberger (1979).

Loss aversion and Endowment Effect

Another pattern which Kahneman and Tversky (1979) observed in their experiments was that losses loom larger than gains, as they state, "the aggravation that one experiences in losing a sum of money appear to be greater than the pleasure associated with gaining the same amount." (p. 279). This observation is referred to as *loss aversion*, which implies that people perceive the displeasure from a (monetary) loss as more significant than the perceived pleasure through gaining the same amount (Rabin, 2002). As an effect, people prefer the status quo or another reference point over alternatives including a 50-50 gamble of positive and negative outcomes (in respect to the status quo) but of the same absolute value. Moreover, this also suggests that people value current possessions more than comparable things they don't have, even for small items such as candy bars or coffee mugs. This described over-evaluation of current possessions is referred to as *the endowment effect* (Thaler, 1980). It is vital to notice, however, that both loss aversion and the endowment effect do not apply to commercial transactions. Monetary

expenditures on items are not treated as a loss, and goods that are bought for a potential sale or exchange - as opposed to using - usually do not generate an endowment effect (Kahneman, Knetsch & Thale, 1990).

Framing and Translation Effect

As touched upon above, the identification of the reference point or *framing* of a decision problem becomes crucial, as outcomes get encoded in relation to this reference level and gains and losses are perceived differently. This became obvious in the following example experiment conducted by Kahneman and Tversky (1979). Two subject groups were confronted with a hypothetical situation in which they had to choose between two alternative programmes to combat a disease which was expected to kill 600 people. Both groups got programme options to choose from with precisely the same statistical expected consequences. In Programme A 200 people would be saved (400 die), while programme B represents a one-third probability that 600 people would be saved (none would die) and a two-thirds probability that none would be saved (600 would die). However, while one group was presented with the options to save a certain number of people ("survival frame"), the other group was presented with the same options but framed in a way so that a certain number of people dies ("mortality frame"). In the survival frame, the majority (72%) favoured the cautious alternative A, but in the mortality frame, a similar majority (78%) favoured the risky alternative.

In fact, the survival frame causes a downward shift of the reference point, comparable to the addition of a positive constant to all results. This downward *translation effect* (Abelson & Levi, 1985) impacts outcomes by effectively increasing people's tendency towards risk aversion. Accordingly, framing an issue in terms of gains or losses has a significant impact on preferences despite the mathematical equivalence of the two choice problems (Levy, 1992). The significance of framing has also been shown by other experimental studies (Fleishman, 1988; Levin et al. 1985; McNeil, Pauker, Sox & Tversky, 1982).

Certainty Effect and Weighting of Outcome Probabilities

The *certainty effect* refers to the observation that people tend to overweight certain outcomes relatively to merely probable outcomes (Allais, 1979; Kahneman & Tversky 1979). Small probabilities tend to be overweight, and high probabilities tend to be underweighted, with the latter effect being more pronounced than the former (Levy, 1992). With the *pseudocertainty effect*, Tversky and Kahneman (1986) describe the behaviour of people treating highly likely

but still uncertain outcomes as if they were certain. Thereupon, they ascribe a complete change in probabilities near 0 or 1, a more significant impact than the same absolute change in probabilities in the middle of the probability range, which they call the *ratio-difference principle* or *sub proportionality*. Ergo, this principle describes the observation that the effects of a fixed positive differential between two amounts increase with their ratio (Tversky & Kahneman, 1986; Quattrone & Tversky, 1988).

2.2.4 Extensions to Traditional Prospect Theory

Adding upon the discussion of Prospect Theory, several moderators have added significant extensions to the traditional theory of Kahneman and Tversky's (1979). For example, extreme performance weaknesses leading to threat rigidity have proven to be an incentive for managers to adopt a survival frame that diminishes their overall risk-taking even though they are below their reference point (Chattopadhyay, Glick & Huber, 2001; Jawahar and McLaughlin, 2001). Organizational size and slack have also an impact on framing, in terms of managerial risk-taking (Chattopadhyay, Glick & Huber, 2001; Singh, 1986) and the reduction of risk when they enable losses to be incurred (Hayward & Shimizu, 2006). A further enhancement of PT is related to the degree of ambiguity (Shimizu, 2007) or the tendency to transfer blame (Hayward & Shimizu, 2006) in changing managers' risk frame.

2.3 Chapter Summary

To increase competitive advantage and performance, managers must take risks, often in an uncertain environment (Hoskisson et al., 2016). The behaviour of managers in taking on risks can ultimately affect the organisational risk, which is usually captured in the variance of the company's future income stream (Nickel & Rodriguez, 2002). Managerial risk-taking is, therefore, a crucial element of strategic management.

Aside from risk-influencing determinants arising from a particular set of circumstances such as individual, organizational and problem characteristics, scholars also have found that risk behaviour differences can be assigned to specific attributes in regard to *age, gender, education, experience*, and *culture*.

Prospect theory, situated in the broader research field of behavioural economics, has since its development by Tversky and Kahneman's (1979) established itself as one of the leading theories for decision making under risk. PT postulates that individuals evaluate choices between alternative prospects based on perceived gains or losses in respect to a specific reference point, rather than to net asset levels. In particular, the theory is best known for its ideation of people being risk-averse in regard to gains and risk-acceptant in regard to losses, as well as for its consideration of the decision maker's framing of decisions around such reference points. Following Tversky and Kahneman (1979), risk preferences can hereby be altered based on loss aversion (losses loom larger than gains), the decision-makers' framing of the problem and decision-makers' weighting of the probabilities of possible outcomes.

In summary, Figure 2.1 illustrates the theoretical skeleton on which this work is based on. First, a fundamental overview was given about the concept of risk, the role of risk-taking for strategic management, as well as the correlation with organisational risk and competitive advantage. Second, prospect theory basics were described to provide the theoretical framework for the understanding and assessment of individual risk preferences. Taken together, this contextual understanding forms the necessary basis for exploring individual risk preferences and assessing the implications for strategic management, under consideration of current macroeconomic trends.

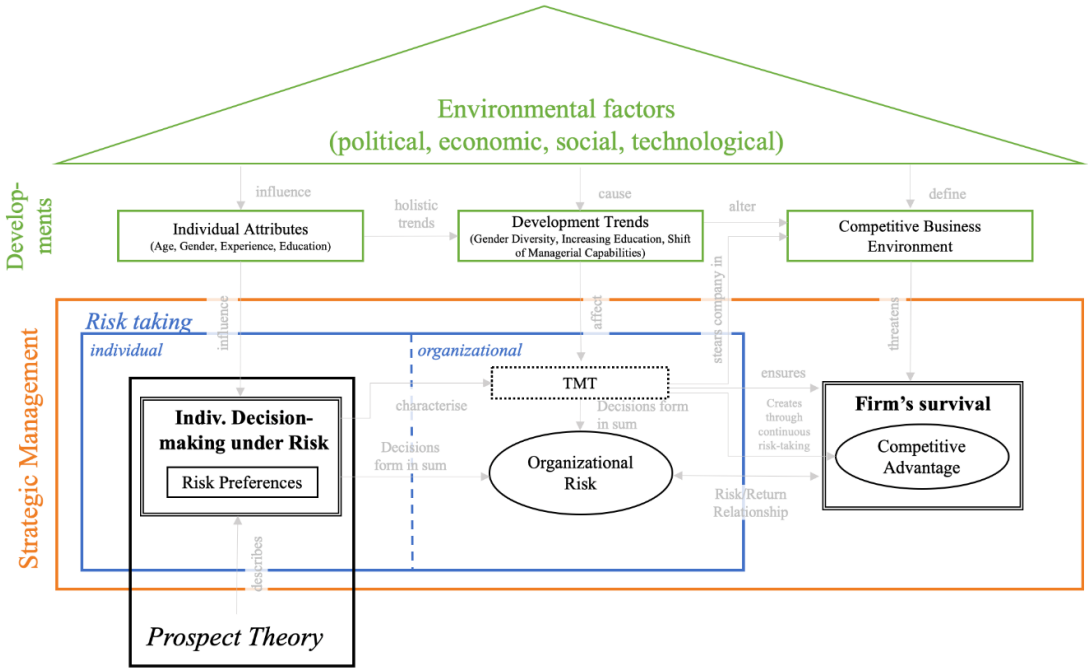


Figure 2.1: Literature Framework

3 Methodology

This chapter illustrates the methodological decisions underlying this study. Accordingly, the study's research approach, design, and data collection method are presented. Also, motives for the selection of the data analysis and the determination of validity and reliability are presented.

3.1 Research Approach

Quantitative Research Approach

According to Easterby-Smith, Thorpe and Jackson (2015), the two main approaches to research are qualitative and quantitative methods. Nevertheless, those two approaches should be considered representations of different ends on a continuum instead of rigid, separated categories, polar opposites, or dichotomies (Newman & Benz, 1998). In general, studies tend to be either more qualitative or more quantitative. The qualitative approach is considered the dominant direction within strategic management (Hoskisson, Hitt Wan & Yiu, 1999). Mixed methods research is in the middle of this continuum because it includes aspects of both approaches (Creswell, 2014). However, for this study, the quantitative research approach better supports the purpose of this study to understand relationships between different preferences and variables by using numerical data. Furthermore, this method allows for testing hypotheses that are based on academic literature and previous research in this field of study with new data. In this way, patterns in the data can be identified, and conclusions are drawn about the risk preferences of groups of people with different managerial experiences and educational backgrounds.

Deductive Research Approach

Bryman and Bell (2011) also differentiate between deductive and inductive research approaches. Inductive research begins with observation, then collects empirical data and uses this data to generate hypotheses or theories. This process demonstrates the back and forth between the topics and the database until the researchers have developed a comprehensive catalogue of topics (Creswell, 2014). This research approach is mainly used in qualitative

research (Bryman & Bell, 2011), which is not aligning with the objective of this study. To better serve the purpose of this thesis, the researchers apply a deductive approach that is common in quantitative research (ibid.). The investigators validate a theory by investigating the hypotheses derived from it (Creswell, 2014). These hypotheses or questions contain constructs that the researchers have to define (Creswell, 2014). From here, the researchers find a tool to determine these variables (Creswell, 2014) and constitute an instrument to measure the attitudes or behaviours of the subjects in this study (Creswell, 2014). Finally, the researchers collect the results of these instruments to accept or reject the hypotheses developed (Creswell, 2014).

3.2 Research Design

Survey as Methodological Design

Following Easterby-Smith, Thorpe and Jackson (2015), the following research design is developed carefully, based on how data collection methods need to be organised within the research framework to answer the thesis' research question. To address the research problem effectively, the research design integrates several components into the study, coherently and logically, to form the design for data collection, measurement, and analysis (De Vaus, 2001).

An experimental design in this thesis allows the researcher to describe the primary intention, to test the effect of a treatment on an outcome by controlling all other factors that could affect that outcome (Creswell, 2014). This is aligning with the objective of this study. By experimenting, the researchers could benefit from the control of variables and a more specific insight compared to a survey (ibid.). Nevertheless, due to its shortcomings in cost, time, and ability to draw conclusions from a larger population, the applied research design in this study is a survey (Saunders, Lewis & Thornhill, 2015). This design offers a quantitative or numerical description of trends, attitudes, or opinions of a population by examining a sample of that population. From the sample results, the researchers generalise or draw conclusions about the population (Creswell, 2014) to answer the research question. By conducting a survey, we will furthermore take advantage of the economy of the design and the rapid turnaround in data collection (Fowler, 2014)

Cross-Sectional Design

In general, there are two primary methodological designs in survey research: cross-sectional and longitudinal (Ruel, Wagner & Gillespie, 2016). While the former focuses on a specific point of time, the latter gathers data over a more extended period. This study is based on the cross-sectional design since it better serves the objective of this study. Therefore, the data is collected and analysed at one point in time by examining the extent to which the variation of the result variables is linked to group differences (De Vaus, 2001). The aim is to identify specific preferences within a group of comparable characteristics rather than building relationships. By comparing several sample groups with each other, we intend to identify possible similarities, patterns, or significant differences in the data collected. The cross-sectional analysis is based on the collection of information and tries to understand the "what" rather than the "why". Hence, this type of analysis allows the formation of assumptions and test hypotheses (Easterby-Smith, Thorpe & Jackson, 2015).

Survey Design and Respondents' Experience

The survey is mainly designed out of forced-choice or fixed-choice questions, meaning respondents have a range of options at their disposal. This type of question design allows the researchers to collect a variety of data, provides easily quantifiable data, and achieves high generalizability when using large samples (Vogt P., Vogt E., Gardner & Haeffele, 2014). This will be necessary in light of the research questions.

Accordingly, the survey (also see Appendix B – Survey) consisted of 16 questions based on multiple choice, dichotomy, checklists and scales (rating scale, likert scale), which represent different types of forced-choice questions (Ruel, Wagner & Gillespie, 2016) and five open-ended questions. Eight questions measured demographic and background information to separate the sample groups, while the rest concerned individual risk behaviour. The questionnaire, which took approximately five to ten minutes to complete, was managed online. Google forms was used to capture responses. Skip options were not included in the questionnaire to verify that respondents read and respond to each question.

Unit of Analysis

In this thesis, the unit of analysis is individuals from Generation X, Millennials, and iGens representing various backgrounds with respect to age, managerial experience, gender, and education. Therefore, the necessary sample size of 236 individuals, derived from an estimated

population, substitutes of two groups. First, master students from Lund University (Lund University, 2019) and current and former students from University of Applied Sciences Karlsruhe (University of Applied Sciences Karlsruhe, 2018) to cover iGens and Millennials (Appendix C – Sample Size Student). Second, managers from three companies located in Baden-Württemberg, Germany, to include Millennials and Generation X (Appendix D – Sample Size Manager). For the calculation of the sample size, the researchers used the widely circulated sample size tables based on Krejcie and Morgan's (1970) formula, as they assume an alpha of 0.05, which is recommended for most educational research (Ary et al., 1996). Moreover, an acceptable error margin of 5% was set, since the focus of the thesis is on categorical data and less on continuous data (Krejcie & Morgan, 1970).

Researchers may often be confronted with various limitations that forces him to use insufficient sample sizes (Kotrlik & Higgins, 2001). These limitations constrain researchers to use the given sample sizes for practical versus statistical reasons (Kotrlik & Higgins, 2001). In this study, budget and time constraints made it infeasible to achieve the required sample size. While the researchers are aware that the sample size of 155 respondents is only partially representative, it is argued that the findings from the evaluated sample serve as an indicator for the likely behaviour and preferences of the investigated generations.

3.3 Data Collection Method

Primary and Secondary Data

Aligned with the purpose of this study, the researchers apply a multi-sourcing approach to extend the empirical data to enhance the generalisability of the results. Sekaran and Bougie (2016) describe two main types of data that can be used for research and are combined in this study. *Primary data* refers to data collected directly by the researcher, mainly through different types of surveys or interviews, to obtain information about institutions, organisations, or individuals. This serves the purpose of the study by collecting the data for the specific comparison on generations in combination with other risk attributes. Using *secondary data*, that has already been processed and recorded by previous research, saves time and effort while providing high-quality data and historical information and perspectives that cannot be retrieved from primary data (Easterby-Smith, Thorpe & Jackson, 2015). However, a critical aspect of secondary data is, that they originally have not been collected with the same intent, which is

why it is necessary to interpret the data with extra care to prevent maladaptation (Bryman & Bell, 2015; Easterby-Smith, Thorpe & Jackson, 2015).

As this thesis attempts to understand individual risk preferences and draw conclusions about the impact on strategic management, primary data is collected on several scenarios about attitudes to risk decision-making and set into context to secondary data.

Convenience Sampling

Quantitative research is usually based on *probability sampling*, which is built on probability theory and involves the usage of any strategy in which samples are selected in a way that every individual in the overall population has a recognizable and nonzero chance of being selected for the relevant study (Leavy, 2017). Nevertheless, there are instances when *purposeful sampling* is used (ibid.). This is beneficial to find the most information-rich cases that best address the research purpose and question to produce suitable data (Morse, 2010). A third sampling approach is *convenience sampling*, which is especially beneficial in cases where the researcher inherently has access to the subject groups in focus. In line with Cochran (1977), the sample size is specified by focusing on the variables of interest that are most vital to the survey. The purpose of this study is to examine risk preferences and derive implications by focusing on Generation X, Y, and Z. Accordingly, a *convenience sampling* approach is adopted in this thesis due to two reasons. Firstly, the researchers had access to subjects within particular organizations, universities, corporations, and other institutions and organisations representing the focused subject groups, to collect the necessary data. Secondly, due to the limited amount of time, this method enabled the researcher to collect enough data on a substantial sample size to perform the necessary hypotheses testing.

Data Collection and Survey Delivery

In view of maximizing the response rate, the survey delivery is another crucial decision (Leavy, 2017). Fowler (2014) describes several types of data collection for surveys: mail, telephone, the internet, personal interviews, or group administration. In this case, the data is collected via an online survey in a two-stage approach. In this sense, professional social media platforms such as Xing and LinkedIn, but also Facebook and WhatsApp have been used. To achieve the highest possible response rate, the majority of respondents have been contacted individually with personalised messages, while avoiding the issues of geographical decentralization and high administrative effort (Leavy, 2017). Then, in a chronologically staggered second and third

wave, group posts to the broad masses in these networks were additionally used to contact as many additional potential participants as possible and at the same time to serve as a reminder for the people addressed in the first step.

Variables in the Study

The study's assessment is based on hypothetical scenarios of which most refer to risky choices in regard to monetary outcomes. These scenarios bear the disadvantage of being hypothetical and comparing very different circumstances (MacCrimmon & Wehrung, 1990). Moreover, the self-rating characteristic of such scenarios even though offering the benefit of having people make a direct assessment, encounter the risk of misperceptions and misrepresentations that such assessments allow (ibid.). On the other hand, however, standardized and naturally occurring situations offer the advantage of being common across subjects and being based on solid theory, as well as real choices made by people. Levy (1992), therefore, concludes that risk-taking behaviour in hypothetical scenarios relating to risky decisions about monetary outcomes can be generalised to other forms of risk-based decision-making.

In order to further leverage on the benefits of existing theory and best practice research designs, while minimizing the downsides of hypothetical scenarios, the survey design is primarily based on existing studies within the research stream of PT (also see Appendix E – Survey Outline). Consequently, the researchers have been able to select the most appropriate and unbiased scenarios.

3.4 Data Analysis

The analysis of the gathered data was conducted in a three-step approach, which is illustrated in Figure 3.1: Structure of Data Analysis. Accordingly, it dealt with the survey distribution, the response bias check, and finally the statistical analysis.

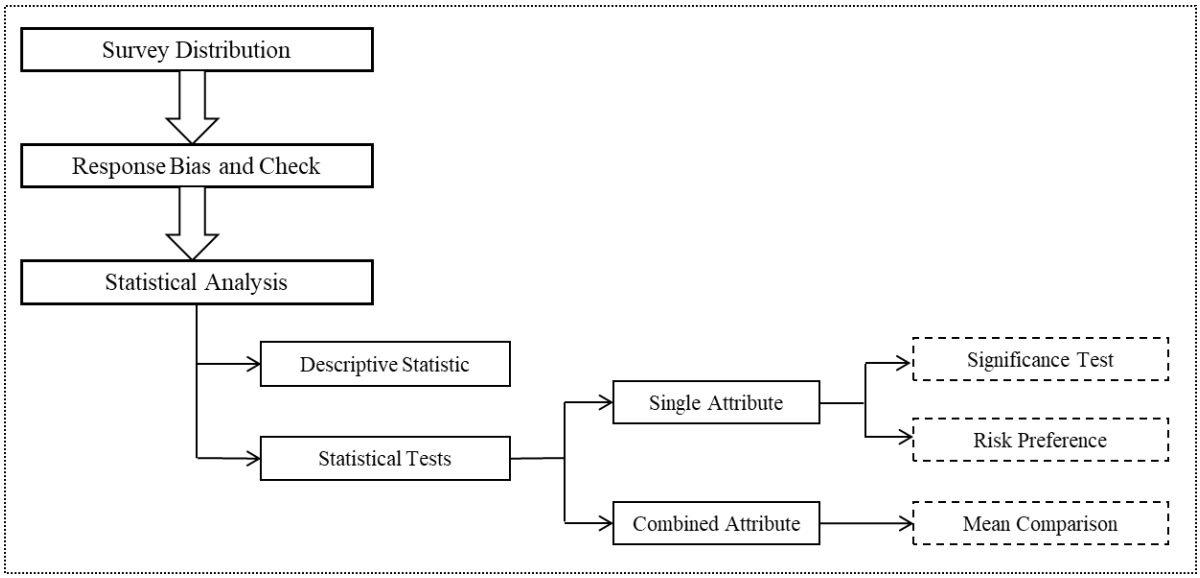


Figure 3.1: Structure of Data Analysis

Survey Distribution to Sample Group

First, the survey has been sent out to around 300 subjects, of which 155 returned the questionnaire. The sample members hereby represent a diverse group in respect to age, gender, educational background, and managerial experience. In this context, three targets are defined, namely Generation X, Y, and Z.

Response Bias

Second, the data had to be checked for response bias, which describes the effect of non-responses on survey estimates (Fowler, 2014). For this purpose, a wave analysis was carried out in which the surveys were sent and evaluated in a staggered multi-wave approach. Accordingly, returns have been examined in two-day intervals to determine if average responses change (Leslie, 1972). Moreover, five predefined individuals of each sample group were excluded from the study. These individuals were contacted after the data has been gathered, and their responses were compared with the data collected to conduct the respondent-non respondent check to exclude response bias.

Statistical Analysis

Third and finally, the statistical analysis is composed of descriptive statistics and statistical tests, which will be outlined in the following.

Descriptive Statistic

In line with Salvatore and Reagle (2001), quantitative research requires preliminary descriptive analysis, establishing the cornerstone of this study. For this step, as well as the following steps, the SPSS software package is used. This kind of statistic tool illustrates basic characteristics and consolidates the data relevant to this research. To serve the purpose of the study, this research aims for measurements of central tendency (means) for each sample group. Hence, similarities and patterns for each variable within the different sample groups can be witnessed and be the base for the argumentation and reasoning.

Statistical Tests

After conducting the descriptive statistics, the next step is focused on statistical significance. The valuation of the hypotheses is done by the comparison of the sample groups with the different variables collected through the survey. The statistical test compares the means of each measured variable to verify whether there is a significant difference between the characteristics in focus. This choice is based on the comparison nature of the research question, the number of independent and dependent variables and the number of variables controlled. Due to the objective of the study, the dependent variable of risk preferences is considered to be static throughout all tests, whereas the independent variable is non-static. The variables are measured mainly on a categorical scale, with one exception that is based on a continuous score (Loss-Aversion Ratio). The objective of this study demands a twofold testing approach, which will be further described.

Firstly, the significance of the single attributes has to be tested. The study focuses on more than two groups, mainly independent variables, and the values don't follow a normal distribution. As a consequence, the Mann-Whitney-U-Test or the Kruskal-Wallis-Test is applied to test for significance, depending on the number of compared sample groups, which is indicated with the mathematical formulation of the hypothesis. For two sample groups, the Mann-Whitney-U Test is conducted. In the case of three sample groups, the Kruskal-Wallis-Test is applied. The asymptotic significance is used for the comparison of significance since the sample size n is >30 (Mehta & Patel, 1997). Once significance is established, for a single (risk) attribute, the hypothesis testing follows the in Figure 3.2outlined process.

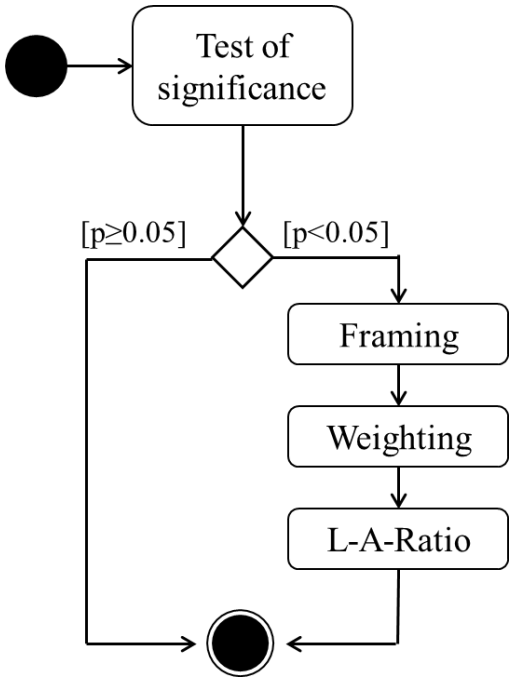


Figure 3.2: Hypothesis Testing - Single Attribute

With a significance of $p<0.05$, the null hypothesis is rejected, and potential differences in framing, weighting, and the loss-aversion ratio will be evaluated. In case the null-hypothesis is admissible, the constant factor won't be further evaluated. Therefore, the null hypothesis assumes that $\mu1 = \mu2$ or $\mu1 = \mu2 = \mu3$, i.e., if the starting position is not rejected, there is no difference between the means or that there is a difference that is not statistically significant enough to draw definite conclusions. Each alternative argument is based on literature, which means that we assume that one mean is either higher or lower than the other. If there was sufficient evidence to reject the null hypothesis, we would not reject the alternative hypothesis, so we vouch that our premise applies at a certain level of significance. Therefore, by inserting the numbers into the formula for the relevant statistics and comparing this value with the critical level, we test our hypotheses, which are essential for answering the research question. Furthermore, we determine the effect size of each corroborated hypothesis.

Additionally, the perception of risk will be briefly compared within the single attribute tests. As a result, general associations between the different sample groups can be indicated.

Secondly, the *combined attributes* have to be evaluated by applying a different approach. The multiple characteristics shown in the matrix are compared using a simplified means overview. This is in line with our research purpose and due to the following two reasons. Firstly, the limited scope and time demand a condensed approach. Secondly, the number of observations to independent variables in a principal, multiple regression analysis would be close to an

acceptable minimum. In this case, there is a risk of over-fitting, which is considered to make the results too specific for the sample and therefore, difficult to generalise (Hair, Anderson, Tatham & Black, 1995).

3.5 Validity and Reliability

To draw meaningful and useful inferences from measured variables on the instrument, it is essential to establish validity and reliability in quantitative research (Creswell, 2014).

3.5.1 Validity

Establishing the validity of the results in a survey helps to determine whether an instrument is suitable for survey research (Creswell, 2014). Validity consists of three distinct aspects, which are not mutually exclusive. Therefore, it is not sufficient to prove one if the remaining are not present to establish validity (Muijs, 2010).

Content Validity

Content Validity refers to whether the elements measure the content they were intended to measure or not (Lynn, 1986). Qualitative reviews of the existing literature are one way to establish this kind of validity (Wynd, Schmidt & Schaefer, 2003). The main criteria for assessing whether an instrument is content valid is its conformity with the theory in terms of how the concept works and what it is (Muijs, 2010). Accordingly, to create a substantively valid instrument, the research area was first thoroughly analysed, and the theoretical definitions of the concepts used examined. Furthermore, all used scenarios are based on previous extensive research. Therefore, adequate content validity is given.

Criterion Validity

As with content validity, criterion validity is closely linked to theory (Muijs, 2010). *Predictive validity* and *concurrent validity* are the two main types of criterion validity and describe whether the used instruments (survey questions) predict values (answers) that can be theoretically expected or whether results correlate with other results (Creswell, 2014). To establish criterion validity a deep understanding of PT, the concept of risk and in which context the hypothetical scenarios have been used before has been acquired, in order to evaluate what variables can be

predicted or correlated. Furthermore, the scenarios are based on previous extensive research. Therefore, adequate criterion validity is given.

Construct Validity

Construct validity describes whether elements measure hypothetical constructs or concepts and refers to the internal structure of an instrument and the concept of measuring (Creswell, 2014). Construct validity is particularly vital in personality, clinical, educational, and organizational psychology, where measurements of individual differences from hypothetical constructs are the essence of research (Anastasi & Urbina, 1997; Cronbach & Meehl, 1955; Nunnally and Bernstein, 1994). Despite the significance of this concept, no simple method can quantify the degree to which a measure can be described as construct valid (Westen & Rosenthal, 2003). Out of the differing nature compared to this study and the complexity in combination with the limited time available, the establishment of construct validity is a minor priority in comparison with the other forms of validity and reliability. Nevertheless, due to the origin of the applied variables in previous research, reasonable construct validity is present.

3.5.2 Reliability

Reliability describes a measurement that delivers consistent results with equal values (Blumberg, Cooper & Schindler, 2005). It shows to which degree the study is unbiased (error-free) and thus ensures consistent measurement over time and different elements in the instrumentation (the observed values). Objectivity and reducing possibilities of subjective assessment are important criteria in this process, as well as the entire research (Twycross & Shields, 2004). Quantitative studies are usually conducted with a higher degree of reliability than qualitative studies due to the limited scope for interpretation. After Mohajan (2017), the reliability of a thesis is mainly divided into two types: stability and internal consistency reliability.

Stability

Stability indicates to what extent the dimensions of the tests are stable and whether the identical result will be achieved when the same test is replicated in the future despite uncontrolled testing conditions or the respondents themselves (Allen & Yen, 1979). Accordingly, a perfectly stable measurement always delivers the same results time after time. Following Mohajan (2017), stability testing methods are test-retest reliability and parallel-form reliability. *Test-retest*

reliability is obtained by repeating the same measure a second time (Graziano & Raulin, 2013) and evaluates the external consistency of a test (Allen & Yen, 1979), whereas *Parallel-form reliability* is obtained by administering different variants of a valuation instrument to the same group of people (Mohajan, 2017). Given that prior research studies were used as a blueprint for the questionnaire design, the conducted test design is considered an established standard in behavioural economics to elaborate on risk preferences. Accordingly, the presented study is believed to be of high stability as both measures and tests obtained will not alter in the future and therefore, will deliver the same results over and over again.

Internal Consistency Reliability

Internal consistency reliability is a measure of reliability that is used to evaluate the degree to which different test items examining the same construct provide similar results. It evaluates whether the items within a scale or measure are homogeneous or not (DeVellis, 2006). In short, it assesses the consistency of data collection through either *inter-rater consistency* or *split-half reliability test*. While the former measures the extent to which information is being collected in a consistent manner (Keyton, King, Mabachi, Manning, Leonard & Schill, 2004), the latter measures the degree of internal consistency by comparing one-half of the results of a series of scaled items with the other half (Ganesh, 2009). In line with the inter-rater consistency, the study presented is considered reliable as the data collection was carried out and verified by two researchers using the same measures. However, even though this procedure increases reliability, this does not necessarily mean that every researcher generates the same results based on the subjective assessment of an individual (Mohajan, 2017). The split-half reliability is not applicable in this case, as it is preferably used in very long and robust test phases (Ganesh, 2009).

Concluding, the study is believed to be of high validity and reliability, since the conducted survey is based on previous research, and the majority of tests performed are well established in the field. Subjectivity always exists, however, as the researchers' assessments may be different. In the case of this particular study, the nature of the research is quantitative, leaving less room for possible bias. Nevertheless, the simple research model offers a high degree of replicability, and the overall results are likely to be the same in the future provided that researchers gather the data in just the same manner.

3.6 Chapter Summary

This study is conducted in a quantitative research approach. By following a deductive approach, the study collects theory first, subsequently states hypotheses, then performs statistical tests and finally accepts or rejects the hypotheses developed. With this method, patterns in the data can be identified, and conclusions can be drawn about the risk preferences of subject groups with varying age, gender, managerial experiences and educational backgrounds. By using online surveys, a considerable sample size of 155 respondents from all target groups was utilized to carry out the hypothesis tests. The data was collected and analysed at one point in time, therefore followed a cross-sectional design. Hereby the survey almost exclusively constitutes of forced-choice or fixed-choice questions, which allowed to collect a variety of primary data efficiently and to achieve high generalizability (Vogt P., Vogt E., Gardner & Haeffele, 2014). The validity and reliability have been evaluated. The former for Content, Criterion, and Construct Validity, the latter by considering Stability and Internal Consistency Reliability testing.

4 Results

This chapter presents the findings of the conducted empirical data collection. Firstly, an overview of the descriptive statistics is provided. Then, the empirical material is presented in continuous order according to the relation matrix as presented in Figure 4.1 to facilitate a more straightforward understanding of the following analytical chapters.

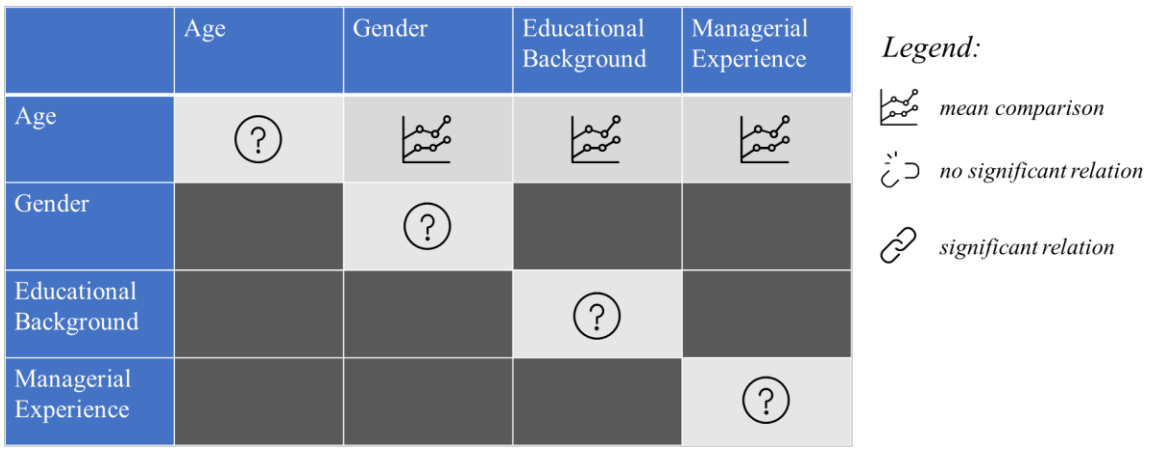


Figure 4.1: Relation Matrix - Overview

4.1 Descriptive Statistic

The following result section is based on data, gathered from a total number of 155 samples. The exact composition of the subjects can be taken from Table 4.1Table 4.1: Descriptive Statistic. The representativeness of Generation X (15 individuals) is critical for the analysis of combined attributes. Besides that, the adequate representation of individuals in each attribute is ensured.

		Count
Age	Gen. Z (<25)	74
	Gen. Y (25-35)	66
	Gen. X (>35)	15
Gender	Male	86
	Female	69
Educational Background	No Mgmt. Background	92
	Mgmt. Background	63
Management Experience	No Mgmt. Experience	80
	Mgmt. Experience	75

Table 4.1: Descriptive Statistic

4.2 Single Attributes

In a first step, as shown in Figure 4.2 and described within 3.4 Data Analysis, the hypotheses of the single attributes of *age*, *gender*, *educational background*, and *managerial experience* were tested.

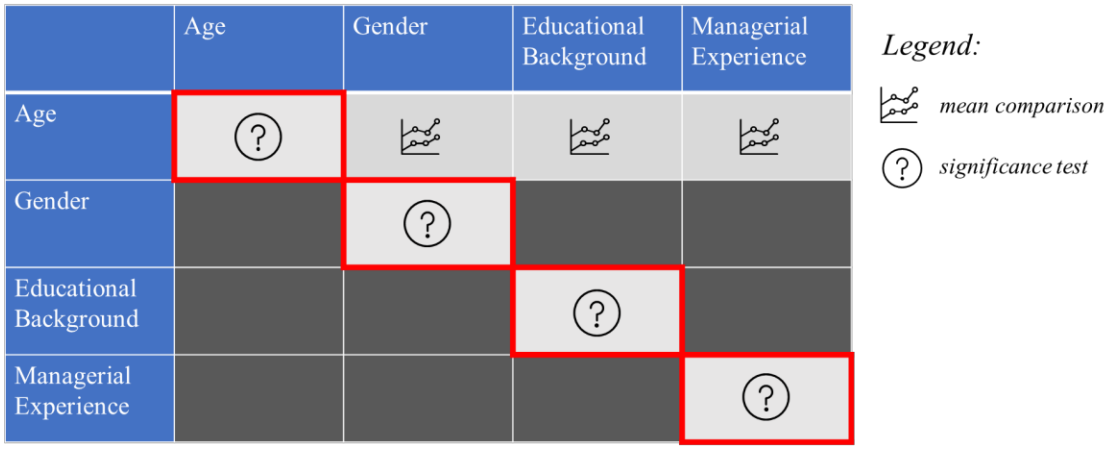


Figure 4.2: Relation Matrix - Single Attributes

Table 4.2 provides a general mean overview of risk preferences in accordance with the single characteristic (age, gender, educational background, managerial experience). A value closer to -1 represents a higher degree of observed risk-seeking behaviour, a value closer to 1 indicates a more risk-averse behaviour. Therefore, the highest risk seeking value is allocated to Millennials (Gen.Y) and the lowest to Generation X.

		Investement Alternatives	
		Mean	Count
Age	Gen. Z (<25)	.76	74
	Gen. Y (25-35)	.44	66
	Gen. X (>35)	.87	15
Gender	Male	.52	86
	Female	.77	69
Educational Background	No Mgmt. Background	.71	92
	Mgmt. Background	.52	63
Management Experience	No Mgmt. Experience	.79	80
	Mgmt. Experience	.47	75

Table 4.2: Mean Overview

4.2.1 Significance Testing

The premises of a normal distribution within the sample is not fulfilled. The Kolmogorov-Smirnov and the Shapiro-Wilk test applies with H_0 that the variable follows a normal distribution as long as $p > 0.05$. As indicated in Table 4.3, none of the variables reach this value. Therefore, normal distribution does not apply. Consequently, either the Mann-Whitney-U Test or Kruskal-Wallis Test (described in 3.4 Data Analysis) is applicable.

All Ranks, which indicate the composition of the tested sample groups and are part of the conducted test, are available in Appendix F – Ranks.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Investement Alternatives	,493	155	,000	,484	155	,000
Age	,276	155	,000	,657	155	,000
Gender	,369	155	,000	,632	155	,000
Adj. Managerial Experience (-->8+)	,295	155	,000	,714	155	,000
Adj. Educational Background M/nM	,389	155	,000	,624	155	,000

a. Lilliefors Significance Correction

Table 4.3: Test of Normality

Significance Testing of Age Attribute

The following hypothesis was tested:

> ***H(1)****People in a higher age are more risk-averse than people at a younger age.*
>
> ***⇒H(0)****There is no significant relationship between Generation X, Millennials, and iGen and risk preferences.*

Mathematical illustration of the hypothesis:

$$H_0: \mu_{GZ} = \mu_{GY} = \mu_{GX}\ ;\ \Rightarrow \mu_{GZ} - \mu_{GY} = 0\ ;\ \mu_{GZ} - \mu_{GX} = 0;\ \mu_{GY} - \mu_{GX} = 0$$

$$H_1: \mu_{GZ} < \mu_{GY} < \mu_{GX}\ ;\ \Rightarrow \mu_{GZ} - \mu_{GY} < 0\ ;\ \mu_{GZ} - \mu_{GX} < 0;\ \mu_{GY} - \mu_{GX} < 0$$

Given the three sample groups, as reflected in the mathematical formulation and described in 3.4 Data Analysis, the Kruskal-Wallis test is applied for this hypothesis. By conducting this test, based on the gathered data, a significance level of $p=0.022 \Rightarrow p<p_{sig}$ with $p_{sig}=0.005$ is calculated (Table 4.4). Therefore, the null hypothesis is partially rejected. Hence, **there is a significant relationship between at least two of the Generation in focus.**

Test Statistics[a,b]

	Investement Alternatives
Kruskal-Wallis H	7,718
df	2
Asymp. Sig.	,021
Exact Sig.	,022
Point Probability	,001

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 4.4: Kruskal-Wallis Test – Age

To compare which of the possible independent mean combination is significant, the pairwise comparison is used (Table 4.5).

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Gen. Y (25-35)-Gen. Z (<25)	12,748	5,137	2,481	,013	,039
Gen. Y (25-35)-Gen. X (>35)	-17,035	8,680	-1,963	,050	,149
Gen. Z (<25)-Gen. X (>35)	-4,286	8,592	-,499	,618	1,000

Table 4.5: Pairwise Comparison - Age

The adjusted significance between the Generations of Y and Z is lower than the significance criteria. Hence, the level of significance for this correlation is reached.

Therefore, the null hypothesis for μ_{GZ} and μ_{GY} is rejected. The means for μ_{GY} and μ_{GZ} conclude that the inverse alternative hypothesis for μ_{GZ} and μ_{GY} is accepted with an effect size of $r_{GY\text{-}GZ}$= 0.210 (Appendix G – Effect Size) indicating a medium magnitude of the correlation between μ_{GY} and μ_{GZ} (Sawilowsky, 2009). **This proves that iGens are more risk-averse than Millennials.**

On the other hand, the level of significance of 0.05 for the null hypothesis of μ_{GZ} and μ_{GX} as well as μ_{GY} and μ_{GX} is not rejected. Hence, the alternative hypothesis is rejected; thus, the null hypothesis is automatically accepted. **This proves that there is no significant relationship between Generation X and Millennials as well as iGens and Generation X in their risk preferences.**

Significance Test of Gender

The following hypothesis was tested:

***H*$_{(2)}$** *Women are more risk-averse than men.*

⇒***H(0)*** *There is no significant relationship between gender and risk preferences.*

Mathematical illustration of the hypothesis:

$$H0: \mu F = \mu M; \Rightarrow \mu F - \mu M = 0$$

$$H2: \mu F > \mu M; \Rightarrow \mu F - \mu M > 0$$

Given the two sample groups, as reflected in the mathematical formulation and described in 3.4 Data Analysis, the Mann-Whitney-U test is used to calculate the asymptotic significance. Based

on the gathered data, a significance level of $p=0.045 \Rightarrow p<p_{sig}$ is calculated (Table 4.6). In this case, the level of significance is below 0.05. Therefore, the null hypothesis is rejected. Hence the alternative hypothesis (H_2) is accepted with an effect size of $r_{M\text{-}F}= 0.161$ (Appendix G – Effect Size) indicating a small magnitude of correlation (Sawilowsky, 2009). **This proves that females are more risk-averse than males.**

Test Statistics[a]

	Investement Alternatives
Mann-Whitney U	2590,500
Wilcoxon W	6331,500
Z	-2,005
Asymp. Sig. (2-tailed)	,045

a. Grouping Variable: Gender

Table 4.6: Mann-Whitney-U Test – Gender

Significance Test of Educational Background

The following hypothesis was tested:

> ***H(3)****People with an educational background in management are less risk-averse than people without an educational management background.*
>
> ***⇒H(0)****There is no significant relationship between educational background and risk preferences.*

Mathematical illustration of the hypothesis:

$$H_0: \mu_{NMB} = \mu_{MB}; \Rightarrow \mu_{NMB} - \mu_{MB} = 0$$

$$H_3: \mu_{NMB} > \mu_{MB}; \Rightarrow \mu_{NMB} - \mu_{MB} > 0$$

Given the two sample groups, as reflected in the mathematical formulation and described in 3.4 Data Analysis, the Mann-Whitney-U test is used to calculate the asymptotic significance. Based on the gathered data, a significance level of $p=0.167 \Rightarrow p>p_{sig}$ is calculated (Table 4.7). In this case, the level of significance is greater 0.05. Therefore, the null hypothesis is accepted. Hence the alternative hypothesis (H_3) is rejected. **This result indicates that there is no significant relationship between educational background and risk preferences**

Test Statistics[a]

	Investement Alternatives
Mann-Whitney U	2641,500
Wilcoxon W	4657,500
Z	-1,382
Asymp. Sig. (2-tailed)	,167

a. Grouping Variable: Educational Background

Table 4.7: Mann-Whitney-U Test - Educational Background

Significance Test of Managerial Experience

***H*$_{(4)}$** *People with managerial experience are less risk-averse than people without managerial experience.*

*⇒**H(0)**There is no significant relationship between managerial experience and risk preferences.*

Mathematical illustration of the hypothesis:

H_0: $\mu_{NME} = \mu_{ME}$; $\Rightarrow \mu_{NME} - \mu_{ME} = 0$

H_4: $\mu_{NME} > \mu_{ME}$; $\Rightarrow \mu_{NME} - \mu_{ME} > 0$

Given the two sample groups, as reflected in the mathematical formulation and described in 3.4 Data Analysis, the Mann-Whitney-U test is used to calculate the asymptotic significance. Based on the gathered data, a significance level of $p=0.012 \Rightarrow p<p_{sig}$ is calculated (Table 4.8). In this case, the level of significance is below 0.05. Therefore, the null hypothesis is rejected. Hence the alternative hypothesis (H_4) is accepted with an effect size of $r_{NME\text{-}ME}= 0.201$ indicates a medium magnitude of correlation (Sawilowsky, 2009). **This proves that people with managerial experience are less risk-averse than people without managerial experience.**

Test Statistics[a]

	Investement Alternatives
Mann-Whitney U	2527,500
Wilcoxon W	5377,500
Z	-2,503
Asymp. Sig. (2-tailed)	,012

a. Grouping Variable: Management Experience

Table 4.8: Mann-Whitney-U Test – Managerial Experience

4.2.2 Risk Preferences

After testing for significance within the single attributes as described in 3.4 Data Analysis, attributes with proved significance, namely *age, gender*, and *managerial experience* are further investigated in the following (see Figure 4.3).

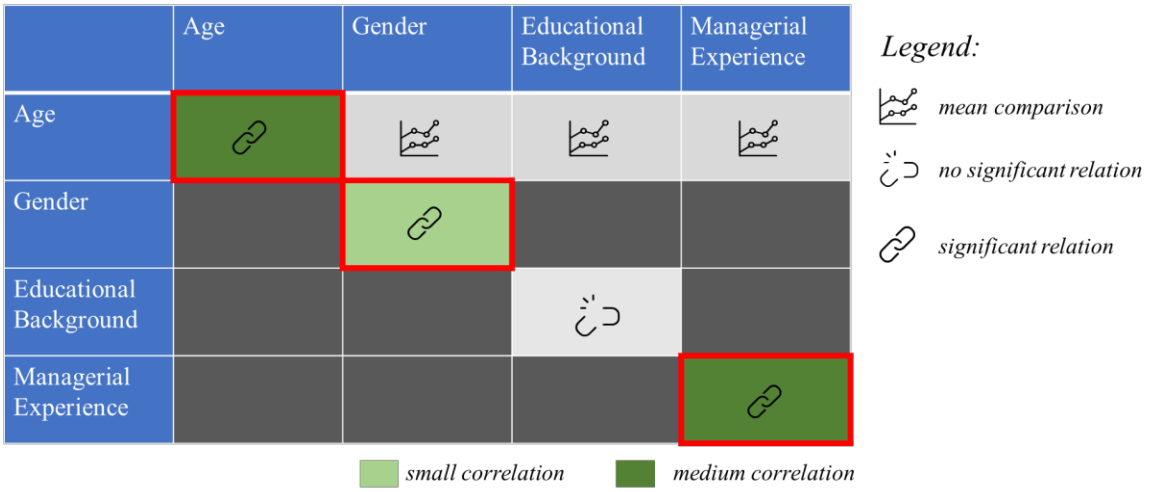


Figure 4.3: Relation Matrix - Risk Preferences

Since the significant attributes are solely composing of two sample groups, the Mann-Whitney-U test is used to calculate the asymptotic significance for all the relevant combinations.

4.2.3 Framing

Table 4.9 provides a general mean overview of the characteristics in focus and the *Framing* perspective. A value closer to -1 represents a higher degree of risk-seeking, a value closer to 1 indicates a stronger risk aversion.

		Gain-frame (Lucky draw) Mean	Gain-frame (Disease) Mean	Loss-frame (Lucky draw) Mean	Loss-frame (Disease) Mean
Gender	Male	.26	-.19	-.29	-.55
	Female	.64	-.12	-.13	-.42
Age	Gen. Z (<25)	.45	-.12	-.19	-.41
	Gen. Y (25-35)	.45	-.27	-.27	-.62
	Gen. X (>35)	.20	.20	-.13	-.33
Management Experience	No Mgmt. Experience	.60	-.15	-.23	-.46
	Mgmt. Experience	.24	-.16	-.21	-.52

Table 4.9: Mean Overview for Framing

Correlation of Framing with Age (Gen. Z - Gen. Y)

Based on the gathered data, the levels of significance (see Table 4.10) indicate a $p_x>0.05$ $\Rightarrow p>p_{sig}$. **Consequently, there is no significant correlation between age and framing.**

Test Statistics[a]

	Gain-frame (Lucky draw)	Gain-frame (Disease)	Loss-frame (Lucky draw)	Loss-frame (Disease)
Mann-Whitney U	2440,500	2203,500	2320,000	2093,000
Wilcoxon W	5215,500	4414,500	4531,000	4304,000
Z	-,008	-1,116	-,587	-1,794
Asymp. Sig. (2-tailed)	,994	,264	,557	,073

a. Grouping Variable: Age

Table 4.10: Mann-Whitney-U Test for Framing – Age

Correlation of Framing with Gender

All levels of significance, besides the *gain-frame* of the *lucky draw* (see Table 4.11), indicate a $p_x>0.05 \Rightarrow p>p_{sig}$.

The level of significance of the *Gain frame (Lucky draw)* indicates $p_{G/LD(G)}=0.008 \Rightarrow p_{G/LD(G)}<p_{sig}$. Hence, the result indicates that the difference in means between *genders*, concerning the gain-frame of the *lucky draw*, are significant and $r_{G/LD(G)}=0.212$ (Appendix G – Effect Size) incorporate a medium magnitude of phenomenon (Sawilowsky, 2009). **Consequently, women are significantly more risk-averse in the gain-frame of the lucky draw than men. The other framings show no significant correlation.**

Test Statistics[a]

	Gain-frame (Lucky draw)	Loss-frame (Lucky draw)	Gain-frame (Disease)	Loss-frame (Disease)
Mann-Whitney U	2384,000	2703,000	2835,000	2742,000
Wilcoxon W	6125,000	6444,000	6576,000	6483,000
Z	-2,643	-1,086	-,527	-,982
Asymp. Sig. (2-tailed)	,008	,277	,598	,326

a. Grouping Variable: Gender

Table 4.11: Mann-Whitney-U Test for Framing – Gender

Correlation of Framing with Managerial Experience

All levels of significance, besides the *gain-frame* of the *lucky draw* (see Table 4.12), indicate a $p_x>0.05 \Rightarrow p>p_{sig}$.

The level of significance of the *gain frame (lucky draw)* indicates $p_{G/LD(G)}=0.014 \Rightarrow p_{G/LD(G)}<p_{sig}$. Hence the result indicates that the difference in means between *managerial experience*, concerning the gain-frame of the *lucky draw*, is significant and $r_{G/LD(ME)}=0.197$ (Appendix G – Effect Size) incorporate a small magnitude of phenomenon (Sawilowsky, 2009). **Consequently, individuals without managerial experience are significantly more risk-averse in the gain-frame of the lucky draw than individuals with managerial experience. The other framings show no significant correlation.**

Test Statistics[a]

	Gain-frame (Lucky draw)	Loss-frame (Lucky draw)	Gain-frame (Disease)	Loss-frame (Disease)
Mann-Whitney U	2457,000	2984,000	2970,000	2899,000
Wilcoxon W	5307,000	6224,000	5820,000	5749,000
Z	-2,448	-,065	-,119	-,439
Asymp. Sig. (2-tailed)	,014	,948	,905	,661

a. Grouping Variable: Management Experience

Table 4.12: Mann-Whitney-U Test for Framing - Managerial Experience

4.2.4 Weighting

Table 4.13 provides a general mean overview of the characteristics in focus and the *Weighting* perspective. A value closer to -1 represents a higher degree of risk-seeking, a value closer to 1 indicates a stronger risk aversion.

		Underweighting large Prob. Mean	Overweighting small Prob. Mean
Gender	Male	.29	.42
	Female	.43	.39
Age	Gen. Z (<25)	.47	.53
	Gen. Y (25-35)	.21	.35
	Gen. X (>35)	.40	.07
Management Experience	No Mgmt. Experience	.39	.40
	Mgmt. Experience	.32	.41

Table 4.13: Mean Overview for Weighting

Correlation of Weighting with Age (Gen. Z - Gen. Y)

Based on the gathered data, the levels of significance (see Table 4.14) indicate a $p_x>0.05$ $\Rightarrow p>p_{sig}$. **Consequently, there is no significant correlation between age and over- or underweighting of probabilities.**

Test Statistics[a]

	Underweighting large Prob.	Overweighting small Prob.
Mann-Whitney U	2141,000	2168,500
Wilcoxon W	4352,000	4379,500
Z	-1,516	-1,352
Asymp. Sig. (2-tailed)	,130	,177

a. Grouping Variable: Age

Table 4.14: Mann-Whitney-U Test for Weighting – Age

Correlation of Weighting with Gender

Based on the gathered data, the levels of significance (see Table 4.15) indicate a $p_x>0.05 \Rightarrow p>p_{sig}$. **Consequently, there is no significant correlation between gender and over- or underweighting of probabilities.**

Test Statistics[a]

	Underweighting large Prob.	Overweighting small Prob.
Mann-Whitney U	2722,000	2899,500
Wilcoxon W	6463,000	5314,500
Z	-1,064	-,282
Asymp. Sig. (2-tailed)	,287	,778

a. Grouping Variable: Gender

Table 4.15: Mann-Whitney-U Test for Weighting – Gender

Correlation of Weighting with Managerial Experience

Based on the gathered data, the levels of significance (see Table 4.16) indicate a $p_x>0.05 \Rightarrow p>p_{sig}$. Consequently, there is no significant correlation between managerial experience and over- or underweighting of probabilities.

Test Statistics[a]

	Underweighting large Prob.	Overweighting small Prob.
Mann-Whitney U	2866,000	2983,000
Wilcoxon W	5716,000	6223,000
Z	-,579	-,071
Asymp. Sig. (2-tailed)	,563	,944

a. Grouping Variable: Management Experience

Table 4.16: Mann-Whitney-U Test for Weighting – Managerial Experience

4.2.5 Loss-Aversion Ratio

Table 4.17 provides you with a general mean overview of the characteristics in focus and the

		Gamble - Losing 100 Mean	Gamble - Losing 200 Mean	Gamble - Losing 500 Mean
Gender	Male	193	405	1,763
	Female	288	616	1,659
Age	Gen. Z (<25)	223	484	2,003
	Gen. Y (25-35)	256	530	1,539
	Gen. X (>35)	201	438	1,088
Management Experience	No Mgmt. Experience	219	459	1,980
	Mgmt. Experience	252	542	1,435

Table 4.17: Mean Overview - Loss-Aversion Ratio

Correlation of Loss-Aversion Ratio with (Gen. Z - Gen. Y)

Based on the gathered data, the levels of significance (see Table 4.18) indicate a $p_x>0.05$ $\Rightarrow p>p_{sig}$. **Consequently, there is no significant correlation between age and the loss-aversion values of 100 €, 200 €, and 500 €.**

Test Statistics[a]

	Gamble - Losing 100	Gamble - Losing 200	Gamble - Losing 500
Mann-Whitney U	2293,500	2233,500	2424,000
Wilcoxon W	5068,500	5008,500	5199,000
Z	-,630	-,880	-,076
Asymp. Sig. (2-tailed)	,528	,379	,939

a. Grouping Variable: Age

Table 4.18: Mann-Whitney-U Test for Framing - Age

Correlation of Loss-Aversion Ratio with Gender

Based on the gathered data, the levels of significance (see Table 4.19) indicate a $p_x>0.05 \Rightarrow p>p_{sig}$. **Consequently, there is no significant correlation between gender and the loss-aversion values of 100 €, 200 €, and 500 €.**

Test Statistics[a]

	Gamble - Losing 100	Gamble - Losing 200	Gamble - Losing 500
Mann-Whitney U	2585,000	2579,000	2695,000
Wilcoxon W	6326,000	6320,000	6436,000
Z	-1,400	-1,411	-,996
Asymp. Sig. (2-tailed)	,162	,158	,319

a. Grouping Variable: Gender

Table 4.19: Mann-Whitney-U Test for Framing - Gender

Correlation of Loss-Aversion Ratio with Managerial Experience

All levels of significance, besides the *gamble of losing 100 €* (see Table 4.20) indicate a level of significance of $p_x>0.05 \Rightarrow p>p_{sig}$. The level of significance of the *gamble of losing 100* indicates $p_{G100(ME)}=0.014 \Rightarrow p_{G100(ME)}<p_{sig}$. Hence, the result indicates that the difference in means between *managerial experience*, *concerning the gamble of losing 100* is significant and $r_{G100(ME)}=0.183$ (Appendix G – Effect Size) incorporate a small magnitude of phenomenon (Sawilowsky, 2009).

Consequently, individuals without managerial experience have a significantly lower Loss-Aversion Ratio in the gamble for 100 € than individuals with managerial experience. The other gambles show no significant correlation to the Loss-Aversion Ratio.

Test Statistics[a]

	Gamble - Losing 100	Gamble - Losing 200	Gamble - Losing 500
Mann-Whitney U	2374,500	2527,500	2777,500
Wilcoxon W	5614,500	5767,500	6017,500
Z	-2,280	-1,708	-,810
Asymp. Sig. (2-tailed)	,023	,088	,418

a. Grouping Variable: Management Experience

Table 4.20: Mann-Whitney-U Test for Framing - Managerial Experience

4.2.6 Perception of Risk

After testing risk determinants within the significant single attributes and before evaluating the combined attributes, the perception of risk within the grouped subjects according to the risk attributes (age, gender, educational background, and managerial experience) is provided in the following.

Perception of Risk by Age

In the following, the most relevant values of the statistics of age (Table 4.21) are mentioned:

37.8% of people within iGen associate risk with loss. Furthermore, individuals out of Millennials link risk to 37.9% to opportunity. In contrast to that, Generation X perceives risk to 86.7% as uncertainty.

$Perception*Ad_Age Crosstabulation

			Age			
			Gen. Z (<25)	Gen. Y (25-35)	Gen. X (>35)	Total
Perception of risk[a]	Uncertainty	Count	51	49	13	113
		% within Ad_Age	68,9%	74,2%	86,7%	
	Opportunity	Count	26	25	4	55
		% within Ad_Age	35,1%	37,9%	26,7%	
	Loss	Count	28	19	3	50
		% within Ad_Age	37,8%	28,8%	20,0%	
	Thrill	Count	18	12	0	30
		% within Ad_Age	24,3%	18,2%	0,0%	
	Gamble	Count	2	1	0	3
		% within Ad_Age	2,7%	1,5%	0,0%	
	Fun	Count	1	1	0	2
		% within Ad_Age	1,4%	1,5%	0,0%	
	Adrenalin	Count	1	0	0	1
		% within Ad_Age	1,4%	0,0%	0,0%	
	Investment	Count	1	1	0	2
		% within Ad_Age	1,4%	1,5%	0,0%	
	Reward	Count	1	0	0	1
		% within Ad_Age	1,4%	0,0%	0,0%	
	Fear	Count	1	0	0	1
		% within Ad_Age	1,4%	0,0%	0,0%	
Total		Count	74	66	15	155

Percentages and totals are based on respondents.

a. Group

Table 4.21: Perception of Risk – Age

Perception of Risk by Gender

In the following, the most essential values of the statistic of gender (Table 4.22) are mentioned:

Men associate risk to 68.6% with uncertainty, 41.9% with opportunity, and 41.9% with loss. In contrast, women link risk to 78.3% to uncertainty, 27.5% to opportunity, and 40.9% to loss.

$Perception*F_19_I2 Crosstabulation

			Gender		
			Male	Female	Total
Perception of risk[a]	Uncertainty	Count	59	54	113
		% within F_19_I2	68,6%	78,3%	
	Opportunity	Count	36	19	55
		% within F_19_I2	41,9%	27,5%	
	Loss	Count	22	28	50
		% within F_19_I2	25,6%	40,6%	
	Thrill	Count	18	12	30
		% within F_19_I2	20,9%	17,4%	
	Gamble	Count	0	3	3
		% within F_19_I2	0,0%	4,3%	
	Fun	Count	1	1	2
		% within F_19_I2	1,2%	1,4%	
	Adrenalin	Count	0	1	1
		% within F_19_I2	0,0%	1,4%	
	Investment	Count	1	1	2
		% within F_19_I2	1,2%	1,4%	
	Reward	Count	1	0	1
		% within F_19_I2	1,2%	0,0%	
	Fear	Count	0	1	1
		% within F_19_I2	0,0%	1,4%	
Total		Count	86	69	155

Percentages and totals are based on respondents.

a. Group

Table 4.22: Perception of Risk - Gender

Perception of Risk by Educational Background

In the following, the most relevant values of the statistic of educational background (Table 4.23) are mentioned:

Individuals without an educational background in management link risk to 31.5% to opportunity, whereas individuals with managerial background associate risk with opportunity to 41.3%. Men associate risk to 68.6% with uncertainty, 41.9% with opportunity, and 41.9% with loss. In contrast, women link risk to 78.3% to uncertainty, 27.5% to opportunity, and 40.9% to loss.

$Perception*A_Edu_Back Crosstabulation

			Educational Background		
			No Mgmt. Background	Mgmt. Background	Total
Perception of risk[a]	Uncertainty	Count	64	49	113
		% within A_Edu_Back	69,6%	77,8%	
	Opportunity	Count	29	26	55
		% within A_Edu_Back	31,5%	41,3%	
	Loss	Count	27	23	50
		% within A_Edu_Back	29,3%	36,5%	
	Thrill	Count	20	10	30
		% within A_Edu_Back	21,7%	15,9%	
	Gamble	Count	2	1	3
		% within A_Edu_Back	2,2%	1,6%	
	Fun	Count	1	1	2
		% within A_Edu_Back	1,1%	1,6%	
	Adrenalin	Count	0	1	1
		% within A_Edu_Back	0,0%	1,6%	
	Investment	Count	2	0	2
		% within A_Edu_Back	2,2%	0,0%	
	Reward	Count	0	1	1
		% within A_Edu_Back	0,0%	1,6%	
	Fear	Count	0	1	1
		% within A_Edu_Back	0,0%	1,6%	
Total		Count	92	63	155

Percentages and totals are based on respondents.

a. Group

Table 4.23: Perception of Risk - Educational Background

Perception of Risk by Managerial Experience

In the following, the most relevant values of the statistic of management experience (Table 4.24) are mentioned: Individuals without management experience associate risk to 32.5% to opportunity and 37.5% with loss. In contrast to that, individuals with management experience link risk to 38.7% to opportunity and 26.7% to loss.

$Perception*Adj_Mgmt Crosstabulation

			Management Experience		
			No Mgmt. Experience	Mgmt. Experience	Total
Perception of risk[a]	Uncertainty	Count	56	57	113
		% within Adj_Mgmt	70,0%	76,0%	
	Opportunity	Count	26	29	55
		% within Adj_Mgmt	32,5%	38,7%	
	Loss	Count	30	20	50
		% within Adj_Mgmt	37,5%	26,7%	
	Thrill	Count	18	12	30
		% within Adj_Mgmt	22,5%	16,0%	
	Gamble	Count	3	0	3
		% within Adj_Mgmt	3,8%	0,0%	
	Fun	Count	2	0	2
		% within Adj_Mgmt	2,5%	0,0%	
	Adrenalin	Count	1	0	1
		% within Adj_Mgmt	1,3%	0,0%	
	Investment	Count	1	1	2
		% within Adj_Mgmt	1,3%	1,3%	
	Reward	Count	1	0	1
		% within Adj_Mgmt	1,3%	0,0%	
	Fear	Count	1	0	1
		% within Adj_Mgmt	1,3%	0,0%	
Total		Count	80	75	155

Percentages and totals are based on respondents.

a. Group

Table 4.24: Perception of Risk - Managerial Experience

4.3 Combined Attributes

After focusing on the relation of single attributes and risk, the combined attributes are evaluated concerning age, as shown in Figure 4.4: Relation Matrix - Combined Attributes.

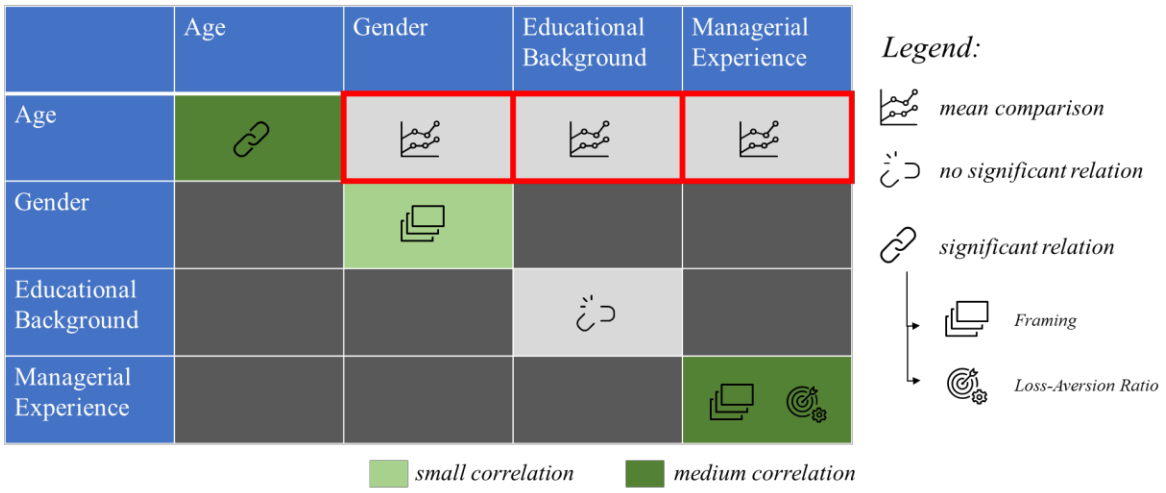


Figure 4.4: Relation Matrix - Combined Attributes

Generation and Gender

The customized cross-reference in the already proven significant categories of gender and age indicates a mean for male $\mu_{GZ(M)}$= 0.83, $\mu_{GY(M)}$= 0.2 and $\mu_{GX(M)}$= 0.80 (see Table 4.25). Whereas, the means for women are indicating a static growth parallel to the age. The mean for $\mu_{GC(F)}$is not representative due to the small sample group.

		Investement Alternatives	
Gender	Age	Mean	Count
Male	Gen. Z (<25)	.83	35
	Gen. Y (25-35)	.20	41
	Gen. X (>35)	.80	10
Female	Gen. Z (<25)	.69	39
	Gen. Y (25-35)	.84	25
	Gen. X (>35)	1.00	5

Table 4.25: Mean Overview for Age – Gender

Generation and Educational Background

Conducting a customized cross reference for the already partially proven significant attribute of age and the non-significant attribute of educational background indicates a mean for male $\mu_{NMB(GZ)}$= 0.71 and $\mu_{MB(GZ)}$= 0.81; female $\mu_{NMB(GY)}$= 0.65 and $\mu_{MB(GY)}$= 0.17 (see Table 4.26). The mean for $\mu_{X(GX)}$is not representative, due to the small sample group.

		Investement Alternatives	
Age	Educational Background	Mean	Count
Gen. Z (<25)	No Mgmt. Background	.71	42
	Mgmt. Background	.81	32
Gen. Y (25-35)	No Mgmt. Background	.65	37
	Mgmt. Background	.17	29
Gen. X (>35)	No Mgmt. Background	.85	13
	Mgmt. Background	1.00	2

Table 4.26: Mean Overview for Age - Educational Background

Generation and Managerial Experience

The customized cross reference for the already partially proven significant attribute of age and the non-significant attribute of educational background indicates a mean for male $\mu_{NME(GZ)}$= 0.84 and $\mu_{ME(GZ)}$= 0.58; female $\mu_{NME(GY)}$= 0.70 and $\mu_{ME(GY)}$= 0.22 (see Table 4.27). The comparison in Generation X is not representative due to distribution within the small sample group.

		Investement Alternatives	
Age	Managerial Experience	Mean	Count
Gen. Z (<25)	No Mgmt. Experience	.84	50
	Mgmt. Experience	.58	24
Gen. Y (25-35)	No Mgmt. Experience	.70	30
	Mgmt. Experience	.22	36
Gen. X (>35)	No Mgmt. Experience	.	0
	Mgmt. Experience	.87	15

Table 4.27: Mean Overview for Age - Managerial Experience

4.4 Chapter Summary

By conducting the statistical tests based on the collected data, we identified the significant relations between various attributes and risk preferences as summarized and illustrated in Figure 4.5Figure 4.5: Relation Matrix - Results. First, the one-dimensional analysis resulted in significant correlations between the risk attributes of age, gender, and managerial experience with risk preference. In a pairwise comparison, the correlation of means of Millennials and iGen are considered significant in terms of risk preferences. By proofing significance of PT characteristics, the empirical results suggest that people of different genders differ considerably in terms of framing, and individuals with different managerial experience differ considerably in terms of framing and their loss-aversion-ratio.

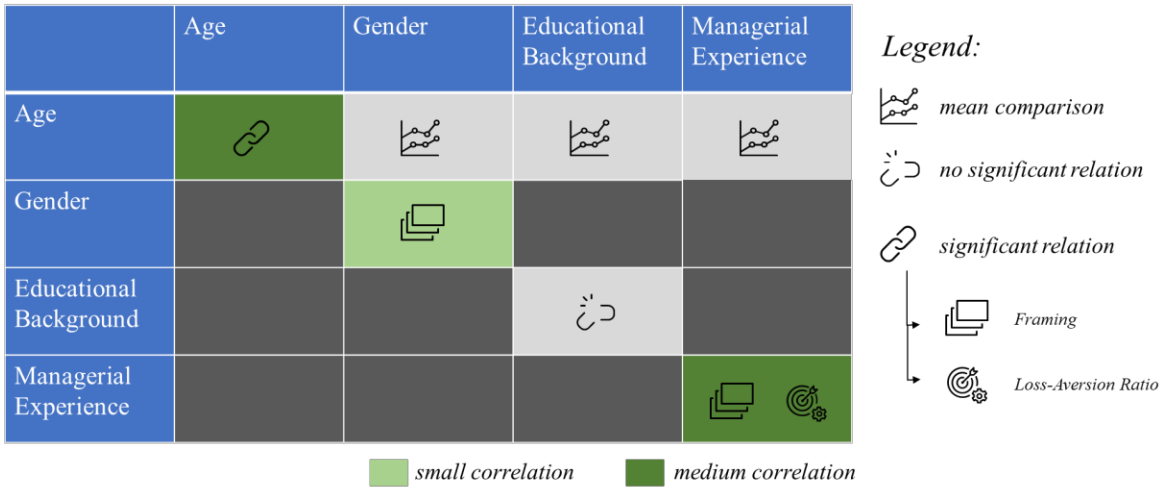


Figure 4.5: Relation Matrix - Results

5 Discussion and Conclusion

This chapter discusses the results of the conducted empirical data collection and provides the conclusion of the thesis. First, the empirical results concerning the risk preference analysis will be described and compared with the existing research. Based on this our findings are interpreted and implications on attribute level will be derived. Second, the research limitations of our study are addressed. Finally, the conclusion takes a more holistic view by summarising the key findings to answer the research questions, deriving the overall implications for strategic management and identifying opportunities for future research.

5.1 The Correlation of Risk Preferences and Attributes

5.1.1 The Role of Age

Findings

Our analysis revealed a significant difference between risk preferences of Millennials and iGens, suggesting that the former are much more risk-seeking compared to the latter. The subsequent significance test for framing, weighting, and loss aversion ratio, aiming to reveal whether such differences are mirrored within the single PT risk determinant measures, showed no significant correlation, however, a clear tendency persists for iGens and Generation X to be more risk-averse than Millennials. This tendency is also consistent with the general perception of risks within our study. While all generations associate risk the most with 'uncertainty' (as illustrated in Chapter 0), the relative comparison shows that Millennials associate risk fairly strongly with 'opportunity', iGens with 'loss' and Generation X with 'uncertainty'.

Literature Comparison

Contrary to the hypothesized and general consensus that risk aversion increases with age (Damodaran, 2007, Harrison, Lau & Rutström, 2007), our results indicate that Millennials are significantly more risk-seeking than iGens and also Generation X. We label this observed bell-shaped distribution of risk-taking behaviour in respect to age as the *risk bell*. Apart from this

peak in between, the observed risk behaviour correlation between Generation X to iGen is consistent with MacCrimmon and Wehring (1990), suggesting that older decision-makers are more risk-averse than less mature ones. Although the sample size of Generation X is only partially representative due to the limited sample size.

Interpretation

While previous research has concentrated on the general age structure, these results show that risk peaks may exist in the age continuum caused by different lifecycle contexts. Based on our findings, we argue that Millennials, who typically are represented by individuals during their first decade of their professional careers, are more determined and career-oriented than the younger iGens. This is further supported by the cognition of Millennials being extremely motivated to make an impact on their organization (Myers & Sadaghiani, 2010) accompanied by the context of increasing international competition for jobs (Levenson, 2010). In this vein, Raines (2002) argues that Millennials are optimistic, achievement-oriented, and are arriving in the workplace with higher expectations concerning their employer than any other generation before them. This determination and ambition are further mirrored by Raines (1997), who argues that Millennials expect work to allow them to distinguish themselves, to stand out and to achieve goals, while the previous Generation X is more concerned with reconciling work and private life and having fun at work. Accordingly, Millennials in their "young professional" life stage might be more willing to face risks, as this may be seen as an accepted necessity to foster their professional development and career. This interpretation is further supported by Kudisch (2011), who finds that risk-taking can be necessary when striving for the next career level, as adaptability and the willingness to try new approaches are considered crucial to management success. Against this, iGens, mostly represented by individuals attending their final years of academic education, are mainly situated in the "graduation" life stage coping with significant decisions, such as what to aspire in career and life. Against this background, iGens are found to strive more for self-fulfilment and inspiring work atmosphere (Fodor and Jaeckel, 2017) rather than for professional success such as the older Millennial generation. Given the multitude of opportunities for study, career and personal development, iGens remains an overload of opportunities and perhaps the fear of making the wrong decisions in their quest of self-fulfilment. This in combination with their play-it-safe mentality (Griffin, 2018), as well as their lower expectations compared to the older Millennial generation (Twenge, 2017) might explain their generally more risk-averse behaviour.

Besides the lifecycle stage, the observed risk behaviour is believed to be reasoned by political, economic and technological developments during a generation's formative years, as this is found to affect individual behavioural and psychological profiles (Strauss & Howe, 1991). In the face of social media, constant connectivity and on-demand entertainment and communication during their childhood, iGens have shown dramatic changes in youth behaviour, attitudes and lifestyle (Dimock, 2018). Therefore, growing up in such an "always on" technological environment (ibid.) while being guarded by overinvolved helicopter parents (Schiffrin, Liss, Miles-McLean, Geary, Erchull & Tashner, 2014) might have led to an increased risk aversion of iGens. Millennials, on the other hand, have been raised by participation-oriented parents, which means that they are accustomed to stand up for themselves (Lancaster & Stillman, 2002). As a consequence, Millennials might have learned independent risk-taking earlier on.

Implications

Concluding, we find the understanding of increased age leading to a general increase of risk aversion as suggested by Harrison, Lau and Rutström (2007) to be disproved. Instead of age, different generations, which are characterised by different life stages and formative developmental conditions, seem to be decisive for specific risk preferences. While individual behavioural and psychological profiles are found to be shaped by influences during formative years (Young & Hinesly, 2012), it is essential to notice that certain goals and aspirations are of a dynamic nature. Accordingly, such influential factors will most likely alter as a cohort develops into a new stage of life, which is accompanied with new aspirations and goals. As a result, risk behaviours assigned to certain generations might change over time and, thus, should be subject to a more dynamic, long-term investigation.

5.1.2 The Role of Gender

Findings

The conducted empirical analysis confirms a higher risk aversion of women compared to men. This is supported by the general perception of risks of men and women, since women more often associate risk with 'uncertainty' and 'loss', whereas vis-versa men associate risk more often with 'opportunity' and 'thrill' (illustrated in Chapter 0). Additional testing of PT determinants revealed a partially significant correlation between gender and one of the gain

framing scenarios. Other framing scenarios, however, do not imply a significant difference but still disclose a clear tendency of men being more risk-seeking than women in regard to both, loss and gain frames.

Literature Comparison

Given the measured loss-aversion ratios (illustrated in Appendix J – Loss Function)108, the risk aversion patterns observed indicate that men are more risk-seeking than women in gambles of smaller amounts and relatively more risk-averse in gambles of larger amounts, congruent with Holt and Laury (2002) who observed the same anomaly. In conjunction with the other results already described, our analysis supports earlier studies (e.g., Byrnes, Miller & Schafer, 1999; Damodaran, 2007; Levy, Elron & Cohen, 1999) which suggest that women are generally more risk-averse than men.

Interpretation

The explanation for such gender-related risk preferences can be based on research findings suggesting that women estimate the probability of gains and losses differently than men (Fehr-Duda, De Gennaro & Schubert, 2006; Olsen & Cox, 2001), which leads to increased loss aversion of women. However, the significance of the gender gap in risk preferences might be altered by the nature of the risky decision at hand. In this context, Byrnes, Miller, and Schafer (1999) suggest that, e.g., intellectual risk-taking and physical skills produced more considerable gender differences than other scenarios such as smoking. Consequently, this increased loss aversion of women might be based on gender differences in reference points, leading to different perceptions of gains and losses. This is further supported by the observation of gender-specific characteristic traits of men, such as competitiveness (e.g., Ellenbogen, Gupta & Derevensky, 2006), optimism (e.g., Niederle & Vesterlund, 2007), adventurousness (e.g., Zuckerman, 1994), and overconfidence (e.g., Pulford & Colman, 1997). Such a deviation of risk perception, in turn, explains different risk preferences between men and women for the same risky decision.

Implications

Considering that the focus on women in management positions has increased again in recent years (Jurkus, Park & Woodard, 2011; Melero, 2011), an increasing risk aversion among top management team's (TMTs) caused by its shifting gender composition is expected. While women continue to be under-represented in decision making positions at all levels, even in the

sectors and occupations where they dominate in terms of numbers (European Union, 2018), the number of Fortune 500 companies with female CEOs has reached a historical all-time high of 33 (Zillmann, 2019). Based on previous research and our findings, we do not suggest that increased gender representation in TMTs affects risk-taking via its impact on performance, but that women may on average be more risk-averse than men, which affects TMT decision-making and firm risk-taking.

5.1.3 The Role of Educational Background

Findings

Our results indicate that there is no significant correlation between the educational background and individual risk behaviour. Based on the mean value comparison, however, an enhanced tendency towards risk-averse behaviour is discernible in the subject group without an educational background in management studies. Furthermore, this is supported by the different risk perceptions within these subgroups. As shown in Chapter 0, individuals from our study with an educational background in management are more likely to associate risk with 'opportunity' than people without. Contrary to this impression, individuals with education in management studies do at the same time link risk more often to 'loss' than people without management education.

Literature Comparison

Prior literature on education as a mediator of individual risk preferences predominantly investigates on education in general terms rather than in regard to a particular profession or with a specific focus on management studies. Therefore, our observations can only partially be seen in line with Grable (2000) stating that individuals with higher attained education are generally more risk-seeking than others. Dwyer, Gilkeson and List (2002), Grable (2000) and Jianakoplos and Bernasek (1998), on the other hand, investigated risk preferences of investors as a particular profession. Since their research may be more applicable to the extent that it analyses the effect of higher education in a particular area on risk behaviour, their conclusion once again supports our findings that well educated people are more inclined to take risks than people with less education (in that particular profession).

Interpretation

The observed notion of higher education in management studies as being a favourable indicator for risk accepting (risk-seeking) behaviour thus might be explained by the higher frequency to which management students have to deal with decision making as one of the main components of their studies. This is believed to result in a higher degree of familiarity with risky decision-making and therefore, might lead to more confidence and thus a more risk accepting approach to hypothetical scenarios such as those described in our study. The lack of significance can be explained by the comparative character of the data analysis, as the majority of the non-management sample group does have higher education but in other academic areas (see Chapter 1.5).

Implications

Taking a step back to consider the bigger picture of education development and its influence on risk behaviour provides an outlook on further implications in this regard. Globalisation has strongly influenced higher education to the extent that information and communication technologies have provided instant access and simplified scientific communication (Altbach, Reisberg & Rumbley, 2019). As pointed out in Chapter 1.1.2, the figures for global enrolment in higher education have reached a historical peak and are further promoted by ambitious goals as set by the European Commission (European Commission, 2019). Such a rapid increase in higher education combined with the observed correlation between higher education and risk-taking behaviour is believed to be a driving force towards a generally more risk-accepting behaviour in the future. However, assuming that most TMTs in the past typically consisted of solely highly educated individuals, this development is unlikely to strongly influence the risk behaviour of top management and thus organisational risk in general. Thus, only the subject-specific academic background rather than the general academic qualifications of managers might play a minor role in influencing risk preferences, as our analysis shows.

5.1.4 The Role of Managerial Experience

Findings

The analysis of managerial experience as an influence factor on individual risk preferences reveals a significant correlation between such experience and risk behaviour, suggesting that more experienced individuals are more risk-seeking than inexperienced ones. Similar to the

attribute of gender, the subsequent assessment of PT determinants suggests a significant correlation for one of the gain frames, while the other framing scenarios do not suggest a significant difference. With this, the loss aversion ratio of individuals with managerial experience is considerably higher than those of people without managerial experience. Furthermore, the general tendency that people with managerial experience are more risk-seeking is also reflected in the risk perception of these two groups (Chapter 0). In this context, individuals with management experience tend to associate risks with 'opportunity' rather than 'loss', in contrast to people without management experience.

Literature Comparison

The results mainly match the research of Dyer, Kagel and Levin (1989), suggesting that people with experience take more risks than people without. This is also further supported by March and Shapira (1987), who found that more experienced decision-makers may be willing to take risks that less experienced people would avoid. Earlier studies such as Slovic, Fischoff and Lichtenstein (1980), support this finding by stating that experience of decision-makers influences risk behaviour by promoting a higher degree of confidence in extremely experienced individuals. This seems to be especially mirrored in our study's gain-frame scenario described above, as people with managerial experience seek significantly more risk in this scenario than the non-experienced sample group. The calculated values for loss aversion, on the other hand, contradict the above statement of March and Shapira (1987).

Interpretation

As suggested by March and Shapira (1987), experienced decision-makers may be able to focus selectively on the evidence of their past ability to overcome obstacles, ultimately leading to increased confidence and risk-taking behaviour, as well as a lower degree of loss aversion (loss fearing). This generally compelling explanation of March and Shapira (1987), however, does not clarify the found contradiction of the observed loss-aversion scenarios, which is attributed to the limited representability of the conducted study.

Implications

The level of experience that managers gained with a certain kind of activity has been reasoned to shape how managers frame their decision outcomes which ultimately influences their risk behaviour (Garbuio, King & Lovallo, 2011; Shimizu, 2007). Yet, the sole component of managerial experience as risk perception indicator can be misleading and might be even more

inapplicable in future generations. This is argued based on the fact that the core philosophy of management is subject to a significant change (Taborda, 2000). As a result of globalization and increased competitive pressure, leadership and management will be redefined in the future (ibid.). This inherent shift from command and control towards more agile and flexible structures requires managers to be moderators rather than controllers (ibid.). As a result, a new set of management capabilities is likely to be increasingly needed that could make previous experiences less relevant. Concluding, managers would be less able to selectively focus on the evidence of their past ability to overcome obstacles as argued by March & Shapira (1987), which in turn might diminish their confidence in risky decision-making as found by Slovic, Fischoff & Lichtenstein (1980). Since this shift of capabilities does not allow managers to build on previous experience, resulting in reduced confidence in risky decision-making situations, we argue that managerial experience as a denominator for managerial risk-preferences will increasingly be of less importance.

5.1.5 Risk Preference Patterns of Combined Attributes

To obtain a more holistic view, combinations of the attributes were evaluated to analyse correlations and patterns between individual attributes.

Generation and Gender

Accumulating the attributes of generation and gender concerning risk, the results for men represent the same *risk bell* as previously described (see Chapter 5.1.1) but not for women. Moreover, the results of the combined attributes, in turn, show that the consensus (Damodaran, 2007) that risk aversion increases with age seem to apply to women but not to men. Besides, while being aware of the minimal sample size representing subjects older than 35, our findings contradict Byrnes, Miller and Schafers (1999) observation of a closing gender gap with increasing age. In summary, increased risk-averse behaviour of women seem to persist throughout different generations with a slight increase with advancing age. The risk behaviour of men, on the other hand, continues to be characterised by the *risk bell* pattern, suggesting that this observation is a gender-related phenomenon.

Taking these correlations together with the implications drawn from the isolated attribute assessment, this offers insights into the nature of the observed risk preference patterns. Based on our findings and existing research, we argue that significant developments (as described in

1.2.1) during the different generation's formative years, which are found to influence individual behavioural and psychological profiles (Strauss & Howe, 1991) affect gender-specific characteristics differently. These characteristics, in turn, lead to increased gender differences in risk behaviour. More specific, characteristic traits such as competitiveness (e.g. Ellenbogen, Gupta & Derevensky, 2006), optimism (e.g. Niederle & Vesterlund, 2007), adventurousness (e.g. Zuckerman, 1994), and overconfidence (e.g. Pulford & Colman, 1997), seem to have been specially altered by developments typical for Millennial childhood. This generation specific shift of traits, as argued previously, might ultimately affect gender-specific reference points and therefore, risk preferences.

Generation and Educational Background

Combining the attributes of generation and educational background, partially results in a diverging impression then by the isolated analysis of educational background. As already mentioned before, Dwyer, Gilkeson and List (2002) argue that individuals with extensive knowledge in one business area are more inclined to take on risk in that line of business, than individuals with less knowledge in the same business area. Following this, risk preferences in the Millennials cohort are in line with this research stream, indicating that an educational background in management seems to result in more risk-seeking behaviour within this generation. Contradictory to this, iGen subjects with higher education in managerial studies seem to be even more risk-averse than subjects without such education. Thus, educational background does not seem to amplify risk-taking behaviour in this particular generation, either for individuals in the field of management sciences or in other fields, which contradicts the otherwise observable tendency for more educated individuals in this field to behave risk-accepting. Besides, Generation X seems to align with Millennials but should not be considered due to missing representability. Overall, the *risk bell* described in Chapter 5.1.1 also becomes visible in this overview regardless of educational attainment.

Ingleby and Oliver (2008) argue that the environment is a significant factor in shaping an individual's personality. One generally accepted fact is that children from academic parents are studying three times as often as children from non-academic parents (Himmelrath, 2018). This illustrates the parental role model status embodying academic and professional success. In parallel with being urged to succeed by their parents (Howe & Strauss, 2003), Millennials in their first profession might be more willing to take risks in order to meet parental expectations and to aspire professional success. As found in Chapter 5.1.1 iGens strive more towards self-

fulfilment compared to Millennials (Fodor and Jaeckel, 2017) and are therefore believed to be less willing to take risk for fostering professional success or meeting parental expectations. This, in addition to their generally lower expectations towards themselves and their employers (Twenge, 2017), might ultimately lead to less success-oriented risk taking to realise exemplified stereotypes of their parents. However, this analysis is subject to the drawback of the chosen convenience sampling approach (explained in 3.3 Data Collection Method). As already mentioned in Chapter 1.5, the survey participants are mainly individuals with a high level of educational attainment. A distinction can therefore only be made between individuals with and without higher education in management studies but not between those with and without higher education in general terms, which therefore further diminishes observable differences of the comparison groups.

Generation and Managerial Experience

The combination of the attributes generation and managerial experience leads to similar impressions as the ones obtained by the isolated analysis of each attribute. Thus, people with managerial experience appear to be less risk-averse than individuals without managerial experience irrespectively of their generation. Generation X is not representative in this combination of attributes because individuals without managerial experience are absent from the sample group. In conclusion, it seems that the pattern of the *risk bell* is as recognizable as in the isolated analysis of age.

5.2 Research Limitations

Even though providing new and valuable insights into individual risk preferences, the generalizability of our study's results is limited by several factors. These factors will be briefly discussed in the following.

5.2.1 Experimental versus Real-Life Decision Making

Manager's decision situations most likely differ in several aspects from the experimental scenarios in PT and accordingly from our study. First, real-life situations are not static, but rather dynamic by nature, meaning that prior outcomes of risky decisions might influence risk preferences for later decisions (Slattery & Ganster, 2002). In this context, Thaler and Johnson

(1990) found in their study, that subjects when told having previously either gained or lost a certain sum of money, behave more risk-seeking in prior gain conditions and risk-avoiding in prior loss condition. Second, while the subjects in our study receive a matrix of probabilities and pay-outs, decision makers generally do not and, therefore, have to make decisions under a higher degree of uncertainty (Slattery & Ganster, 2002). Third, decision-makers in real-life situations often have several (rather than a single) reference points that can jointly define their decisions' framing (ibid.). Lastly, gains and losses resulting from a manager's decision in real-life, lead to real-life consequences with which decision makers have to live with. This might not produce the same reversal of risk preferences, as observed in hypothetical scenarios (ibid.).

5.2.2 Organizational Characteristics

Moreover, as touched upon earlier, our study is limited to the risk determinants proposed by Kahneman and Tversky's (1979) Prospect Theory, which, according to Pablo and Sitkin (1992), can predominantly be categorized into individual and problem characteristics. As a consequence, there are several predictors of individual risk behaviour that are not considered in our study design. The first is the *composition of the group* within which risk-related decisions are made. Following Janis' (1972) groupthink hypothesis and Stoner's (1968) notion of the risky shift, group contexts might influence individuals to take more extreme positions to risk. Moreover, the culture of a collectivity as defined by Hofstede (1980, p.19) is determined by values that mirror a "broad tendency to prefer certain states of affairs over others.". Therefore, an organization's *cultural risk values*, meaning its tendencies to prefer certainty versus uncertainty and risk avoidance versus risk-seeking, is also believed to influence individual risk behaviour (Douglas & Wildavsky, 1982). As a third factor, several researchers have stressed the crucial role of managers in determining risk behaviour and giving personal legitimacy to take or avoid risk (Jackofsky, Slocum & McQuaid, 1988; MacCrimmon & Wehrung, 1986; Nutt, 1986; Schein, 1985). This is why the *leader's risk orientation* represents another organizational characteristic that is suggested to affect individual risk preferences (Pablo & Sitkin, 1992). Lastly, an *organization's control system* of their decision-making processes is found to influence a decision maker's risk behaviour (March & Shapira, 1987). Hereby, the individual willingness to take risk is encouraged or discouraged through monitoring, evaluating, and rewarding of the outcomes achieved and processes applied (Ouchi, 1977) when risks are involved.

5.3 Conclusion

The purpose of this thesis was to examine the risk behaviour of our current and future generation of managers and its implications for strategic management through providing empirical insights into individual risk preferences and risk attributes. Based on the prevailing theory of decision making under risk, namely Prospect Theory, a corresponding sample group of 155 subjects has been analysed and resulted in the following conclusions.

5.3.1 Main Findings

First, our findings suggest that Millennials are significantly more risk-seeking than the younger iGens and also the older Generation X, which contradicts the hypothesized and general consensus that risk aversion increases with *age*. This observed *risk bell*, which refers to the increased willingness to take risk in the middle range of the surveyed age spectrum, can be explained by a combination of factors. Respectively, different generations characterised by certain life stages and formative developmental conditions seem to be decisive for individual risk preferences, rather than age. However, risk behaviours assigned to particular generations might change over time as aspirations and goals linked to particular life stages will most likely alter as a cohort develops into a new stage of life. beyond the isolated analysis of individual attributes, we have also investigated correlations of attribute combinations to obtain a more integrated view of risk behaviour patterns.

Second, investigating other risk defining attributes more in-depth, our analysis found a *gender*-related gap in risk preferences, supporting previous research stating that women are generally more risk-averse than men. Based on these findings, we predict an increase of managerial risk aversion due to the growing gender diversity in the firm's top management teams.

Third, the conjoint analysis of different *generation and gender* combinations further revealed additional insights. While the increased risk-averse behaviour of women compared to men persists throughout different generations with a slight increase with advancing age, the risk behaviour of men continues to be characterised by the *risk bell* pattern, showing the most risk-seeking behaviour amongst Millennials. Thus, this observation appears to be a gender-specific phenomenon and might be explained by certain formative developments that affect gender

characteristics such as competitiveness, optimism, adventurousness and overconfidence differently.

Fourth, the collected data indicates that *education* in management related studies generally favours risk accepting (risk-seeking) behaviour, which is also consistent with previous studies. Taking into consideration the rapid increase in higher education observed in recent years combined with the observed correlation with risk-accepting behaviour, this is considered a counterforce to the general motion towards a higher degree of risk aversion in TMTs. Assuming that most TMTs have typically consisted of highly educated individuals in the past, this is unlikely to strongly influence the risk behaviour of top management and thus, firms.

Fifth, *managerial experience* has also been observed to advocate risk-taking behaviour due to a higher level of confidence and managers' ability to selectively focus on evidence of their previous ability to overcome obstacles. However, research suggests that globalization and increased competitive pressure causes a shift from command and control towards more agile and flexible firm structures, which in turn requires new managerial capabilities. Accordingly, we argue that management experience will be of less importance as a denominator for managerial risk preferences as this capability shift might prevent managers from building on past experience, resulting in less confidence in risky decision-making situations.

5.3.2 Implications for Strategic Management

In conclusion, the present findings suggest that the observed trends towards more risk-averse management generations do not match the growing challenges businesses are facing in times of digital globalisation, as proactive risk-taking is a prerequisite for effectively managing uncertainties and unpredictable conditions. Given the role of risk in creating competitive advantage, we suggest that behavioural views of risk-taking should be integrated in organizational risk management. This realisation leaves firms with the challenge of reviewing their assumptions about how risks are defined, which risks are considered to be favourable, which risks should not be taken and, accordingly, which decision-makers should be entrusted with risky decisions. Premises derived in this way should lead to certain working practices, structures, processes, and routines that favour particular types of risk, as well as defined risk takers. Concluding, our analysis does not only help to understand individual decision-making

under risk better but also serves as a basis for the design of risk-taking and risk management within organizations.

Based on the findings presented by the conducted study, the following fields of action can be derived to influence managerial decision making under risk strategically. First and foremost, the *composition of top management teams* is considered of central importance as the sum of its individuals' risk behaviour constitutes the organization's risk. Taking into account our empirical findings and a firm's understanding and attitude towards risk, top management teams should consist of a carefully balanced composition of people of different genders and generations.

Second, the perception mechanisms of individuals, which constitute the basis of prospect theory, should form the basis for companies to *interact and systematically influence managerial risk behaviour*. This can be achieved through the following measures.

In order to encourage or inhibit managers' willingness to take risks in the *short-term*, companies must design their interventions in such a way that they correspond to the thought patterns of managers. From a prospect theory standpoint, it might be more effective to directly address the attention patterns and vanities of managers rather than trying to change perceptions about the likelihood of events or to promote preferences for highly variable alternatives Therefore, *incentivising risk-taking* in line with the needs of companies may be the right way forward in the short-term. In doing so, particular attention should be paid to generation-specific character traits in order to maximise this effect.

In addition, with regard to *mid-term* measures, risk behaviour might be influenced by addressing the organisation's *risk culture*. By promoting a specific attitude towards risk, group thinking and the culture of collectivity can be used to influence individuals, as group contexts can influence individuals to take more extreme positions to risk.

From a *long-term* perspective, targeted *training and education* of managers in decision-making under risk could be beneficial, as there may be promising opportunities for a change in leadership perspectives through direct training in decision theory approaches to risk and risk management. As already mentioned, however, manager's inherent preferences are not just a matter of individual taste but are deeply embedded in norms and expectations. Such a change in risk preferences and behaviour is, therefore, likely to take time, as it is more a matter of altering beliefs and values than merely modifying the selection or training of managers.

5.3.3 Future Research

Following this study, it is recommended to further investigate individual risk preferences and to elaborate on their influence on strategic decision-making.

In a subsequent longitudinal study, there lies the opportunity for analysing on how risk preferences of generations, especially Millennials, will evolve in the future. By conducting a long-term study, researchers will be able to determine whether the observed *risk bell* in Millennials will continue to be presented throughout the years. Thus, the question can be answered whether risk preferences of certain generations are mainly based on motivations and aspirations prescribed by certain life stages or predominantly anchored in their personal development in formative years. Also, this will provide the basis for investigating what motivations and aspirations exist within certain generations and whether a shift in these can be observed over different cohorts.

Furthermore, and by applying a more holistic approach, we suggest that research is needed to investigate how managerial risk-taking determines different types of organisational structure and environmental outcomes. This leads to a deeper understanding of the internal and external consequences of individual risk behaviour. This, in turn, provides guidance on how exactly the composition of top management teams can be strategically influenced to optimise collective performance and to align managerial risk behaviour with corporate strategy.

6 References

Abelson, R.P. & Levi A. (1985). Decision making and decision theory. G. Lindzey, E. Aronson (Eds.), *Handbook of social psychology*, New York: Random House, vol.3, pp. 231-309

Allais, M. (1953). Le comportement de l'homme rationnel devant le risque: critique des postulats et axiomes de l'ecole americaine. Econometrica, vol. 21. pp. 503-546

Allen, M. J. & Yen, W. M. (1979). Introduction to Measurement Theory. Monterey, CA: Brooks/Cole Publishing Company

Altbach, P. G., Reisberg, L. & Rumbley, L. E. (2019). Trends in Global Higher Education. Leiden, Niederlande: Brill, Sense Publishers

Anastasi, A. & Urbina, S. (1997). Psychological testing (7th ed.). New York: Macmillan

Andersen, T.J., Garvey, M. & Roggi, O. (2014). Managing risk and opportunity: The governance of strategic risk-taking. OUP Oxford

Arrow, K. (1958). Utilities, attitudes, choices: A review note. Econometrica, vol. 26, no. 1, pp.1-23

Arrow, K. J. (1965). Aspects of the Theory of Risk Bearing. Helsinki: Yijo Jahnssonis Saatio

Ary, D. Jacobs, C. & Razavieh A. (1996). Introduction to research in education. Fort Worth, TX: Harcourt Brace College Publishers

Bannister, J.E. & Bawcutt, P.A. (1981). Practical risk management. London:Witherby

Baucells, M. & Villasís, A. (2010). Stability of risk preferences and the reflection effect of prospect theory. Theory and Decision, vol. 68, no. 1-2, pp.193-211

Baucus, M. S. & Near, J. P. (1991). Can illegal corporate behavior be predicted? An event history analysis. *Academy of Management Journal,* vol. 34, no. 1, pp.9-36

Bauer, D. L., Collins, D. T. & Richardson, K. (2001). Attitudes about Financial Wealth: Generational Comparisons of Gen-Xers vs. Millennials. Journal of Business & Economic Policy, vol. 4, no. 2, pp.30-35

Bell, N. S., Connell, J. A. & McMinn, N. E. (2011). How will the Next Generation Change the Business World? A Report on a Survey. *Insights to a Changing World Journal*, vol. no. 1, pp. 45-55

Berge, Z. L. & Berge, M. B. (2019). Generations X, Y, and Z. Performance Improvement. *The Economic ABCs of Educating and Training*, vol. 58, no. 5, p.44

Bettis, R. A & Hitt, M. A. (1995). The new competitive landscape. *Strategic management journal,* vol.16, pp.7-19

BlackRock (2018). Investor Pulse - Money and Happiness | BlackRock. [online] BlackRock. Available at: https://www.blackrock.com/corporate/insights/investor-pulse [Accessed 8 May 2019]

Blumberg, B., Cooper, D. R. & Schindler, P. S. (2005). Business Research Methods. Berkshire: McGraw Hill Education

Borghesi, A. (1979). Rischio aziendale, risk management e strategia delle imprese di assicurazione. Il Risparmio No.9

Borghesi, A. & Gaudenzi, B. (2013). Risk management. Milan: Springer

Boulding, K. Cyert, R. & March, J. (1964). A Behavioral Theory of the Firm. American Sociological Review, vol.29, no. 4, p.592

Brealey, R. A. & Myers, S. C. (1981). Principles of Corporate Finance, 1st Edition, McGraw-Hill

Brockner, J. (1992). The Escalation of Commitment to a Failing Course of Action: Toward Theoretical Progress. *The Academy of Management Review,* vol. 17, no. 1, p.39

Bryman, A. & Bell, E. (2011). Ethics in business research. Business Research Methods, vol. 7, no. 5, pp.23-56

Bureau of Labor Statistics (2013). Women in the labor force: A databook. Washington, DC: U.S. Department of Labor

Byrnes, J., Miller, D. & Schafer, W. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin,* vol. 125, bo. 3, pp.367-383

Camerer, C., Loewenstein, G. & Prelec, D. (2005). Neuroeconomics: How neuroscience can inform economics. *Journal of Economic Literature*, vol. 43, no. 1, pp. 9-64

Camerer, C., Loewenstein, G. & Rabin, M. (2011). Advances in behavioral economics. Princeton: Princeton University Press

Camerer, C., MacCrimmon, K., Wehrung, D. & Stanbury, W. (1988). Taking Risks: The Management of Uncertainty. *Administrative Science Quarterly*, vol. 33, no. 4, p.638

Carter, R.L. (1979). Economics and insurance. Stockport: PH Press

Charness, G. & Gneezy, U. (2012). Strong Evidence for Gender Differences in Risk Taking. *Journal of Economic Behavior & Organization,* vol. 83, no.1, pp.50-58

Chatterjee, S., Wiseman, R., Fiegenbaum, A. & Devers, C. (2003). Integrating Behavioural and Economic Concepts of Risk into Strategic Management: the Twain Shall Meet. Long Range Planning, vol.36, no.1, pp.61-79

Chattopadhyay, P., Glick, W. H. & Huber, G. P. (2001). Organizational actions in response to threats and opportunities. *Academy of Management Journal,* vol. 44, no.5, pp. 937-955

Chiles, T. & McMackin, J. (1996). Integrating Variable Risk Preferences, Trust, and Transaction Cost Economics. *The Academy of Management Review,* vol. 21, no. 1, p.73

Cochran , G. (1977). Sampling techniques (3rd ed.). New York: John Wiley & Sons

Creswell, J. (2014). Research design: qualitative, quantitative, and mixed methods approaches. 4th ed. SAGE Publications, Inc.

Cronbach, L. & Meehl, P. (1955). Construct validity in psychological tests. Psychological Bulletin, vol. 52, no.4, pp.281–302

Crouch, E. & Wilson, R. (1982). Risk/Benefit Analysis. Ballinger, Cambridge, MA

D'Aveni, R. A. & Gunther, R. (1994). Managing the dynamics of strategic maneuvering

Damodaran, A. (2007). Strategic risk taking: a framework for risk management. Pearson Prentice Hall

De Vaus, D. (2001). Research design in social research. SAGE Publications Ltd.

DeVellis, R. E. (2006). Scale Development: Theory and Application. *Applied Social Science Research Method Series*. Vol. 26 Newbury Park: SAGE Publishers Inc

Dickerson, D. (2007). Risk management and the Millennial generation. Campus Activities Programming

Dickinson, G. (2001). Concepts of probability and risk, handbook of risk management. Kluwer-Harrap Handbooks, London, pp.1974–1984

Dimock, M. (2018). Defining generations: Where Millennials end and Generation Z begins. Pew Research Center

Douglas, M. & Wildavsky, A. (1982). Risk and culture: An essay on the selection of environmental and technological dangers. Berkeley: University of California Press

Dwyer, P., Gilkeson, J. & List, J. (2002). Gender differences in revealed risk taking: evidence from mutual fund investors. *Economics Letters,* vol. 76, no. 2, pp.151-158

Dyer, D., Kagel, J. H. & Levin, D. (1989). A comparison of naive and experienced bidders in common value offer auctions: A laboratory analysis. *The Economic Journal*, vol. 99, no. 394, pp.108-115

Easterby-Smith, M., Thorpe, R. & Jackson, P. (2015). Management and Business Research. 5th ed. Los Angeles: SAGE, pp.188-315

Ellenbogen, S., Gupta, R. & Derevensky, J. (2006). A Cross-Cultural Study of Gambling Behaviour Among Adolescents. *Journal of Gambling Studies,* vol. 23, no. 1, pp.25-39

European Commission - European Commission. (2019). Europe 2020 strategy. [online] Available at: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-

correction/european-semester/framework/europe-2020-strategy_en [Accessed 22 May 2019]

European Union. (2018). 2018 Report on equality between women and men in the EU. Luxembourg: European Union, p.70

Fehr-Duda, H., De Gennaro, M. & Schubert, R. (2006). Gender, financial risk, and probability weights. *Theory and decision, vol.* 60, no.2-3, pp.283-313

Fischhoff, B., Watson, S. & Hope, C. (1984). Defining risk. *Policy Sciences*, vol. 17, no. 2, pp.123-139

Fishburn, P. & Kochenberger, G. (1979). Two-piece Von Neumann-Morgenstern utility functions. *Decision Sciences,* vol. 10, no. 4, pp.503-518

Fleishman, J. (1988). The Effects of Decision Framing and Others' Behavior on Cooperation in a Social Dilemma. *Journal of Conflict Resolution*, vol. 32, no. 1, pp.162-180

Fodor, M. & Jaeckel, K. (2017). What does it take to have a successful career through the eyes of generation Z-based on the results of a primary qualitative research. *International Journal on Lifelong Education and Leadership*, vol. 4,no. 1, pp.1-7

Fowler, F. J. (2014). Survey research methods (5th ed.). Thousand Oaks, CA: SAGE

Friedman, M. & Savage, L. (1948). The Utility Analysis of Choices Involving Risk. *Journal of Political Economy,* vol. 56, no. 4, pp.279-304

Ganesh, T. (2009). Reliability and Validity Issues in Research. *Integration and Dissemination Research Bulletin*, vol. 4, pp.35-40

Garbuio, M., King, A. W. & Lovallo, D. (2011). Looking inside psychological influences on structuring a firm's portfolio of resources. *Journal of Management,* vol. 37, pp.1444-1463

Ghoshal, S. (1987). Global strategy: An organizing framework. *Strategic management journal,* vol. 8, no. 5, pp.425-440

Grable, E. J. (2000). Financial Risk Tolerance and Additional Factors That Affect Risk Taking in Everyday Money Matters. *Journal of Business and Psychology,* vol. 14, no. 4, pp.625–630

Grable, J. E. & Lytton, R. H. (2003). The Development of a Risk Assessment Instrument: A Follow-Up Study. *Financial services review*, vol. 8, no. 3, pp.163-181

Graziano, A. M. & Raulin, M. L. (2006). *Research Methods: A Process of Inquiry* (6th Ed.). Boston, MA: Allyn & Bacon

Griffin, R. (2018). Millennials are old news — now it's Gen Z's turn to kill industries. [online] Bloomberg.com. Available at: https://www.bloomberg.com/news/articles/2018-08-07/move-over-millennials-it-s-gen-z-s-turn-to-kill-industries [Accessed 22 May 2019]

Hair, J., Anderson, R., Tatham, R. & Black, W. (1995). Multivariate data analysis (4th ed.). Upper Saddle River, NJ: Prentice Hall, p.105

Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A. & Davison, R. B. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of Management*, vol.35, pp. 469-502

Harris, J. & Bromiley, P. (2007). Incentives to cheat: The influence of executive compensation and firm performance on financial misrepresentation. *Organization Science*, vol. 18, pp.350-367

Harrison, G. W., Lau, M. I. & Rutström, E. E. (2007). Estimating risk attitudes in Denmark: A field experiment. *scandinavian Journal of Economics*, vol. 109, no. 2, pp.341-368

Hayward, M. L. A. & Shimizu, K. (2006). De-commitment to losing strategic action: Evidence from the divestiture of poorly performing acquisitions. *Strategic Management Journal*, vol.27, pp.541-557

Hillman, A., Shropshire, C. & Cannella, A. (2007). Organizational Predictors of Women on Corporate Boards. *Academy of Management Journal*, vol. 50, no. 4, pp.941-952

Himmelrath, A. (2018). Bildungserfolg: Auf die Eltern kommt es an - Forum SPIEGEL ONLINE. [online] Spiegel.de. Available at: https://www.spiegel.de/forum/lebenundlernen/bildungserfolg-auf-die-eltern-kommt-es-a-thread-749736-1.html [Accessed 24 May 2019]

Hofstede, G. (1980). Culture's consequences, international differences in work-related values. Beverly Hills: Sage

Hogarth, R. M. (1987). Judgement and choice: The psychology of decision. New York: John Wiley. 2nd ed

Holt, C. A. & Laury, S. K. (2002). Risk aversion and incentive effects. *American economic review*, vol. 92, no. 5, pp.1644-1655

Hoskisson, R., Chirico, F., Zyung, J. & Gambeta, E. (2016). Managerial Risk Taking. *Journal of Management*, vol. 43, no. 1, pp.137-169

Hoskisson, R., Hitt, M., Wan, P. & Yiu, D. (1999). Theory and Research in Strategic Management: Swings of a pendulum. *Journal of Management*, vol. 25, no. 3, pp.417-456

Howe, N. & Strauss, W. (1992). Generations: The history of America's future, 1584 to 2069. Harper Collins

Howe, N. & Strauss, W. (2003). Millennials go to college: Strategies for a new generation on campus: Recruiting and admissions, campus life, and the classroom. Washington, DC: American Association of Collegiate Registrars and Admissions Officers

Ingleby, E. & Oliver, G. (2008). Applied Science for Early Years. Sage

ISO Guide 73:2009 (2009). Risk management - Vocabulary complements ISO 31000 by providing a collection of terms and definitions relating to the management of risk.

Jackofsky, E., Slocum, J. and McQuaid, S. (1988). Cultural Values and the CEO: Alluring Companions?. *Academy of Management Perspectives*, vol. 2, no. 1, pp.39-49

Jackson, V., Stoel, L. & Brantley, A. (2011). Mall attributes and shopping value: Differences by gender and generational cohort. *Journal of Retailing and Consumer Services*, vol 18, no. 1, pp.1-9

Janis, I. L. (1972). Victims of groupthink: A psychological study of foreign-policy decisions and fiascoes

Jawahar, I. M. & McLaughlin, G. L. (2001). Toward a descriptive stakeholder theory: An organizational life cycle approach. *Academy of Management Review*, vol. 26, pp.397-414

Jianakoplos, A. & Bernasek, A.. (1998). Are Women More Risk Averse? *Economic Inquiry*, vol. 36, no. 4, pp.620-631

Jones, C. & Shao, B. (2011). The net generation and digital natives: implications for higher education

Jurkus, A., Park, J. & Woodard, L. (2011). Women in top management and agency costs. *Journal of Business Research*, vol. 64, no. 2, pp.180-186

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *The American Economic Review*, vol. 93, pp.1449-1475

Kahneman, D. (2011). Thinking, fast and slow. Macmillan

Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, vol. 47, pp.263-291

Kahneman, D., Knetsch, J. & Thaler, R. (1990). Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy*, vol. 98, no.6, pp.1325-1348

Keyton, J., King, T., Mabachi, N. M., Manning, J., Leonard, L. L. & Schill, D. (2004). Content analysis procedure book. Lawrence, KS: University of Kansas

Knight, F. (2012). Risk, uncertainty and profit. Courier Corporation

Kotrlik, J.W. & Higgins, C.C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. Information technology, *learning*, *and performance* journal, vol. 19, no.1, p.43

Krejcie V. & Morgan W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, vol. 30, pp.607-610

Krishna, M. (2018). The Young & the Cautious: Why Millennials Hoard Cash. [online] Investopedia. Available at: https://www.investopedia.com/news/millennials-are-risk-averse-and-hoarding-cash/ [Accessed 16 May 2019]

Kudisch, J. (2011). Career Coach: The benefits of risk-taking. [online] Available at: https://www.washingtonpost.com/business/capitalbusiness/career-coach-the-benefits-of-risk-taking/2011/07/13/gIQAhwCFKI_story.html [Accessed 26 May 2019]

Kupperschmidt, B. R. (1998). Understanding generation X employees. Journal of Nursing Administration, vol. 28, no. 12, pp.36-43

Lancaster, L. & Stillman, D. (2002). When generations collide: Who they are. Why they clash. How to solve the generational puzzle at work. New York: HarperCollins Publishers

Laughhunn, D., Payne, J. & Crum, R. (1980). Managerial Risk Preferences for Below-Target Returns. *Management Science*, vol. 26, no. 12, pp.1238-1249

Leavy, P. (2017). Research Design : Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches, Guilford Publications, pp.96-112

Legg Mason (2018). Investor Insights: Global Investment Survey 2018. [online] Leggmason.com. Available at: https://www.leggmason.com/en-gb/campaigns/global-investment-survey-2018.html# [Accessed 16 May 2019]

Leitner, F. (1915). Die Unternehmungsrisiken. 3rd ed. Berlin: G.Reimer

Leslie, L. L. (1972). Are high response rates essential to valid surveys?. *Social Science Research*, vol. 1, no. 3, pp.323-334

Levenson, A. (2010). Millennials and the World of Work: An Economist's Perspective. *Journal of Business and Psychology*, vol. 25, no. 2, pp.257-264

Levin, I., Johnson, R., Russo, C. & Deldin, P. (1985). Framing effects in judgment tasks with varying amounts of information. *Organizational Behavior and Human Decision Processes*, vol. 36, no.3, pp.362-377

Levy, H., Elron, E. & Cohen, A. (1999). Gender differences in risk taking and investment behavior: An experimental analysis. Unpublished manuscript, The Hebrew University

Levy, J. S. (1992). An introduction to prospect theory. Political Psychology, pp.171-186

Lopes, L. L. (1987). Between hope and fear: The psychology of risk. Advances in *Experimental Social Psychology*, vol. 20, pp.255-295

Lund University (2019). Annual Report 2018, Available online: https://www.lu.se/sites/www.lu.se/files/lu-ar-2018-20190219.pdf [Accessed 6 May 2019]

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, vol. 35, no. 6, pp.382-385

MacCrimmon, K. & Wehrung, D. (1990). Characteristics of Risk Taking Executives. *Management Science*, vol. 36, no. 4, pp.422-435

March, J. (1988). Variable risk preferences and adaptive aspirations. *Journal of Economic Behavior & Organization*, vol. 9, no.1, pp.5-24

March, J. & Shapira, Z. (1987). Managerial perspectives on risk and risk taking. *Management Science*, vol. 33, pp.1404-1418

March, J. & Shapira, Z. (1992). Variable risk preferences and the focus of attention. *Psychological Review*, vol. 99, no. 1, pp.172-183

Martynov, A. & Schepker, D. (2015). Risk Preferences and Asset Ownership: Integrating Prospect Theory and Transaction Cost Economics. *Managerial and Decision Economics*, vol. 38, no.2, pp.125-143

McKinsey & Company (2014). Global flows in a digital age. [online] McKinsey & Company. Available at: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/global-flows-in-a-digital-age [Accessed 5 May 2019]

McKinsey & Company (2016). Digital globalization: The new era of global flows. [online] McKinsey & Company. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows [Accessed 5 May 2019]

McNeil, B., Pauker, S., Sox, H. & Tversky, A. (1982). On the Elicitation of Preferences for Alternative Therapies. *New England Journal of Medicine*, vol. 306, no. 21, pp.1259-1262

Mehta, C. & Patel, N. (1997). Exact Tests. Chicago, Ill.: SPSS Inc.

Melero, E. (2011). Are workplaces with many women in management run differently?. *Journal of Business Research*, vol. 64, no. 4, pp.385-393

Mishina, Y., Dykes, B. J., Block, E. S. & Pollock, T. G. (2010). Why "good" firms do bad things: The effects of high aspirations, high expectations, and prominence on the incidence of corporate illegality. *Academy of Management Journal*, vol. 53, pp.701-722

Mohajan, H. (2017). Two Criteria for Good Measurements in Research: Validity and Reliability. Annals of Spiru Haret University. *Economic Series*, vol. 17, no. 4, pp.59-82

Morgan, G. (1986). Images of organization. Beverly Hills, CA: Sage

Morse, J. M. (2010). Sampling in grounded theory. The SAGE handbook of grounded theory, pp.229-244

Mowbray, A.M., Blanchard, R.H. & Williams, C.A. (1979) Insurance. Krieger Publishing Co., Huntington (original edition by Mowbray 1930)

Muijs, D. (2010). Doing quantitative research in education with SPSS. Sage Publications, Thousand Oaks

Mullainathan, S. & Thaler, R. (2001). Behavioral Economics. SSRN Electronic Journal.

Myers, K. & Sadaghiani, K. (2010). Millennials in the Workplace: A Communication Perspective on Millennials' Organizational Relationships and Performance. *Journal of Business a*nd *Psychology*, vol. 25, no.2, pp.225-238

Newman, I. & Benz, C. R. (1998). Qualitative-quantitative research methodology: Exploring the interactive continuum. Carbondale and Edwardsville: Southern Illinois University Press

Nickel, M. N. & Rodriguez, M. C. (2002). A review of research on the negative accounting relationship between risk and return: Bowman's paradox. *Omega*, vol. 30, pp.1-18

Niederle, M. & Vesterlund, L. (2007). Do Women Shy Away From Competition? Do Men Compete Too Much?. *The Quarterly Journal of Economics*, vol. 122, no.3, pp.1067-1101

Novkovska B. & Serafimovic G. (2018). Recognizing the Vulnerability of Generation Z to Economic and Social Risks. *UTMS Journal of Economics*, vol. 9, no. 1, pp. 29–37

Nunnally, C. & Bernstein, H. (1994). Psychometric theory (3rd ed.). New York: McGraw-Hill

Nutt, P. (1986). Decision style and strategic decisions of top executives. *Technological Forecasting and Social Change*, vol. 30, no. 1, pp.39-62

Oberparleiter, K. (1930). Funktionen und Risiken des Warenhandels. Wien: Springer

Olsen, R. A. & Cox, C. M. (2001). The influence of gender on the perception and response to investment risk: The case of professional investors. *The journal of psychology and financial markets*, vol. 2, no. 1, pp.29-36

Ouchi, W. G. (1977). The relationship between organizational structure and organizational control. *Administrative science quarterly*, vol. 22, no. 1, pp.95-113

Pablo, A. L., Sitkin, S. B. & Jemison, D. B. (1996). Acquisition decision-making processes: *The central role of risk. Journal of Managemen*t, vol. 22, no. 5, pp.723-746

Pablo, L. & Sitkin. B. (1992). Reconceptualizing the determinants of risk behavior. *Academy of Management Review*, vol. 17, no. l, pp.9-38

Perrow, C. (2011). Normal accidents: Living with high risk technologies-Updated edition. Princeton university press

Peters, T. & Waterman, R. (1982). In Search of Excellence. New York: Harper & Row

Pulford, B. & Colman, A. (1997). Overconfidence: Feedback and item difficulty effects. *Personality and Individual Difference*s, vol. 23, no. 1, pp.125-133

Quattrone, G. & Tversky, A. (1988). Contrasting Rational and Psychological Analyses of Political Choice. *The American Political Science Revie*w, vol. 82, no. 3, pp.719-736

Rabin, M. (1998). Psychology and Economics. *Journal of Economic Literature*, vol. 36, no. 1, pp.11-46

Rabin, M. (2002). A perspective on psychology and economics. *European Economic Review*, vol. 46, no. 4-5, pp.657-685

Raines, C. (1997). Beyond generation x. Menlo Park, CA: Crisp Publications

Raines, C. (2002). Managing millennials. Connecting Generations: The Sourcebook, 16

Reisenwitz, T. H. & Iyer, R. (2009). Differences in Generation X and Generation Y: Implications for the Organization and Marketers. Marketing management journal, vol. 19, no. 2, pp.91-103

Rowe, W.D. (1977). An anatomy of risk. New York: Wiley

Ruel, E., Wagner, W. E., III & Gillespie, B. J. (2016). The practice of survey research: Theory and applications. Thousand Oaks, CA: SAGE

Sahadi, J. (2019). Only 33 women now lead Fortune 500 companies. And that's a record high. [online] CNN. Available at: https://edition.cnn.com/2019/05/16/success/women-ceos-fortune-500/index.html [Accessed 28 May 2019]

Salvatore, D. & Reagle, D. (2001). Schaum's Outline of Statistics and Econometrics. 2nd ed., pp. 11–16. New York: McGraw-Hill

Saunders, M., Lewis, P. & Thornhill, A. (2015). Research methods for business students (Vol. Seventh edition). Harlow, Essex, England: Pearson Education Limited

Sawilowsky, S. (2009). New Effect Size Rules of Thumb. *Journal of Modern Applied Statistical Methods*, vol. 8, no. 2, pp.597-599

Schein, E. H. (1985). Organizational culture and leadership. San Francisco: Jossey-Bass

Schiffrin, H. H., Liss, M., Miles-McLean, H., Geary, K. A., Erchull, M. J. & Tashner, T. (2014). Helping or hovering? The effects of helicopter parenting on college student's well-being. *Journal of Child and Family Studies*, vol. 23, pp.543–557

Schildberg-Hörisch, H. (2018). Are Risk Preferences Stable?. *Journal of Economic Perspectives,* vol. 32, no. 2, pp.135-154

Schneider, S. L. & Lopes, L. L. (1986). Reflection in preferences under risk: Who and when may suggest why. *Journal of Experimental Psychology: Human Perception and Performance*, vol. 12, no. 4, pp.535-548

Sekaran, U. & Bougie, R. (2016). Research Methods for Business. 7th ed. John Wiley & Sons Australia

Sharf, S. (2014). The Recession Generation: How Millennials Are Changing Money Management Forever. [online] Forbes.com. Available at: https://www.forbes.com/sites/samanthasharf/2014/07/30/the-recession-generation-how-millennials-are-changing-money-management-forever/ [Accessed 9 May 2019]

Shimizu, K. 2007. Prospect theory, behavioral theory, and the threat-rigidity thesis: Combinative effects on organizational decisions to divest formerly acquired units. *Academy of Management Journal*, vol. 50, pp.1495-1514

Siepel, J. & Nightingale, P., (2014). Anglo-Saxon governance: Similarities, difference and outcomes in a financialised world. *CRITICAL PERSPECTIVES ON ACCOUNTING*, vol. 25, no. 1, pp. 27-35

Simon, H. (1982). Models of bounded rationality. Cambridge, MA: MIT Press

Singh, J. V. (1986). Performance, slack, and risk taking in organizational decision making. *Academy of Management Journa*l, vol. 29, pp.562-585

Sirias, D., Karp, H.B. & Brotherton, T. (2007). Comparing the Levels of Individualism/Collectivism Between Baby Boomers and Generation X; Implications for Teamwork, Management Research News, vol. 30, p. 749

Slattery, J. P. & Ganster, D. C. (2002). Determinants of risk taking in a dynamic uncertain context. *Journal of Management*, vol. 28, no. 1, pp.89-106

Slovic, P., Fischoff, B. & Lichtenstein, S. (1980). How safe is safe enough. Societal risk assessment, pp.181-216

Smith A (1776) An inquiry into the nature and causes of the wealth of nations. Strahan Ed., London

Stadler, M. (1932). Studien aus der Theorie des Risikos. Institut für Welthandelslehre, Wien

Stoner, J. A. (1968). Risky and cautious shifts in group decisions: The influence of widely held values. *Journal of Experimental Social Psychology,* vol.4, no.4, pp.442-459

Strauss, W. & Howe, N. (1991). Generation Z

Taborda, C. (2000). Leadership, teamwork, and empowerment: Future management trends. Cost Engineering; Morgantown Bd. 42, pp.41-44

Tang, Q. & Zhen L. (2009). Management risk preference, compensate incentive and R&D investment-based on Chinese listed company. *Economic Management Journal*, vol. 5, pp.56-64

Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior & Organization*, vol. 1, no. 1, pp.39-60

Thaler, R. H. & Johnson, E. J. (1990). Gambling with the house money and trying to break even: The effects of prior outcomes on risky choice. *Management Science*, vol. 36, pp.643-660

Troy, C., Smith, K. G. & Domino, M. A. (2011). CEO demographics and accounting fraud: Who is more likely to rationalize illegal acts? *Strategic Organization*, vol. 9, pp.259-282

Tsang, E. (2006). Behavioral assumptions and theory development: the case of transaction cost economics. *Strategic Management Journal*, vol. 27, no. 11, pp.999-1011

Tversky, A. & Kahneman, D. (1986). Rational Choice and the Framing of Decisions. *The Journal of Business*, vol. 59, no. 4, pp.251-278

Twenge, J. M. (2017). IGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy--and Completely Unprepared for Adulthood--and What That Means for the Rest of Us. Simon and Schuster

Twycross, A. & Shields, L. (2004). Validity and Reliability-What's it All About? Part 2: Reliability in Quantitative Studies. *Paediatric Nursing*, vol.16, no. 10, p.36

University of Applied Sciences Karlsruhe, (2018). [online] Hochschule in Zahlen. Available at: https://www.hs-karlsruhe.de/home/hochschule/ueber-uns/portrait/hochschule-in-zahlen/ [Accessed 5 May 2019]

van Osch, S. M., van den Hout, W. B. & Stiggelbout, A. M. (2006). Exploring the reference point in prospect theory: Gambles for length of life. *Medical Decision Making,* vol. 26, no. 4, pp.338-346

Vogt, P. W., Vogt, E. R., Gardner, D. C. & Haeffele, L. M. (2014). Selecting the right analyses for your data: Quantitative, qualitative, and mixed methods. New York: Guilford Press

Wakker, P. (2010). Prospect theory. Cambridge: Cambridge University Press

Westen, D. & Rosenthal, R., (2003). Quantifying construct validity: Two simple measures. *Journal of Personality and Social Psychology*, vol. 84, no. 3, pp.608-618

Willet, A. (1901). The economic theory of risk and insurance. Philadelphia: Philadelphia University Press

Williams, A. (2014). Move Over Millennials, Here Comes Generation Z. [online] Blogs.vsb.bc.ca. Available at: https://www.nytimes.com/2015/09/20/fashion/move-over-millennials-here-comes-generation-z.html [Accessed 14 May. 2019]

Wood, S. (2013). Generation Z as consumers: trends and innovation. Institute for Emerging Issues: NC State University, pp.1-3

Wynd, A., Schmidt, B. & Schaefer, M. A. (2003). Two quantitative approaches for estimating content validity. *Western Journal of Nursing Researc*h, vol. 25, no. 5, pp.508-518

Yates, J. F. & Stone, E. R. (1992). The risk construct. In J. F. Yates (Ed.), Risk taking behavior. New York: Wiley, pp.1-25

Young M. A. & Hinesly D. M. (2012). "Identifying Millennials' key influencers from early childhood: insights into current consumer preferences", *Journal of Consumer Marketing*, vol. 29, no. 2, pp.146-155

Zhang, X., Bartol, K. M., Smith, K. G., Pfarrer, M. D. & Khanin, D. M. (2008). CEOs on the edge: Earnings manipulation and stock-based incentive misalignment. *Academy of Management Journal,* vol. 51, pp.241-258

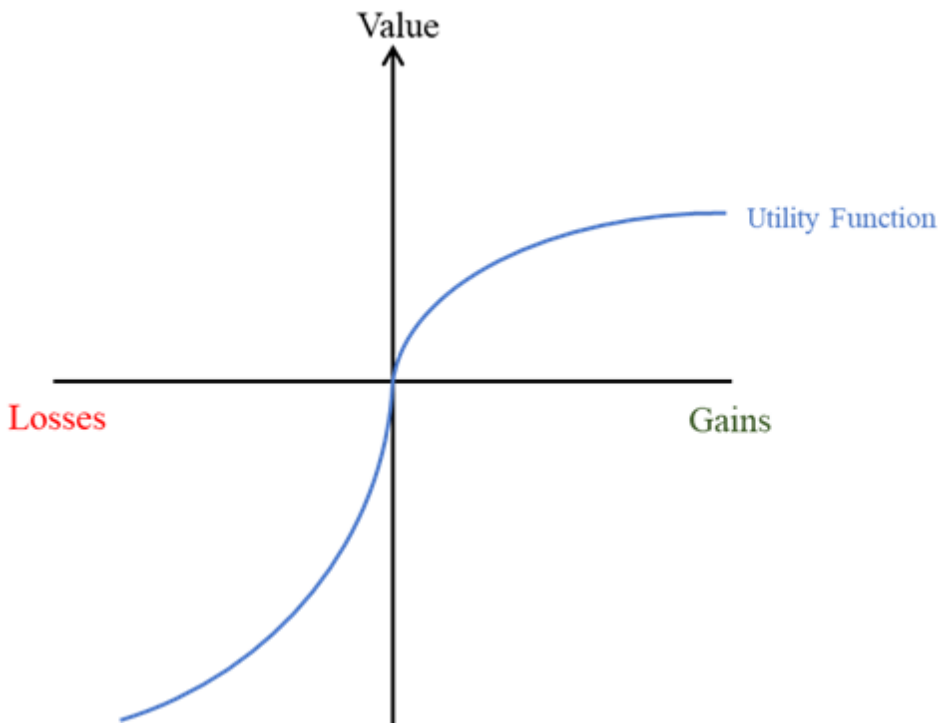
Zhuang, P. & Hou, H. (2014). Empirical Study on Risk Preference of Enterprise Managers. International Conference on Management of e-Commerce and e-Government

Zillmann, C. (2019). http://fortune.com. [online] Fortune. Available at: http://fortune.com/2019/05/16/fortune-500-female-ceos/ [Accessed 22 May 2019]

Zuckerman, M. (1994). Behavioral Expressions and Biosocial Bases of Sensation Seeking. New York: Cambridge University Press

7 Appendix

7.1 Appendix A - Utility Function



7.2 Appendix B – Survey

Risk Preference Survey

Welcome to our risk preference survey!

Thanks for taking the time to participate in our questionnaire.
In context of our Master's Thesis at Lund University School of Economics and Management, we are conducting research on behavioural patterns in decision-making.
In the following, you will be confronted with a set of different hypothetical scenarios, which will help us better understand personal risk preferences. So try to answer the questions intuitively and not to overthink them.
The survey should not take more than 5 - 10 minutes, and your responses are completely anonymous.
If you have any questions about the survey, please feel free to email us to risk.preference.survey@gmail.com.
We really appreciate your input!

Please Click 'Next' to begin.

1) Imagine you are confronted with two alternative investment opportunities. Assume that the exact scientific estimates of the investment alternatives are as follows:

1. *Mark only one oval.*

- ( ) Choice A: equally likely outcomes of a profit of 1 million € and a profit of 3 million €
- ( ) Choice B: equally likely outcomes of a loss of 1 million € and a profit of 5 million €
- ( ) No preference

2) Imagine you are taking part in a lucky draw. Which of the following tickets would you prefer over the other?

2. *Mark only one oval.*

- ( ) Ticket A: 10% chance of winning 0€, 40% chance of winning 1000€, 40% chance of winning 2000€ and 10% chance of winning 3000€
- ( ) Ticket B: 50% chance of winning 0€ and 50% chance of winning 3000€
- ( ) No preference

3) Imagine your hometown is preparing for the outbreak of an unusual disease, which is expected to kill 600 people. Two alternative programmes have been proposed to combat the disease, which one would you chose? Assume that the exact scientific estimates of the consequences are as follows:

3. *Mark only one oval.*

- ( ) Programme A: 200 people will be safed
- ( ) Programme B: There is ⅕ probability that all 600 people will be saved and ⅗ probability that no people will be saved at all
- ( ) No preference

4) Imagine yourself gambling and you can choose out of the following two (unfavourable) gambles. Which one would you prefer?

4. *Mark only one oval.*

- ( ) Gamble A: losing 0€ with a probability of 10%, losing 1000€ with a probability of 40%, losing 2000€ with a probability of 40% or losing 3000€ with a probability of 10%.
- ( ) Gamble B: losing 0€ with a probability of 50% or losing 3000€ with a probability of 50%
- ( ) No preference

5) Imagine that a cruise ship has collided with an iceberg and is about to sink, which is expected to cost 600 passenger lives. Two alternative rescue programmes have been proposed to save passengers. Assume that the exact scientific estimates of the consequences of the rescue programmes are as follows:

5. *Mark only one oval.*

- ( ) Programme A: 400 people will drown
- ( ) Programme B: There is a ⅓ probability that no one will drown and ⅔ probability that 600 people will drown
- ( ) No preference

6) Imagine you got diagnosed with an unusual disease and the doctors provide you with two alternative treatment options. Which of them would you choose, if the exact scientific estimates of life expectation are as follows:

6. *Mark only one oval.*

- ( ) Treatment A: A 50% chance of living in good health for 50 years and a 50% chance of dying within one week.
- ( ) Treatment B: A guarantee (100%) that you will live in good health for 25 years.
- ( ) No preference

7) Imagine having the choice between receiving 50€ for sure or tossing a coin, which either leads to a win of 0€ or 100€ (depending on head or tails)

7. *Mark only one oval.*

- ( ) Option A: Receive €50 for sure.
- ( ) Option B: Take a 50–50 gamble with two equal possible outcomes of €0 or €100?
- ( ) No preference

8) Imagine yourself playing lottery. Which of the following two lotteries would you prefer?

- ◯ Lottery A: Winning 6000€ with a probability of 0,001%
- ◯ Lottery B: Winning 3000€ with a probability of 0,002%
- ◯ No preference

9) Imagine you're asked to play a coin tossing game. Heads means losing 100€. What is the smallest potential € win for tails that would make the gamble attractive to you? (e.g. "75" or "125" or ...)

9. _____

10. What if heads means losing 200€? What is the smallest potential € win for tails that would make the gamble attractive to you? (e.g. "175" or "225" or...)

_____

11. What if heads means losing 500€? What is the smallest potential € win for tails that would make the gamble attractive to you? (e.g. "475" or "525" or ...)

_____

10) When you think of the word "risk" which of the following words comes to your mind first?

12. *Check all that apply:*

- ☐ Uncertainty
- ☐ Loss
- ☐ Opportunity
- ☐ Thrill
- ☐ Other: _____

11) Imagine you are considering getting a new car for your company's car fleet. How important do you consider the following aspects in your decisions whether to buy, lease or not to get a new car?

	Low	Low-Moderate	Moderate	Moderate-High	High
Offers of other dealers					
How urgently you need a new car					
Your trust in the car salesman/dealership to make you a fair offer					
Expected value decrease of the car					
Your experience in purchasing cars					

14. **What other factors besides the above mentioned do you consider/influence you in your investment decision?**

12) Almost done, we just need some last information...

These information will help us to link certain behavioural patterns to demographic characteristics and will be 100% confidential.

15. **Age**

16. **Gender**

Mark only one oval.

- Female
- Male
- Prefer not to say
- Other: _____

17. **Nationality**

18. **Are you a student?**

Mark only one oval.

- Yes
- No
- Other: _____

19. **Educational Background**
Check all that apply.

- [ ] Business & Economics
- [ ] Management
- [ ] Engineering & Technology
- [ ] Law
- [ ] Psychology
- [ ] Medicine & Health
- [ ] Other: _____

20. **Management Experience (e.g. Project leadership, Responsibility over team, etc.)**
Mark only one oval.

- ( ) 0 years
- ( ) 1 - 3 years
- ( ) 4 - 7 years
- ( ) 8 - 11 years
- ( ) 12+ years
- ( ) Other: _____

21. **If so, in which industry did you gain your managerial experience?**
Check all that apply.

- [ ] Chemical
- [ ] Construction
- [ ] Consulting
- [ ] Education
- [ ] Health care
- [ ] Manufacturing
- [ ] Service
- [ ] Other: _____

22. **Do you face vertical integration decisions (make-or-buy decisions) in your job?**
Mark only one oval.

- ( ) No.
- ( ) Yes, sometimes.
- ( ) Yes, on a regular basis.
- ( ) I don't know what that is.

7.3 Appendix C – Sample Size Student

Determine Student Population

Nr.	*Institution*	*Total*	*Criteria*	*Relevant Individuals*
1.	Master Students Lund University	710	Students	
		20%	Management	
		142		142
2.	Current Students University of Applied Sciences Karlsru	8.200	Students	
		6	Faculties	
		15%	Drop-Out ratio	
		25%	Advanced studies	
		51		51
3.	Former Studies - Graduates of Researchers	51	Students	51
=	**Student Population**			**245**

Sample Size Student

Sample Size (n_0)

Categorical Data

Required sample size > than 5% population!

$$n_0 = \frac{(t)^2 * (p)(q)}{d^2} = \frac{(1.96)^2 * (0.5)(0.5)}{0.05^2} = \underline{\mathbf{384}}$$

with:

n_0	required return sample size according to Cochran's formula
t	value for selected alpha level of .025 in each tail = 1.96
(p)(q)	estimate of variance
d	acceptable margin of error for mean being estimated

Corrected Sample Size

$$n_1 = \frac{n_0}{(1+\frac{n_0}{Population})} = \frac{384}{(1+\frac{384}{245})} = \underline{\mathbf{149}}$$

with:

n_1	required return sample size because sample > 5% of population
n_0	required return sample size according to Cochran's formula

7.4 Appendix D – Sample Size Manager

Determine Manager Population

Nr.	*Institution*	*Total*	*Criteria*	*Relevant Individuals*
1.	Company A	50	Employees	
		80%	Manager ratio	
		40		40
2.	Company B	300	Employees	
		14%	Manager ratio	
		43		43
3.	Company C	350	Employees	
		8%	Manager ratio	
		29		29
=	**Student Population**			**112**

Sample Size Manager

Sample Size (n_0)

Categorical Data

Required sample size > than 5% population!

$$n_0 = \frac{(t)^2 * (p)(q)}{d^2} = \frac{(1.96)^2 * (0.5)(0.5)}{0.05^2} = \underline{\mathbf{384}}$$

with:

- n_0 required return sample size according to Cochran's formula
- t value for selected alpha level of .025 in each tail = 1.96
- (p)(q) estimate of variance
- d acceptable margin of error for mean being estimated

Corrected Sample Size Manager

$$n_1 = \frac{n_0}{(1+\frac{n_0}{Population})} = \frac{384}{(1+\frac{384}{112})} = \underline{\mathbf{87}}$$

with:

- n_1 required return sample size because sample > 5% of population
- n_0 required return sample size according to Cochran's formula

7.5 Appendix E – Survey Outline

Nr.	Survey Topic	Aim	Author of Scenario	Title of Research
1	Investment Opportunities	Risk preference	Martynov & Schepker (2017)	Risk Preferences and Asset Ownership: Integrating Prospect Theory and Transaction Cost Economics
2 & 4	Lucky Draw (Gain - & Loss Frame)	Framing Effect	M. Baucells & A. Villasís (2010)	Stability of risk preferences and the reflection effect of prospect theory
3 & 5	Disease (Gain - & Loss Frame)	Framing Effect	D. Kahneman & A. Tversky (1979)	Prospect Theory
6	Life Expectancy	Reference Point	van Osch, van den Hout & Stigglebout (2004)	Exploring the Reference Point in Prospect Theory- Gambles for Length of Life
7	Coin Tossing	Underweighting of large probabilities	D. Kahneman & A. Tversky (1979)	Prospect Theory
8	Lottery	Overweighting of small probabilities	D. Kahneman & A. Tversky (1979)	Prospect Theory
9	Loss-Aversion Ratio	Loss Aversion Ratio	D. Kahneman (2011)	Thinking, fast and slow
10	Risk Perception	General Perception of Risk	J. Grable & R. Lytton (2003)	The development of a risk assessment instrument: A follow-up study

7.6 Appendix F – Ranks

7.6.1 Single Characteristic

Age (Gen. Z - Gen. Y)

Ranks

	Age	N	Mean Rank
Investement Alternatives	Gen. Z (<25)	74	83,01
	Gen. Y (25-35)	66	70,27
	Gen. X (>35)	15	87,30
	Total	155	

Gender

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Investement Alternatives	Male	86	73,62	6331,50
	Female	69	83,46	5758,50
	Total	155		

Educational Background

Ranks

	Educational Background	N	Mean Rank	Sum of Ranks
Investement Alternatives	No Mgmt. Background	92	80,79	7432,50
	Mgmt. Background	63	73,93	4657,50
	Total	155		

Managerial Experience

Ranks

	Management Experience	N	Mean Rank	Sum of Ranks
Investement Alternatives	No Mgmt. Experience	80	83,91	6712,50
	Mgmt. Experience	75	71,70	5377,50
	Total	155		

7.6.2 Framing

Age (Gen. Z - Gen. Y)

Ranks

	Age	N	Mean Rank	Sum of Ranks
Gain-frame (Lucky draw)	Gen. Z (<25)	74	70,48	5215,50
	Gen. Y (25-35)	66	70,52	4654,50
	Total	140		
Gain-frame (Disease)	Gen. Z (<25)	74	73,72	5455,50
	Gen. Y (25-35)	66	66,89	4414,50
	Total	140		
Loss-frame (Lucky draw)	Gen. Z (<25)	74	72,15	5339,00
	Gen. Y (25-35)	66	68,65	4531,00
	Total	140		
Loss-frame (Disease)	Gen. Z (<25)	74	75,22	5566,00
	Gen. Y (25-35)	66	65,21	4304,00
	Total	140		

Gender

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Gain-frame (Lucky draw)	Male	86	71,22	6125,00
	Female	69	86,45	5965,00
	Total	155		
Loss-frame (Lucky draw)	Male	86	74,93	6444,00
	Female	69	81,83	5646,00
	Total	155		
Gain-frame (Disease)	Male	86	76,47	6576,00
	Female	69	79,91	5514,00
	Total	155		
Loss-frame (Disease)	Male	86	75,38	6483,00
	Female	69	81,26	5607,00
	Total	155		

Managerial Experience

Ranks

	Management Experience	N	Mean Rank	Sum of Ranks
Gain-frame (Lucky draw)	No Mgmt. Experience	80	84,79	6783,00
	Mgmt. Experience	75	70,76	5307,00
	Total	155		
Loss-frame (Lucky draw)	No Mgmt. Experience	80	77,80	6224,00
	Mgmt. Experience	75	78,21	5866,00
	Total	155		
Gain-frame (Disease)	No Mgmt. Experience	80	78,38	6270,00
	Mgmt. Experience	75	77,60	5820,00
	Total	155		
Loss-frame (Disease)	No Mgmt. Experience	80	79,26	6341,00
	Mgmt. Experience	75	76,65	5749,00
	Total	155		

7.6.3 Weighting

Age (Gen. Z - Gen. Y)

Ranks

	Age	N	Mean Rank	Sum of Ranks
Underweighting large Prob.	Gen. Z (<25)	74	74,57	5518,00
	Gen. Y (25-35)	66	65,94	4352,00
	Total	140		
Overweighting small Prob.	Gen. Z (<25)	74	74,20	5490,50
	Gen. Y (25-35)	66	66,36	4379,50
	Total	140		

Gender

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Underweighting large Prob.	Male	86	75,15	6463,00
	Female	69	81,55	5627,00
	Total	155		
Overweighting small Prob.	Male	86	78,78	6775,50
	Female	69	77,02	5314,50
	Total	155		

Management Experience

Ranks

	Management Experience	N	Mean Rank	Sum of Ranks
Underweighting large Prob.	No Mgmt. Experience	80	79,68	6374,00
	Mgmt. Experience	75	76,21	5716,00
	Total	155		
Overweighting small Prob.	No Mgmt. Experience	80	77,79	6223,00
	Mgmt. Experience	75	78,23	5867,00
	Total	155		

7.6.4 Loss-Aversion Ratio

Age (Gen. Z - Gen. Y)

Ranks

	Age	N	Mean Rank	Sum of Ranks
Gamble - Losing 100	Gen. Z (<25)	74	68,49	5068,50
	Gen. Y (25-35)	66	72,75	4801,50
	Total	140		
Gamble - Losing 200	Gen. Z (<25)	74	67,68	5008,50
	Gen. Y (25-35)	66	73,66	4861,50
	Total	140		
Gamble - Losing 500	Gen. Z (<25)	74	70,26	5199,00
	Gen. Y (25-35)	66	70,77	4671,00
	Total	140		

Gender

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Gamble - Losing 100	Male	86	73,56	6326,00
	Female	69	83,54	5764,00
	Total	155		
Gamble - Losing 200	Male	86	73,49	6320,00
	Female	69	83,62	5770,00
	Total	155		
Gamble - Losing 500	Male	86	74,84	6436,00
	Female	69	81,94	5654,00
	Total	155		

Managerial Experience

Ranks

	Management Experience	N	Mean Rank	Sum of Ranks
Gamble - Losing 100	No Mgmt. Experience	80	70,18	5614,50
	Mgmt. Experience	75	86,34	6475,50
	Total	155		
Gamble - Losing 200	No Mgmt. Experience	80	72,09	5767,50
	Mgmt. Experience	75	84,30	6322,50
	Total	155		
Gamble - Losing 500	No Mgmt. Experience	80	75,22	6017,50
	Mgmt. Experience	75	80,97	6072,50
	Total	155		

7.7 Appendix G – Effect Size

Effect size

$$r_{x-y} = \left|\frac{Z}{\sqrt{N}}\right|$$

with:

r	Effect size
z	Standard normal deviate
N	Sample size in focus

Effect size r	
Very small	0.01
Small	0.2
Medium	0.5
Large	0.8
Very large	1.2
Huge	2.0

Single Characteristic

Generation

$$r_{GY-GZ} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{2.481}{\sqrt{74+66}}\right| = 0.210$$

Gender

$$r_{M-F} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{-2.005}{\sqrt{86+69}}\right| = 0.161$$

Managerial Experience

$$r_{NME-ME} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{-2.503}{\sqrt{80+75}}\right| = 0.201$$

Risk preferences

Framing

Gain Frame- Lucky draw (Gender)

$$r_{G/LD(G)} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{-2.643}{\sqrt{86+69}}\right| = 0.212$$

Gain Frame- Lucky draw (Managerial Experience)

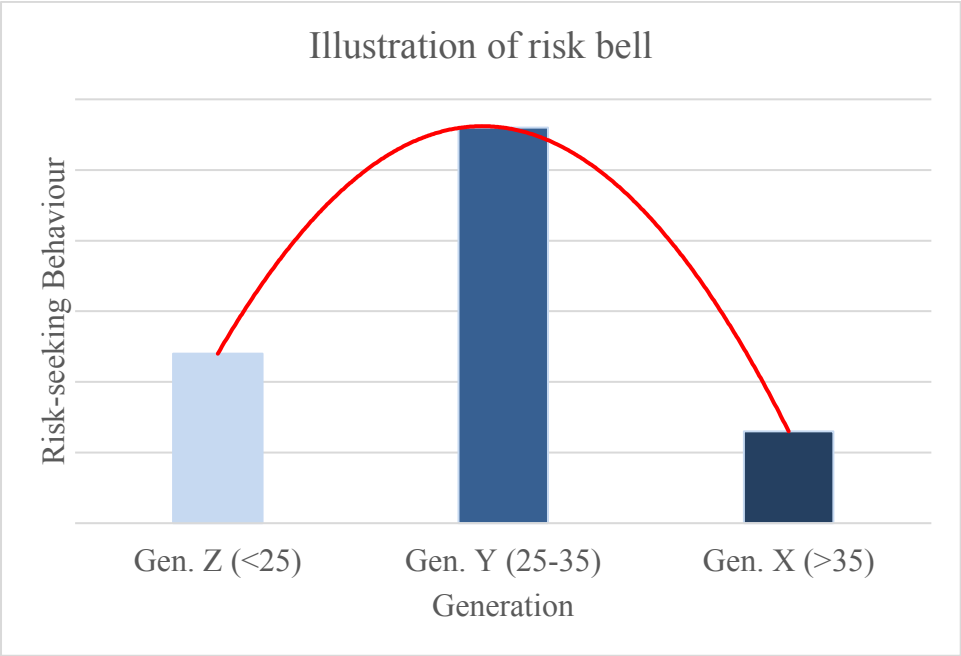
$$r_{G/LD(G)} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{-2.448}{\sqrt{80+75}}\right| = 0.197$$

Loss-Aversion Ratio

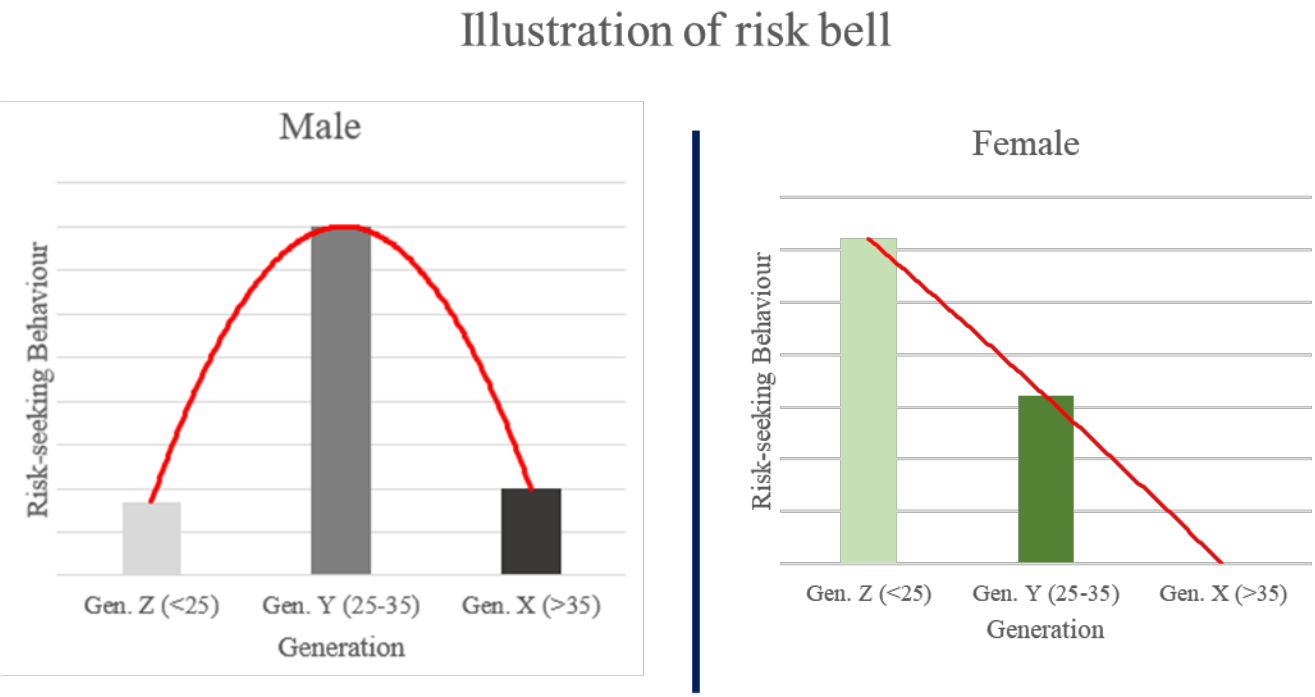
Gamble of Losing 100 (Managerial Experience)

$$r_{G/LD(G)} = \left|\frac{Z}{\sqrt{N}}\right| = \left|\frac{-2.280}{\sqrt{80+75}}\right| = 0.183$$

7.8 Appendix H – Risk Bell – Generation



7.9 Appendix I – Risk Bell – Gender



7.10 Appendix J – Loss Function