

EFFECTS OF PERSONAL CHARACTERISTICS ON PERFORMANCE OUTCOMES IN SUPPLY CHAIN MANAGEMENT

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List of abbreviations

BFI-10	10-item Big Five Inventory
CFA	Confirmatory factor analysis
CPO	Chief Procurement Officer
EFA	Exploratory factor analysis
HEXACO	Honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience framework
HRM	Human resource management
NEO	Neuroticism-Extraversion-Openness Inventory
OCEAN	Openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism model
OLS	Ordinary least squares
SIC	Standard Industrial Classification
SCM	Supply chain management
SCRes	Supply chain resilience of immediate business environment
SUR	Seemingly unrelated regression
TAS	Total annual salary
TMT	Top management team

Chapter 1 Introduction and research questions

1.1 Introduction

In a globalized world, supply chains and their frictionless functioning are ever more important and today, business environments are more interconnected and globalized than ever (Blackhurst, Craighead, Elkins, & Handfield, 2005; Reeves, Levin, & Ueda, 2016). However, more globalized supply chains are more complex and consequently more susceptible to disruptions (Hoole, 2005; Manuj & Mentzer, 2008). It has been shown that higher levels of supply chain complexity increase the frequency of supply chain disruptions (Bode & Wagner, 2015; Zhao & Freeman, 2019). Once they happen, supply chain disruptions cannot only have severe, negative consequences for the affected firms and their stakeholders (e.g., Hendricks & Singhal, 2003, 2005), but for whole supply chains that can break down (Tang, 2006). Such disruptions happen quite often. For example, firms have to deal with disruptions that lead to material disruptions lasting a month or longer every 3.7 years on average (S. Lund et al., 2020). Thus, it is important to understand how supply chains function, which elements are important, and what is important for interacting within supply chains.

In case of a supply chain disruption, firms, and especially the directly involved procurement and risk management professionals, need to understand to what extent these disruptions impact their business activities and they need to respond quickly to the disruption (Blackhurst, Rungtusanatham, Scheibe, & Ambulkar, 2018; Craighead, Blackhurst, Rungtusanatham, & Handfield, 2007). By means of a quick disruption detection capability, firms can increase their resilience and mitigate negative effects on their supply chain performance (Bode & Macdonald, 2017; Sheffi, 2015). Supply chain resilience can be defined as “the ability of a system to return to its original state or move to a new, more desirable state after being disturbed” (Christopher & Peck, 2004, p.2). Literature identified several enablers and capabilities to increase supply chain resilience (e.g., Jain, Kumar, Soni, & Chandra, 2017; Pettit, Fiksel, & Croxton, 2010) and some literature reviews capture the most important concepts and developments with regard to this topic (e.g., Kamalahmadi & Parast, 2016; Tukamuhabwa, Stevenson, Busby, & Zorzini, 2015). The identified enablers and capabilities include, but are not limited to, redundancy, flexibility, visibility, collaboration and information-sharing among the involved firms (e.g., Jain et al., 2017; Pettit et al., 2010; Scholten & Schilder, 2015; Sheffi

& Rice, 2005; Soni, Jain, & Kumar, 2014). However, research on supply chain resilience mainly has had a focus on organizational capabilities thus far (Annarelli & Nonino, 2016). This is in line with a general trend in supply chain management research, to focus mainly on the firm-level, on interfirm relationships, or on whole supply networks (e.g., Y. Kim, Chen, & Linderman, 2015; Paulraj, Lado, & Chen, 2008; Selnes, 1998).

Thus far, the scope of most research is not on individual persons, though this is supposed to be an important, yet under-researched topic (Loch & Wu, 2007; Wieland, Handfield, & Durach, 2016). Individuals can have an influence on the functioning of operating systems (Gino & Pisano, 2008), on firm and supply chain performance (Narayanan & Moritz, 2015), and individuals' personalities are supposed to be important in buyer-supplier relationships (Tangpong, Hung, & Ro, 2010). They incessantly have to make decisions – which are oftentimes influenced by human judgment (Fahimnia, Pournader, Siemsen, Bendoly, & Wang, 2019). These decisions can have a more long-term focus, like defining procurement and supply chain strategies, or the decisions can be more short-termed ones, like decisions on how to behave in certain unexpected situations. Especially the latter decision-making situations are interesting from a research perspective contemplating personal behaviors, as those situations are oftentimes characterized by high levels of uncertainty and stress for the individual decision-maker. However, individuals tend to make different decisions if they are exposed to stress (Nowacki et al., 2019) and how they cope with stress depends on their personality (Penley & Tomaka, 2002). Moreover, these decisions have to be made against the background of a changing business environment for procurement professionals (Frey & Osborne, 2017; Zheng, Knight, Harland, Humby, & James, 2007).

Though there is a recent trend to explore decision-making, supply chain risk and resilience at a personal level (Mena, Melnyk, Baghersad, & Zobel, 2020), research on individual procurement professionals and their personalities and characteristics is still scarce in supply chain management. Considering the potential importance of individuals, this is quite surprising. Thus, the aim of this dissertation research is to address this issue and provide further insights on how personalities and characteristics affect individuals' behavior in business life and how this affects both their individual performance, as well as the performance of their immediate business environments. The results will provide valuable implications for theory and practice and reveal promising future research opportunities.

1.2 Research questions

This dissertation addresses research questions revolving around performance implications of individual professionals in supply chains – thereby considering both personal outcomes and outcomes related to their immediate business environments. Literature from other fields of study indicates significant, yet varying impacts of personality and individuals' characteristics on overall job performance (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000; Rothmann & Coetzer, 2003) and on personal career success (e.g., Seibert & Kraimer, 2001; Spurk & Abele, 2011). However, apart from very few exceptions (e.g., Strohhecker & Größler, 2013), this topic received relatively scant attention in supply chain management research.

We want to investigate how personal traits and characteristics have an influence for the individuals themselves on the one hand, but on the other hand, also on their immediate business environments. In brief, the first research question scrutinizes the impact of individuals' traits and factors on the personal career success when they act in a complex supply chain environment. The second research question focuses on personal work experience and investigates whether this experience affects the disruption susceptibility and resilience capabilities of their immediate business environment. Finally, the third research question sheds light on how personality traits of individual decision-makers influence resilience capabilities of their immediate business environment. Figure 1 illustrates an overview of the research questions that will be outlined in more detail below.

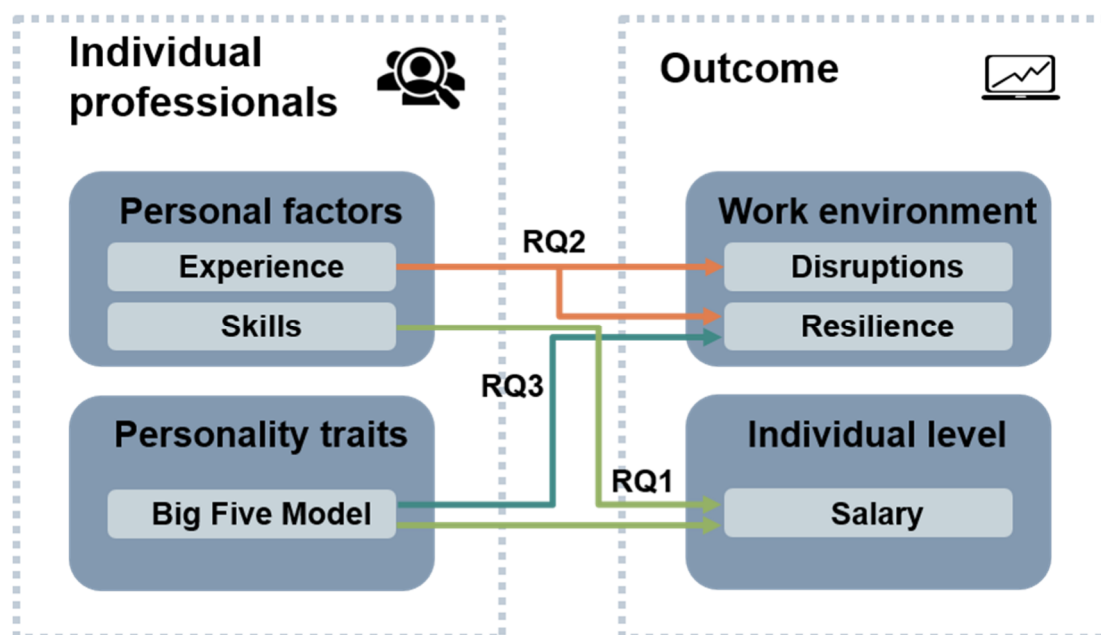


Figure 1: Overview of research questions

1.2.1 Research question 1: Personal success of procurement professionals

Although personal factors can influence the way people behave in certain business situations, how they negotiate and consequently how successful they are in their careers (e.g., Bowles, Gintis, & Osborne, 2001; Judge, Higgins, Thoresen, & Barrick, 1999; Rode, Arthaud-Day, Mooney, Near, & Baldwin, 2008), the impact of such factors remains unclear for procurement professionals' personal career success. One indicator of personal career success is salary.

However, studies that scrutinized impact factors of salary in procurement mainly considered organizational characteristics (e.g., firm size, spend in relation to revenues, industry), some human capital factors (e.g., educational level, professional designation, experience), workplace-related factors (e.g., purchasing spend responsibility, working hours) or gender of the examined groups (e.g., Larson & Morris, 2008, 2014; Ogden, Zsidisin, & Hendrick, 2002; Zsidisin, Ogden, Hendrick, & Clark, 2003). None of these studies considered personality traits and personal factors of the individuals working in this business environment.

Personality traits do not only impact salary, but on a more general level they can also influence people's job and career satisfaction (Flint-Taylor, Davda, & Cooper, 2014; Judge, Heller, & Mount, 2002), their (job) performance (e.g., Robertson, Baron, Gibbons, Maciver, & Nyfield, 2000; Strohhecker & Größler, 2013) and (career) decision-making (Honeycutt & Rosen, 1997; Riedl, Kaufmann, Zimmermann, & Perols, 2013). Those factors, in turn, might determine salary levels of the individuals, as well as other performance and nonperformance factors (Fossum & Fitch, 1985; North, 2019).

Hence, the first study in chapter 2 seeks to identify personal factors of procurement professionals that influence their salary as one measurable extrinsic career success factor. Furthermore, the study investigates how important those factors are compared to other organizational, workplace-related and human capital factors that are supposed to determine salary as well. The empirical results of the study provide an answer to the following research question:

Research question 1 *Which factors of procurement professionals determine their personal career success and how important are those factors compared to other factors that determine their personal career success?*

1.2.2 Research question 2: Personal experience in supply chain disruption and recovery processes

In complex supply chains, disruptions can be caused by unexpected triggering events that lead to situations that can seriously harm operating performance, lead to financial losses and have negative effects on shareholder value (Christopher & Peck, 2004; Hendricks & Singhal, 2003, 2005; Macdonald & Corsi, 2013). The more complex and globalized a supply chain is, the higher is the probability of a disruption, as there are more risk sources that could trigger such a disruption along the supply chain (e.g., Bode & Wagner, 2015; Bozarth, Warsing, Flynn, & Flynn, 2009). Possible sources for supply chain disruptions range from natural disasters, strikes, economic disruptions, terrorism, or fires (Jacobs & Singhal, 2017; Kleindorfer & Saad, 2005) to more problem-specific and decision-maker related factors or system inherent weaknesses, that may lie dormant until the system is stressed (Aitken, Bozarth, & Garn, 2016; Rao & Goldsby, 2009). The challenge for firms is to anticipate and prevent disruptions or, once they occurred, to detect them quickly and start the disruption management process in order to recover and go back to normal operations (Bode & Macdonald, 2017; Sheffi, 2015).

While research on disruptions and resilience mainly focused on organizational factors (Annarelli & Nonino, 2016), individuals and the role of their personal characteristics and skills received scant attention – largely neglecting those that have to deal with disruptions and their consequences in their day-to-day work. This is surprising, given that studies from other fields of management suggest that personal factors like experiences play a crucial role in explaining performance outcomes (Delmar & Shane, 2006; Easton & Rosenzweig, 2012, 2015; Strohhecker & Größler, 2013). With regard to disruptions and resilience, it is important that more experienced individuals are supposed to have more “lessons learned” from previous disruptions, which could foster an appropriate handling of disruptions (LaPorte & Consolini, 1991). Especially the individuals’ perception of supply chain risks and the ability to properly detect early warning signals are aspects that should not be neglected (Brusset & Teller, 2017; DuHadway, Carnovale, & Hazen, 2019; Ellis, Henry, & Shockley, 2010).

Consequently, study two in chapter 3 aims to empirically study the impact of both executive and employee experience on supply chain disruptions and recovery processes. More specially, we study the relationship between executive and employee experience and both, number of disruptions and recovery time, defined as the time until full recovery

is attained (Macdonald & Corsi, 2013). We attempt to anticipate the effect of pertinent work experience on the way executives and employees deal with anomalous situations in their immediate business environment and address the following research question:

Research question 2 *What is the role of executive / employee experience in preventing supply chain disruptions and in detecting and recovering from disruptions, once they occurred?*

1.2.3 Research question 3: Personality traits and supply chain resilience

As explained above, today's globalized and complex supply chains are associated with a higher probability of disruptions caused by different events along the supply chain (e.g., Bode & Wagner, 2015; Zhao & Freeman, 2019). Supply chains that are affected by a disruption need to be resilient and return to normal business operations as quickly as possible (Craighead et al., 2007; Sheffi, 2015). Literature identified factors and enablers that enhance the level of resilience (e.g., Jain et al., 2017; Pettit et al., 2010), as well as strategies how to respond best to a disruption (Bode, Wagner, Petersen, & Ellram, 2011; Hasani & Khosrojerdi, 2016; Tang, 2006).

However, most of these factors and strategies mainly focused on organizational aspects (Annarelli & Nonino, 2016). Advantageous factors and strategies could be an organization's learning orientation (Braunscheidel & Suresh, 2009), adding redundancy to the supply chain (Kamalahmadi & Parast, 2017; Sheffi & Rice, 2005), tighter integration between different tiers of the supply chain (Brusset & Teller, 2017), flexibility (Brusset & Teller, 2017; Scholten & Schilder, 2015; Sheffi & Rice, 2005), or collaboration between firms (Scholten & Schilder, 2015).

As individuals can be critical to operating systems and as they can impact the performance of whole firms with the decisions that they make (Gino & Pisano, 2008; Narayanan & Moritz, 2015), the third study focuses on individuals' personality traits and how they influence individuals' behaviors in situations where a supply chain disruption occurred. Supply chain disruptions are unplanned events that are characterized by a high level of uncertainty, where individual employees might have to make decisions without proper information about the outcomes (Craighead et al., 2007). Personality, in turn, seems to have the greatest influence in such dynamic, unpredictable, and changing environments, as such situations do not allow standardized responses (Miller & Toulouse,

1986). Human personality has been a topic of research for decades. It can influence how people negotiate (Barry & Friedman, 1998; Sharma, Bottom, & Elfenbein, 2013) and how they behave in certain (business) situations (e.g., Bowles et al., 2001; Rode et al., 2008).

In order to assess human personality we draw on the well-recognized “Big Five” personality dimensions openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (Goldberg, 1990; Norman, 1963). The third study looks at how individuals’ personality traits can have an impact in case of a supply chain disruption and it seeks to further scrutinize the impact of individuals on the supply chain resilience of their immediate business environments. Thereby, the study answers the following research question:

Research question 3 *What is the relationship between personality traits and supply chain resilience of immediate business environments?*

1.3 Methodological approach

In order to tackle these interesting research questions and to find out about performance implications of individual professionals in supply chains, we collected data among procurement professionals and other supply chain managers. The methodological approaches employed for answering the particular research questions will be explained in more detail later on in the respective chapters of this dissertation. However, to get an initial overview, the approaches will be sketched briefly at this point.

All research questions discussed in this dissertation project deal with individual procurement professionals, but each research question considers different aspects of the individuals and has different outcomes under investigation. To answer the research questions, we mainly pursued survey-based approaches, as individual respondents are the unit of analysis and these individuals are supposed to be pretty accurate reporters of their own (job) situation (Spenner, 1990).

We were able to collect a rich dataset in cooperation with the “Association of Supply Chain Management, Procurement and Logistics,” a German-based professional association for supply chain managers, buyers and logisticians. The Association promoted our survey via an online newsletter, which enabled us to collect 461 usable responses. The survey contained different parts, prompting for data about the respondents’

personality, their job situation, information on the respondents' salary, data on their employers and data with regard to supply chain disruptions and resilience.

We used this ample dataset to answer the first and the third research question. The part on the individuals' personality was used in both analyses, but of course, the dependent variables differ, as well as other independent and control variables. To answer research question 1, we used the collected data about the salaries of the procurement professionals that answered the survey, as this research question focuses on personal outcomes. In order to answer the third research question, we used parts of the dataset that dealt with supply chain disruptions and resilience, as this research question focuses on outcomes related to the respondents' immediate business environments. However, the populations that we finally used to conduct the respective analyses differ between the two studies. This is due to answers from participants that never experienced a supply chain disruption by themselves and hence, were precluded from analysis and due to missing values values, especially in the measure for supply chain resilience of immediate business environment used to answer research question three. Here, the number of usable cases was reduced to 293.

As mentioned above, some of the constructs are used in both analyses and consequently, we needed to conduct similar analytical approaches in order to demonstrate the fit of the measures. Also with regard to the theoretical foundation of the essays, some literature used in the theoretical background parts of the respective chapters might overlap between chapters two and four. In a similar vein, there might be overlappings between chapters three and four, as both chapters deal with supply chain resilience and recovery processes after an occurred supply chain disruption.

To answer the second research question, that aims to empirically study the impact of both executive and employee experience on supply chain disruptions and recovery processes, we collected data by means of a self-administered online survey. We targeted supply chain executives, the questionnaire asked the respondents about their current job position, their experience within the field of procurement and supply chain management, their employer, and we asked about occurred supply chain disruptions and consequent recovery times. Here, we were able to collect 336 responses. However, due to missing values in the single item variables and especially due to responses from non-target group members, the number of usable cases reduced to 223.

Chapter 2 Personal factors and salaries of procurement professionals: Is it about who you are?

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Abstract

Research on predictors of salaries in procurement is scarce and has mainly dealt with organizational and some human capital factors, and not so much with personal factors, though they are deemed to be important as well. In our study, we seek to identify which personal factors of procurement professionals influence their salary and how important those factors are compared to other organizational and human capital factors. We investigated the influence of the “Big Five” personality traits and three other personal factors on salary in a sample of 461 procurement professionals from Germany. Our results suggest that extraversion is positively related to salary, whereas neuroticism and conscientiousness are negatively related to salary. The latter is a surprise, as conscientiousness is mostly supposed to be a positive predictor of work performance and salary. Among the other personal factors included, only appropriate English skills seem to be related to salary. The results highlight that some personality traits and personal factors indeed make a significant difference with regard to individuals’ salaries, although their effect might not be as large as that of other organizational and human capital factors. This study contributes to the expansion of knowledge of salary predictors in operations management professions and delivers insights that can be crucial for managers in both procurement and human resource management.

2.1 Introduction

What determines the salaries of procurement professionals? This simple, but relevant question has largely been neglected in procurement research. Few previous studies have examined this issue and have mainly considered organizational characteristics (e.g., firm size, spend in relation to revenues, industry), some human capital factors (e.g., educational level, professional designation, experience), workplace-related factors (e.g., purchasing spend responsibility, working hours), or gender of the examined groups (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003). However, none of them considered personal factors and personality traits. This is surprising, as research from other domains indicates that there is a relationship between personal factors and salary (e.g., Rode et al., 2008; Spurk & Abele, 2011).

Personal factors influence the way people behave in certain business situations, how they negotiate and consequently how successful they are in their careers, with salary being one indicator of career success (e.g., Bowles et al., 2001; Judge et al., 1999; Rode et al., 2008; Seibert & Kraimer, 2001). The influence of personality on negotiation success (Barry & Friedman, 1998; Sharma et al., 2013) can be of special importance in a procurement context in general and in a salary negotiation context specifically. However, personality traits do not only impact salary, but on a more general level also influence people's job and career satisfaction (e.g., Flint-Taylor et al., 2014), (job) performance (e.g., Robertson et al., 2000; Rothmann & Coetzer, 2003; Strohhecker & Größler, 2013), and (career) decision-making (Honeycutt & Rosen, 1997; Riedl et al., 2013). Those factors, in turn, might determine individuals' salary levels as well as other factors (e.g., Fossum & Fitch, 1985).

Nevertheless, salary levels and predictors of salary are not only relevant to procurement professionals, but also to the firms that employ them. Firms can use the salary levels that they pay as one component to attract and retain skilled employees to the jobs they offer (e.g., Campbell, Ganco, Franco, & Agarwal, 2012; Fisher, Graham, Vachon, & Vereecke, 2010; Sevchenko & Ethiraj, 2018), as skilled people are important to firm success and cannot be replaced easily (Hatch & Dyer, 2004). In a similar vein, firms also need to know how attractive their salary level is, compared to competitors or other firms in the supply chain (Fisher et al., 2010; Tenhiälä & Laamanen, 2018). This is of particular importance for functions that face disruptive changes in their respective areas of responsibility. One area where needed skills are supposed to change dramatically is the

supply chain function of firms, especially the procurement function. These changes can have manifold causes such as the changing scope of the supply chain (Jordan & Bak, 2016), globalization and outsourcing (Giunipero, Handfield, & Eltantawy, 2006; Zheng et al., 2007) or digitalization and computerization (Frey & Osborne, 2017) and the related changes in buyer-supplier relationships (Kosmol, Reimann, & Kaufmann, 2019). Thus, procurement professionals need to adapt and enhance their personal skills to their changing roles and responsibilities.

Firms need to ensure that they have skilled personnel. For example, firms might face the problem that they cannot properly implement digitalization projects because they simply lack the required IT capabilities (Streif, Abidi, Russo, & Sommerer, 2018). On that account, human resource management (HRM) and the policies that HRM pursues are crucial in order to stay competitive (Barnes & Liao, 2012). Here, compensation policies and compensation structure can be strategic levers, as they can attract and motivate workers and even influence managerial decisions (Feldman, Gartenberg, & Wulf, 2018; Larkin, Pierce, & Gino, 2012).

In this study, we seek to identify personal factors of procurement professionals that influence their salary and investigate how important those factors are compared to other organizational and human capital factors that determine salary as well. Based on pertinent literature, we hypothesize the influence of different personal factors on salaries in procurement. We test these hypotheses by means of a survey of 461 procurement professionals. The empirical results contribute to theory and practice by revealing which are the crucial factors with regard to salary of procurement professionals.

2.2 Theoretical background and research hypotheses

2.2.1 Strategic importance of salary and predictors of salary levels

Employees are important to firms, as they can be critical to the operating systems in their work environment (Gino & Pisano, 2008). Thus, firms need to attract and retain skilled employees, which is not always easy, as employees are mobile across firms (Sevcenko & Ethiraj, 2018). One means for firms to achieve this attraction and staff retention is to offer attractive salaries (Campbell et al., 2012; Honeycutt & Rosen, 1997; Sevcenko & Ethiraj, 2018). With the right salary composition and compensation schemes, firms can offer incentives to their employees to do their job in alignment with the firm's strategic goals (e.g., Stroh, Brett, Baumann, & Reilly, 1996).

Hence, it can be argued that salary offers are strategic (Larkin et al., 2012). On that account, it is important for firms to understand whether the salary that they pay is high or low compared to other firms in order to determine their strategies (Tenhiälä & Laamanen, 2018). Moreover, choosing the right compensation strategy can have positive effects on firm performance (Becker & Gerhart, 1996). Choosing the right compensation strategy is a complex topic and depends on several different factors (Werner, Tosi, & Gomez-Mejia, 2005).

Predictors of salary levels have been scrutinized extensively. Those predictors can be organizational factors like firm size (e.g., Lambert, Larcker, & Weigelt, 1991), industry (Gutteridge, 1973; Joy, 2003), and the criticality of an employee's position (e.g., Pfeffer & Davis-Blake, 1987). Furthermore, research has also identified workplace-related factors like work hours (Gutteridge, 1973) and human capital factors that influence salary levels and total salaries, such as work experience (Gutteridge, 1973), job performance (Fossum & Fitch, 1985), and educational level (Joy, 2003). In addition, gender seems to influence salaries (e.g., Joy, 2003). However, although the gender pay gap persists, its size remains somewhat ambiguous (e.g., Lips, 2013). Another stream of literature proposes that not only such organizational, workplace-related and human capital factors predict salary, but also personal factors of the concerned managers and employees (e.g., Monti-Belkaoui & Riahi-Belkaoui, 1993; Rode et al., 2008; Spurk & Abele, 2011).

In procurement, human resource management practices and associated compensation strategies are important, yet somewhat under-researched topics (Fisher et al., 2010). There are a few studies dealing with these topics, either focusing on Chief Procurement Officers (CPOs) (Ogden et al., 2002; Zsidisin et al., 2003) or on all procurement professionals (Larson & Morris, 2008, 2014). Ogden et al. (2002) identified industry, annual sales, spend share, number of employees reporting, hierarchical level of the CPO, experience, age, and professional certifications as the most important predictors of CPO compensation. Similarly, Zsidisin et al. (2003) found annual sales, spend share, hierarchical level of the CPO and age to be important. Larson and Morris (2008, 2014) focused on gender pay differences. Besides gender, they identified six (Larson & Morris, 2008), respectively seven (Larson & Morris, 2014) further predictors of salary. These predictors included professional designation, education, experience, purchasing spend responsibility, firm size, share of potential bonus payments and work hours.

However, none of these papers considered personal factors of the procurement professionals, although research suggests that these can be important predictors of salary as well (e.g., Monti-Belkaoui & Riahi-Belkaoui, 1993; Rode et al., 2008; Spurk & Abele, 2011).

2.2.2 Personal factors as indicators for both firm performance and personal career success

Personal characteristics of individuals can affect whole firms and even supply chains as these individuals make decisions and influence performance (Gino & Pisano, 2008; Narayanan & Moritz, 2015). In operations management, these personal factors – and associated behavioral issues – are supposed to be important as well, though they may still be considered to be somewhat under-researched (Wieland et al., 2016). Notwithstanding, there already exists a body of literature suggesting that these factors are especially important in operations management and should not be neglected (e.g., Croson, Schultz, Siemsen, & Yeo, 2013; Riedl et al., 2013).

Personal characteristics of individuals can undoubtedly be important to firms, but they are important to the individuals themselves, as well. They can affect an individual's job performance and career success (e.g., Barrick & Mount, 1991; Rode et al., 2008). Those personal characteristics can be further distinguished into different categories. Past research examined personality traits (e.g., Fiske, 1949; Goldberg, 1990; Norman, 1963) and personality-related characteristics such as risk attitude, cultural ability, intelligence, and knowledge (e.g., Bowles et al., 2001; Martin & Côté, 2019; Rode et al., 2008; Strohhecker & Größler, 2013), as well as more directly job-related characteristics. Those range from work experience to specialized expertise and language skills (e.g., Ehrenreich, 2010; Greenwood, Agarwal, Agarwal, & Gopal, 2019; Tassabehji & Moorhouse, 2008). As this study seeks to identify which personal factors of procurement professionals influence their salary beyond already observed organizational and human capital factors, we will focus on personality traits and on work-specific skills.

The first category of interest, *human personality*, has been an object of investigation for decades (Goldberg, 1990) and, consequently, several research frameworks and questionnaires for personality assessment exist. The most prominent ones are based on the taxonomy of the “Big Five” personality dimensions, which refers to the personality traits openness to experience, conscientiousness, extraversion, agreeableness, and

neuroticism (hence, also called OCEAN model) (e.g., Fiske, 1949; Goldberg, 1990; Norman, 1963). Various distinct questionnaires exist to measure these dimensions, among them are the Big Five Inventory (John, 1990) and the Neuroticism-Extraversion-Openness Inventory (NEO) and its extensions (Costa Jr. & McCrae, 1985). Further recognized research frameworks to assess personality are, for example, the Hogan Personality Inventory (R. Hogan & Hogan, 1995) or more recent approaches like the HEXACO personality framework, which includes the dimensions honesty-humility (H), emotionality (E), extraversion (X), agreeableness (A), conscientiousness (C), and openness to experience (O) (K. Lee & Ashton, 2004).

No matter how they are measured, personality traits are associated with personal success factors such as annual salary (Seibert & Kraimer, 2001; Spurk & Abele, 2011), promotions (Seibert & Kraimer, 2001) and other job performance factors (e.g., Barrick, Mount, & Judge, 2001; Rothmann & Coetzer, 2003; Strohhecker & Größler, 2013). They influence how people negotiate (Barry & Friedman, 1998; Sharma et al., 2013) and how people behave in certain business situations (e.g., Bowles et al., 2001; Rode et al., 2008; Seibert & Kraimer, 2001).

The second category of interest, *work-specific skills* of individual procurement professionals, is somewhat more ambiguous and vague. As mentioned above, we focus on directly job-related skills, which range from work experience to specialized expertise and language skills (e.g., Ehrenreich, 2010; Greenwood et al., 2019; Tassabehji & Moorhouse, 2008).

Against this background, the potential interplay between personal factors from the categories of interest and individuals' salary levels will be investigated in more detail.

2.2.3 The “Big Five” personality dimensions

To assess human personality, we use the aforementioned “Big Five” framework of personality traits. A thorough derivation and description of the single dimensions can be found in, for example, Norman (1963). Goldberg (1990) analyzed the taxonomy's advancement and demonstrated its generality, while Barrick and Mount (1991) scrutinized the model's emergence and interpretations in a highly regarded meta-analysis. In a nutshell, the “Big Five” personality dimensions are *openness to experience* (being intellectual, refined and imaginative), *conscientiousness* (being tidy, responsible and scrupulous), *extraversion* (being talkative, frank and sociable), *agreeableness* (being

good-natured, gentle and cooperative), and *neuroticism* (being anxious, insecure and moody), which is sometimes also referred to as its opposite, emotional stability (Norman, 1963).

We focus on the “Big Five” personality dimensions for several reasons. First, broader personality traits are supposed to be superior when it comes to prediction and explanation in research, compared to narrower, more fine-grained traits (Ones & Viswesvaran, 1996). Second, the established “Big Five” personality dimensions have been shown to be reliable predictors of the comprised five personality dimensions (e.g., Fiske, 1949; Goldberg, 1990, 1993; Norman, 1963). Since its introduction, many other proposed models that were supposed to replace the original five dimensions have not received similar amounts of empirical support (Goldberg, 1993). Third, the “Big Five” personality traits are stable for adults (Costa Jr. & McCrae, 1988) and across different cultural backgrounds (Benet-Martínez & John, 1998). Fourth, well-validated short versions of the “Big Five” inventory are available that can be used when study participants have limited time (e.g., Gosling, Rentfrow, & Swann, 2003; Rammstedt & John, 2007; Woods & Hampson, 2005). Finally, it has been repeatedly shown that the “Big Five” framework relates to both negotiation outcomes (Barry & Friedman, 1998; Sharma et al., 2013) and individuals’ performance (Barrick & Mount, 1991), which are of high relevance in our research setting, where we investigate predictors of individuals’ salary levels. In the following, we look closely at the five personality traits and hypothesize how they potentially influence salary levels as one indicator of personal career success (Rode et al., 2008; Spurk & Abele, 2011).

2.2.3.1 Openness to experience

Individuals that are open to experience are considered to be intellectual, refined and imaginative (Norman, 1963). With regard to job performance, negotiations and predicted salary levels, findings from pertinent research are mixed.

On the one hand, individuals that are open to new experiences perform better in job trainings and they show high training proficiency (Barrick & Mount, 1991; Barrick et al., 2001). Moreover, this personality trait is linked to high levels of career planning and job involvement (Flint-Taylor et al., 2014), and open people are prone to bargaining (Sharma et al., 2013). Openness to experience can predict success for specific occupations. This effect has especially been shown for individuals working in sales and for managers (Barrick et al., 2001; Rothmann & Coetzer, 2003).

On the other hand, openness to experience apparently is not relevant for many work criteria (Barrick et al., 2001). Individuals with high scores on openness to experience exhibit lower organizational commitment (Flint-Taylor et al., 2014), and for some occupations and tasks there seems to be a negative impact of openness to performance (Strohhecker & Größler, 2013). Although open individuals are prone to bargaining (Sharma et al., 2013), they might have a tendency towards more integrative deals (Barry & Friedman, 1998), which might be negative in salary negotiations. Accordingly, Seibert and Kraimer (2001) found a negative impact of openness to experience to salary levels. Consequently, we hypothesize:

Hypothesis 1a: *There is a negative relationship between openness to experience and salary of procurement professionals.*

2.2.3.2 Conscientiousness

Conscientious individuals are supposed to be tidy, responsible, and scrupulous (Norman, 1963). They show less counterproductive work behaviors (Mount, Ilies, & Johnson, 2006), are more protected from stress (Bartley & Roesch, 2011) and tend to achieve higher (career) goals in general (Boyce, Wood, & Brown, 2010). They perform well in job trainings and become task specific experts (Studer-Luethi, Jaeggi, Buschkuhl, & Perrig, 2012). Consequently, there are mostly positive effects of conscientiousness on work performance (Barrick & Mount, 1991; Barrick et al., 2001; Rothmann & Coetzer, 2003) and the trait is positively linked to career and job involvement, as well as career planning (Flint-Taylor et al., 2014). Furthermore, conscientiousness is supposed to positively predict career success (Judge et al., 1999) and to have a positive effect on salary (Spurk & Abele, 2011).

However, there might be a negative relationship between conscientiousness and some performance outcomes (Yeo & Neal, 2004), although it might not influence managerial performance (Robertson et al., 2000). Although conscientious individuals are more protected from stress in general, conscientiousness is expected to exacerbate stress reactions if individuals experience stress (W. Lin, Ma, Wang, & Wang, 2015). The effects of conscientiousness on personal economic outcomes seem to vary over studies (Sharma et al., 2013), and the trait seems to be unrelated to success in bargaining situations (Barry & Friedman, 1998).

Assessing all these arguments from the literature, the positive influences of conscientiousness seem to outweigh the negative influences, and thus we hypothesize:

Hypothesis 1b: *There is a positive relationship between conscientiousness and salary of procurement professionals.*

2.2.3.3 Extraversion

Extraverts are talkative, frank, and sociable (Norman, 1963), which results in their vein to make higher first offers in bargaining situations (Barry & Friedman, 1998). However, there is no relationship to remarkable gains in such situations (Barry & Friedman, 1998). Again, there seem to be varying personal economic outcomes when extraversion is researched (Sharma et al., 2013).

Notwithstanding, extraversion appears to be a personality trait that facilitates the handling of complex tasks (Barry & Friedman, 1998; Sharma et al., 2013) and it is positively related to task performance, creativity, and career advancement goals (Rothmann & Coetzer, 2003; Spurr & Abele, 2011). Extraversion especially appears to positively predict job performance for occupations where interaction with others is important (Barrick & Mount, 1991; Barrick et al., 2001). This is a relevant finding with regard to procurement professionals. Furthermore, extraversion is found to be (strongly) positively related to salary levels and career success (Boudreau, Boswell, & Judge, 2001; Rode et al., 2008; Seibert & Kraimer, 2001). Hence, we hypothesize:

Hypothesis 1c: *There is a positive relationship between extraversion and salary of procurement professionals.*

2.2.3.4 Agreeableness

Individuals that score high on agreeableness are good-natured, gentle, cooperative and altruistic (Norman, 1963; Rothmann & Coetzer, 2003). Usually, they show less counterproductive work behavior (Mount et al., 2006), and often they engage in organizational citizenship behavior (Ilies, Scott, & Judge, 2006). They are supposed to be good team players (Barrick et al., 2001) and managers that score high on this personality trait seem to perform well (Rothmann & Coetzer, 2003). In bargaining situations, agreeable individuals are often satisfied with their outcomes on a subjective self-evaluation basis, and create a constructive bargaining climate (Sharma et al., 2013).

Despite the assumption that working with agreeable individuals seems to be pleasant, overall, agreeableness does not really seem to be an important predictor of job

performance (Barrick & Mount, 1991; Barrick et al., 2001). Worse still for agreeable individuals is the assumption that they do not do a good job because their behavior might be too compliant (Judge et al., 1999). In bargaining situations, they have a high susceptibility to anchoring and, consequently, perform more poorly than others in such situations (Barry & Friedman, 1998). Consequently, research has found agreeableness to be a negative predictor of salary levels (Boudreau et al., 2001; Rode et al., 2008; Spurk & Abele, 2011). Hence, we hypothesize:

Hypothesis 1d: *There is a negative relationship between agreeableness and salary of procurement professionals.*

2.2.3.5 Neuroticism

Neurotic individuals are anxious, insecure and moody (Norman, 1963), and neuroticism is mainly linked to negative outcomes with regard to job performance, bargaining situations and salary levels (e.g., Barrick & Mount, 1991; Sharma et al., 2013; Spurk & Abele, 2011). However, neurotics feel that they have some kind of job success if they have to assess themselves compared to peers (Rode et al., 2008), though they might still not be satisfied with their careers (Seibert & Kraimer, 2001).

In bargaining situations, neuroticism seems to negatively influence negotiation climate, because neurotic individuals complain more often than others and are not flexible (Sharma et al., 2013). Although correlations between neuroticism and job performance sometimes appear to be relatively low, individuals scoring high on this trait seem to be unable to function effectively on their own (Barrick & Mount, 1991), and they show lower levels of occupational self-efficacy (Spurk & Abele, 2011). They perform poorly in career planning (Flint-Taylor et al., 2014), and they are supposed to be less creative and perform worse in management tasks (Rothmann & Coetzer, 2003). Similarly, Barrick et al. (2001) found evidence that there is a positive effect of emotional stability on job performance, which implies a negative effect of neuroticism on job performance, as neuroticism is the inverse of emotional stability. Furthermore, neuroticism is negatively related to job performance and extrinsic career success, measured as total income (Judge et al., 1999). In a similar vein, Spurk and Abele (2011) as well as Boudreau et al. (2001), found a negative effect of neuroticism on salary. Consequently, we hypothesize:

Hypothesis 1e: *There is a negative relationship between neuroticism and salary of procurement professionals.*

2.2.4 Personal skills

Besides personality, other personal factors like work-specific skills are of interest, as procurement professionals need them to perform their job competently (Tassabehji & Moorhouse, 2008). Those can be personality-related factors (e.g., Bowles et al., 2001; Martin & Côté, 2019; Rode et al., 2008; Strohhecker & Größler, 2013) or more directly job-related factors. As personality traits are already covered in H1a-H1e, here we focus on directly job-related factors such as specialized expertise and skills, as well as language skills (e.g., Ehrenreich, 2010; Greenwood et al., 2019; Martin & Côté, 2019; Wolfson & Mathieu, 2021). Those skills are supposed to be important to procurement professionals for performing competently and efficiently in newly emerging job tasks, as well as in everyday work (Greenwood et al., 2019; Tassabehji & Moorhouse, 2008; Wolfson & Mathieu, 2021).

2.2.4.1 Additional qualifications

Task-specific skills are important to the job performance of procurement professionals (Jordan & Bak, 2016; Tassabehji & Moorhouse, 2008). Additional procurement-specific qualifications can help professionals develop such task-specific skills – which might be especially important in procurement, as at least some roles within procurement functions are susceptible to sweeping changes as a result of globalization, collaboration and computerization (Frey & Osborne, 2017; Giunipero et al., 2006). Task-specific skills and experiences positively predict performance in various professions, as individuals with such skills seem to perform better and more efficiently (e.g., Greenwood et al., 2019; Strohhecker & Größler, 2013; Wolfson & Mathieu, 2021). For example, Strohhecker and Größler (2013) found that individuals with context-specific economic knowledge perform better in an inventory management task.

With regard to salary, an increase in task-specific skills is supposed to positively predict salaries (Fossum & Fitch, 1985), and within a concrete procurement setting, there is evidence that professional designation and certifications are positively related to salary levels (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003). Thus, we hypothesize:

Hypothesis 2a: *There is a positive relationship between procurement-specific additional qualifications and salary of procurement professionals.*

2.2.4.2 English skills

Globalization is one of the key developments that especially concern procurement departments of firms, as they source ever more globally (Giunipero et al., 2006; Zheng et al., 2007), and procurement professionals need to cope with this trend (Tassabehji & Moorhouse, 2008). English is the lingua franca, the language of communication between speakers with different first languages in international business settings (e.g., Seidlhofer, 2005). Thus, in globally operating environments such as the procurement functions of firms, English skills have become a crucial and, in many cases, mandatory element of overall business skills (Kankaanranta & Louhiala-Salminen, 2010). Professionals in such environments must be able to communicate with each other in English in order to fulfil their role proficiently (Ehrenreich, 2010).

As English skills seem to be a basic requirement in a globalized procurement context, professionals who cannot sufficiently communicate in English will not be able to fulfil their role as competently as other professionals who are able to do so (Ehrenreich, 2010). Hence, English skills should especially influence salary levels in such countries, where English is not the first language. We hypothesize:

***Hypothesis 2b:** There is a positive relationship between English skills of non-native English speakers and salary of procurement professionals.*

2.2.4.3 Procurement-specific IT-skills

The application of electronic solutions has become an integral part of procurement, and will become even more important (Giunipero et al., 2006; Zheng et al., 2007). The implementation of new IT systems is perceived to lead to significant changes in work processes, and these changes can have impacts on individuals (Bala, 2013). As some functions in procurement, such as the role of procurement clerks, are supposed to be near-completely computerized soon (Frey & Osborne, 2017), IT capabilities in procurement departments are needed to implement and understand digital solutions (Streif et al., 2018). Thus, procurement-specific technical knowledge and IT skills are important for individuals working within procurement functions (Giunipero et al., 2006; Tassabehji & Moorhouse, 2008).

Alternatively, some researchers argue that the importance of specific IT skills is not as vital anymore, because nowadays most graduates are accustomed to the use of IT

anyway (Jordan & Bak, 2016). However, either way, such a point of view also acknowledges that IT skills are important and, consequently, we hypothesize:

Hypothesis 2c: *There is a positive relationship between procurement-specific IT skills and salary of procurement professionals.*

Figure 2 depicts the eight hypothesized effects.

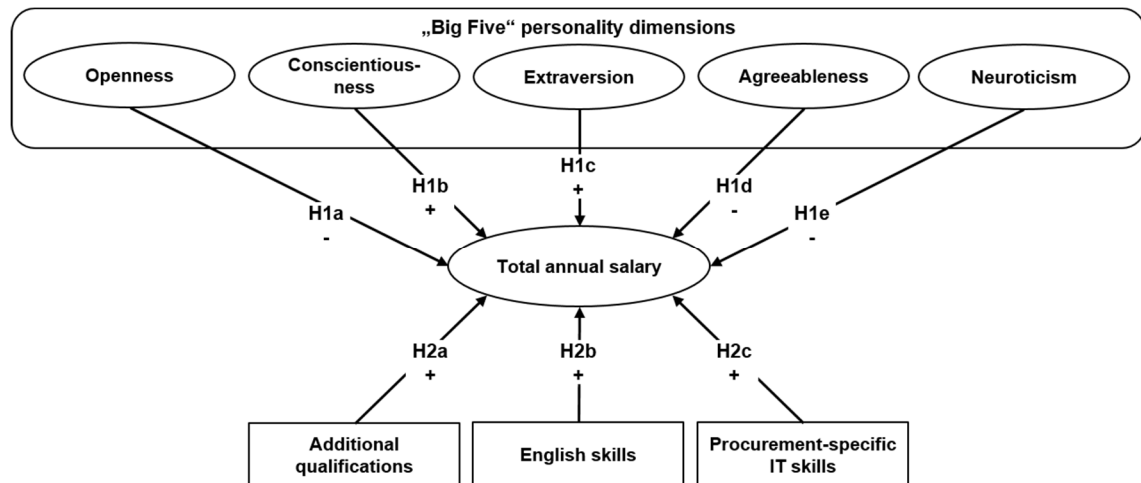


Figure 2: Research model with the hypothesized predictors of total annual salary

2.3 Methodology

2.3.1 Sample and data collection

To test our hypotheses, we collected data by means of a self-administered online survey, with individual procurement professionals as the unit of analysis. We targeted procurement professionals across different industry sectors located in Germany, and consequently the survey instrument was in the German language. Within these geographical limits, potential participants are assumed to form a homogeneous group with regard to cultural socialization and traits, and with regard to basic economic prerequisites related to salary levels. The questionnaire asked the respondents about their current position and their experience as procurement professionals to ensure that only responses from target group members were used.

We promoted our survey via an online newsletter distributed by the “Association of Supply Chain Management, Procurement and Logistics,” a German-based professional association for supply chain managers, buyers and logisticians. In exchange for participation, respondents were offered an executive summary of the results of the salary

survey. We collected 461 usable responses. Respondents (19.7% female) had an average of 12.05 years ($SD = 8.51$) of relevant work experience in procurement positions.

Non-response bias was assessed based on the assumption that later respondents would be more like non-respondents (Armstrong & Overton, 1977). For all questionnaire items, the responses of later respondents were compared to those of earlier respondents. This comparison indicated absence of non-response bias. We addressed potential common method variance problems through assurances of anonymity and confidentiality, as well as an appeal to make subjective assessments in case the respondents did not know the exact answer to a question (Chang, van Witteloostuijn, & Eden, 2010; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Furthermore, the survey instrument did not provide any information or hints on how the variables under investigation were related (Craighead, Ketchen, Dunn, & Hult, 2011; Podsakoff et al., 2003). Additionally, an attention check was included to eliminate answers from participants that were just clicking through in order to receive the executive summary of the results. Participants had to state the shares of strategic, tactical and operational tasks that they have to fulfil in their everyday work, which naturally had to add up to 100%.

2.3.2 Measures and variables

We followed standard psychometric scale and survey instrument development techniques (DeVellis, 2003). This process included preliminary interviews with procurement professionals, an extensive review of the extant academic and practitioner literature, as well as in-person pretesting with selected procurement professionals.

2.3.2.1 Dependent variable

For the dependent variable, *total annual salary (TAS)*, we asked the respondents to state their annual (gross) base salary, further benefits that they receive from their firms (e.g., employer's pension scheme or capital-forming payments, grants for public transport tickets or food) on an annual basis, their end-of-year bonus and their average performance-related bonus. Those single numbers (in €) were then added up to obtain the respondents' TAS. Using total annual salary is in line with literature that assessed salaries (e.g., Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003). To reduce skewedness of the distribution, we used the natural logarithm of total annual salaries (cf. Ertug & Castellucci, 2013). The average total annual salary of the respondents is € 84,564.76 (median = € 76,200, $SD = 36,632.62$).

2.3.2.2 Independent variables

To assess the “Big Five” personality dimensions *openness to experience* (*O*), *conscientiousness* (*C*), *extraversion* (*E*), *agreeableness* (*A*) and *neuroticism* (*N*), we used the 10-item Big Five Inventory (BFI-10) by Rammstedt and John (2007). Since this item inventory was originally provided in both English and German versions, no translations were required on our part. The use of such short measures of personality is especially suitable when respondents’ time is limited (Gosling et al., 2003; Rammstedt & John, 2007) – which we assume to be very much the case in our research setting, addressing procurement professionals via an online-survey.

Respondents were asked whether they agreed or disagreed with statements about their personality (e.g. “I see myself as someone who does a thorough job.”). The used BFI-10 measures each of the five personality dimensions with two items on a seven-point rating scale (ranging from 1 – “disagree strongly” to 7 – “agree strongly”). One of the two items for each factor was reverse-coded, so that we could ask questions that were unidirectional measures of the two poles of the respective personality dimension, and we combined the scores for the two items for each factor (Rammstedt & John, 2007; Woods & Hampson, 2005).

BFI-10 Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
BFI-10 Question 1 [Extraversion reversed]		0.904			
BFI-10 Question 2 [Agreeableness]					0.722
BFI-10 Question 3 [Conscientiousness reversed]				0.952	
BFI-10 Question 4 [Neuroticism reversed]			0.445		
BFI-10 Question 5 [Openness reversed]	0.553				
BFI-10 Question 6 [Extraversion]		0.675			
BFI-10 Question 7 [Agreeableness reversed]					0.462
BFI-10 Question 8 [Conscientiousness]				0.514	
BFI-10 Question 9 [Neuroticism]			0.994		
BFI-10 Question 10 [Openness]	0.998				

Note. All factor loadings above the cutoff value of 0.32 are shown.

Table 1: Loadings of exploratory factor analysis of study 1

The BFI-10 has proven to be efficient in similar managerial research settings (e.g., Bledow, Rosing, & Frese, 2013) and has been found to retain significant levels of reliability and validity (Rammstedt & John, 2007). However, it is not advisable to perform a confirmatory factor analysis (CFA) to demonstrate the fit of the BFI-10 measure, as personality measures usually perform poorly when they are evaluated with CFA, although

their fit can be demonstrated otherwise (Hopwood & Donnellan, 2010; McCrae, Zonderman, Costa Jr., Bond, & Paunonen, 1996). Potential reasons for this might be the inherent complexity of personality and related measurement issues (Hopwood & Donnellan, 2010), or issues related to some assumptions underlying the use of CFA models and their interpretation (Hopwood & Donnellan, 2010; McCrae et al., 1996).

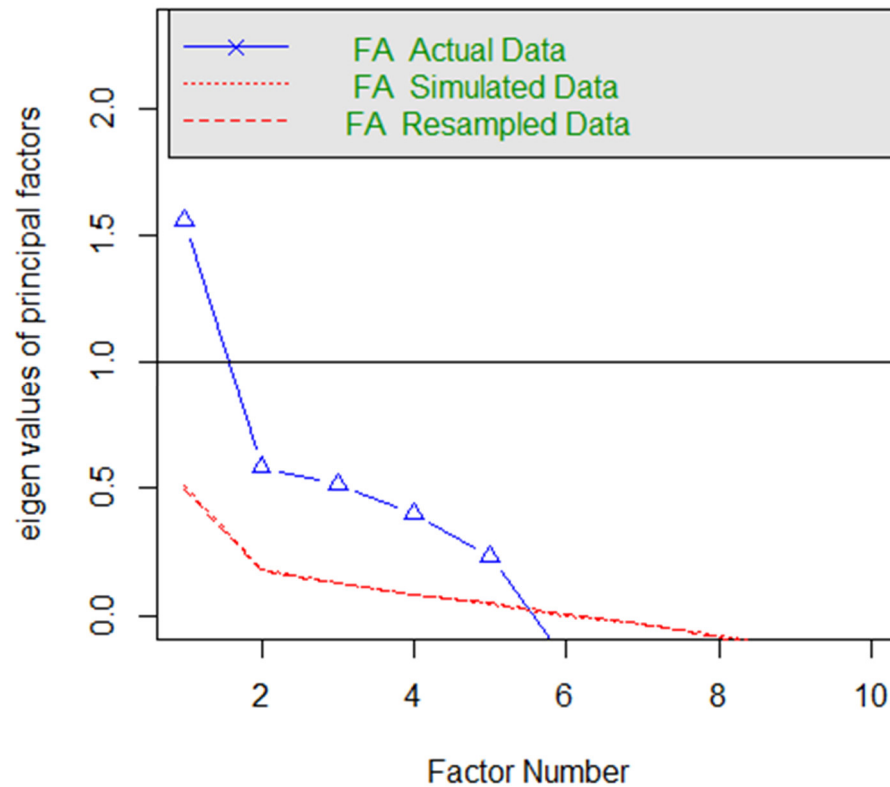


Figure 3: Parallel analysis scree plots of study 1

In order to additionally demonstrate the fit of the BFI-10, an exploratory factor analysis (EFA) was conducted with the 10 different items as input factors. First, we performed a parallel analysis, as this is supposed to be one of the most accurate factor retention methods (Hayton, Allen, & Scarpello, 2004). Results of the parallel analysis suggested that the total number of factors should be five. As we have to expect some correlation between the “Big Five” personality dimensions (Digman, 1997), we opted for oblimin rotation (Yong & Pearce, 2013). Thus, factor analysis with five as the number of factors and oblimin rotation was performed.

The Kaiser-Meyer-Olkin measure of sampling adequacy – computed with the correlation matrix of the 10 items – was 0.55, which is above the commonly suggested threshold of 0.5, indicating that the data were acceptable and sufficient for EFA (Dziuban & Shirkey, 1974; Yong & Pearce, 2013). Considering a cutoff of 0.32 for the factor

loadings (Tabachnick, Fidell, & Ullman, 2007; Yong & Pearce, 2013), there were no crossloadings; that is, there were no items that loaded at 0.32 or higher on two or more factors (Costello & Osborne, 2005). Thus, each item loaded on exactly one factor and, as expected, the respective items loaded on the factors that they were supposed to, as proposed by the BFI-10. Table 1 shows the results of the EFA, Figure 3 the scree plots of the performed parallel analysis.

In line with relevant literature (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003), we assessed whether or not respondents had any *procurement-specific additional qualifications* (*AQ*). For the sake of brevity and to minimize respondent refusal, we relied on a single item measure here (Bergkvist & Rossiter, 2007). Research suggests the use of single items for constructs that are “doubly concrete,” which means that for the respondents, the construct is concrete and unidimensional in terms of both its content (object) and its attributes (Bergkvist & Rossiter, 2007). Respondents could tick off some prescribed procurement-specific additional qualifications or could tick off “miscellaneous additional qualifications.” The latter had to be specified in a text box. This allowed us to check whether those additional qualifications were procurement-specific or not and to finally code the binary variable *AQ*, depending on whether or not the respondents have any procurement-specific additional qualifications. 289 respondents had procurement-specific additional qualifications; 172 did not.

With regard to *English skills* (*Eng*), we resorted to a single item measure again. Respondents – for whom English is a foreign language, as they were German – had to state whether they speak English at least on a business fluent level. 413 of 461 respondents stated that they do, indicating that English indeed has become an important element in overall business know-how (Kankaanranta & Louhiala-Salminen, 2010).

To assess *procurement-specific IT skills* (*IT*), respondents had to rate their expertise in procurement specific software on a seven-point rating scale (ranging from 1 – “no skills” to 7 – “specialist skills”). We used this self-reported single measure as an all-round measure (Dohmen et al., 2011), as individuals are supposed to be fairly accurate reporters of their job situation (Spenner, 1990).

2.3.2.3 Control variables

As control variables, we included variables that are supposed to be predictors of salary levels. Consequently, we controlled for *industry* (*Ind*) (Ogden et al., 2002) and *firm size*

(*FS*) (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003) on the firm level. On the level of individual respondents, we controlled for *actual weekly working hours* (*WH*) (Gutteridge, 1973; Larson & Morris, 2014), *experience in procurement* (*EP*) (Larson & Morris, 2008, 2014), *time in actual position* (*TP*) (Boudreau et al., 2001; Gutteridge, 1973) and *educational level* (*Edu*) (Boudreau et al., 2001; Bowles et al., 2001; Larson & Morris, 2008).

Industry was controlled for by using eight industry dummies, accounting for the effects of the biggest Standard Industrial Classification (SIC)-code-based industry sectors in our sample and a further category where respondents of other industries were pooled. *Firm size* was assessed by the number of employees of the employing firm. We used the natural logarithm of the number of employees to reduce skewedness of the distribution.

For *actual weekly working hours*, respondents had to state their average number of weekly working hours, rounded to integers. *Experience in procurement* and *time in actual position* had to be indicated in full years, and again we used the natural logarithm of these last two numbers to reduce skewedness. To control for *educational level*, we included six education dummies, accounting for the effects of seven predefined educational levels in our sample. Table 2 summarizes descriptive statistics for all variables, except for the industry and educational level dummies, which are omitted for improved readability and Table 3 shows the bivariate correlations. All measurement items and scales are provided in Appendix A.

Variables	Items	<i>M</i>	<i>SD</i>
Total annual salary [€]	1	84,564.76	36,632.62
Openness [7-point rating scale]	2	4.71	1.32
Conscientiousness [7-point rating scale]	2	5.82	0.96
Extraversion [7-point rating scale]	2	4.97	1.20
Agreeableness [7-point rating scale]	2	4.00	1.04
Neuroticism [7-point rating scale]	2	2.86	1.06
Procurement-specific IT skills [7-point rating scale]	1	3.96	1.66
Actual weekly working hours [in hours]	1	44.68	5.73
Time in actual position [years]	1	7.90	7.38
Experience in procurement [years]	1	12.05	8.51
Firm size [Number of employees]	1	7,970.10	28,749.62
Binary Variables		Yes	No
Additional qualifications		289	172
English skills		413	48

Table 2: Descriptive statistics for all variables in study 1

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Total salary	1.000												
(2) Openness	0.133 **	1.000											
(3) Conscientiousness	0.020	0.102 *	1.000										
(4) Extraversion	0.053	0.198 ***	0.163 ***	1.000									
(5) Agreeableness	0.057	-0.039	0.002	-0.021	1.000								
(6) Neuroticism	-0.191 ***	-0.146 **	-0.177 ***	-0.194 ***	-0.078 †	1.000							
(7) Additional qualifications	-0.025	0.075	0.053	0.015	0.067	-0.034	1.000						
(8) English skills	0.170 ***	0.045	0.037	0.068	0.026	-0.103 *	0.001	1.000					
(9) Procurement-specific IT skills	-0.005	0.028	0.072	0.033	-0.104 *	-0.047	0.039	0.056	1.000				
(10) Actual weekly working hours	0.485 ***	0.134 **	0.091 †	-0.004	-0.032	-0.080 †	0.086 †	0.073	0.097 *	1.000			
(11) Time in actual position	0.298 ***	-0.008	0.138 **	-0.046	0.087 †	-0.031	0.096 *	-0.064	-0.041	0.039	1.000		
(12) Experience in procurement	0.426 ***	0.057	0.038	-0.057	0.061	-0.085 †	0.131 **	0.032	0.013	0.157 ***	0.540 ***	1.000	
(13) Firm size	0.215 ***	-0.023	-0.036	0.083 †	0.128 **	-0.091 †	-0.118 *	0.203 ***	0.102 *	0.037	0.104 *	0.042	1.000

Note. Pearson correlation coefficients are shown. $n = 461$.

† $p < 0.10$ (equals $|r| > 0.077$), * $p < 0.05$ (equals $|r| > 0.091$), ** $p < 0.01$ (equals $|r| > 0.120$), *** $p < 0.001$ (equals $|r| > 0.153$) (two-tailed).

Table 3: Bivariate correlations for all variables of study 1

2.4 Results

In order to test our research hypotheses, we first entered the control variables as a block to account for the impact of these variables, as they are supposed to be predictors of salary levels. Subsequently, we entered the hypothesized independent variables in a second block and thus we estimated the following models:

Model 1 (Control-variables only):

$$\ln(TAS_i) = b_0 + b_1 * WH_i + b_2 * \ln(TP_i) + b_3 * \ln(EP_i) + b_4 * \ln(FS_i) + \sum_{k=1}^8 b_{5,k} * Ind_{k,i} + \sum_{l=1}^6 b_{6,l} * Edu_{l,i} + \varepsilon_i$$

Model 2 (Full model):

$$\ln(TAS_i) = b_0 + b_1 * WH_i + b_2 * \ln(TP_i) + b_3 * \ln(EP_i) + b_4 * \ln(FS_i) + \sum_{k=1}^8 b_{5,k} * Ind_{k,i} + \sum_{l=1}^6 b_{6,l} * Edu_{l,i} + b_7 * O_i + b_8 * C_i + b_9 * E_i + b_{10} * A_i + b_{11} * N_i + b_{12} * AQ_i + b_{13} * Eng_i + b_{14} * IT_i + \varepsilon_i$$

We utilized ordinary least squares (OLS) regression to estimate the models, as we scrutinized influence diagnostics and verified that the assumptions underlying OLS estimation were met. Residuals appeared to be approximately normally distributed and neither the scrutinized influence diagnostics nor the Bonferroni adjusted outlier test raised concerns over outliers. No indications of multicollinearity were found: zero-order correlations were relatively low (Table 3) and the variance inflation factors (maximum: 2.007) were below the commonly suggested thresholds for all models (Cohen, Cohen, West, & Aiken, 2003).

In summary, these analyses did not provide any reason to assume that the chosen method was inappropriate. Table 4 reports the corresponding results of the OLS regression. Both models were statistically significant ($p < 0.001$). The control model explained 49.66% of the variance of total annual salary. For the full model, there was a slight, but significant ($p < 0.01$) increase in the explained variance of total annual salary to 51.43%.

Variables	Model 1: Control variables			Model 2: Full model		
Intercept	10.872 ***	(0.044)	[10.780; 10.964]	10.790 ***	(0.068)	[10.642; 10.938]
<i>Controls</i>						
Actual weekly working hours	0.170 ***	(0.017)	[0.121; 0.219]	0.170 ***	(0.017)	[0.120; 0.219]
Time in actual position	0.055 **	(0.019)	[0.014; 0.095]	0.068 ***	(0.020)	[0.027; 0.109]
Experience in procurement	0.171 ***	(0.020)	[0.128; 0.214]	0.161 ***	(0.020)	[0.118; 0.205]
Firm size	0.075 ***	(0.017)	[0.044; 0.107]	0.060 ***	(0.017)	[0.025; 0.095]
<i>Industry dummies^a</i>						
Automotive	-0.026	(0.061)	[-0.134; 0.081]	-0.026	(0.061)	[-0.137; 0.086]
Chemicals, plastics, rubber	0.147 *	(0.061)	[0.015; 0.278]	0.144 *	(0.060)	[0.021; 0.267]
Electronics, optics, data processing	-0.068	(0.065)	[-0.199; 0.063]	-0.041	(0.065)	[-0.163; 0.081]
Consumer goods	-0.017	(0.088)	[-0.197; 0.163]	-0.038	(0.087)	[-0.218; 0.142]
Aerospace, defense	0.152 †	(0.082)	[-0.006; 0.310]	0.124	(0.082)	[-0.045; 0.293]
Machinery and plant engineering	-0.018	(0.044)	[-0.105; 0.070]	-0.019	(0.044)	[-0.105; 0.068]
Metals, metal working	-0.019	(0.088)	[-0.183; 0.144]	-0.021	(0.088)	[-0.176; 0.134]
Pharmaceuticals	-0.036	(0.077)	[-0.189; 0.117]	-0.049	(0.077)	[-0.215; 0.118]
<i>Educational level dummies^b</i>						
Foreman/Technician/Business administrator	0.100	(0.062)	[-0.043; 0.243]	0.109 †	(0.061)	[-0.052; 0.243]
Bachelor (University of Applied Sciences)	0.166 **	(0.052)	[0.060; 0.272]	0.163 **	(0.051)	[0.055; 0.272]
Bachelor (University)	0.180 †	(0.108)	[-0.058; 0.417]	0.126	(0.107)	[-0.113; 0.365]
Master (University of Applied Sciences)	0.289 ***	(0.051)	[0.183; 0.395]	0.280 ***	(0.052)	[0.172; 0.388]
Master (University)	0.361 ***	(0.054)	[0.250; 0.473]	0.337 **	(0.056)	[0.220; 0.455]
PhD	0.559 ***	(0.153)	[0.105; 1.013]	0.575 ***	(0.156)	[0.106; 1.043]
<i>Main effects</i>						
Openness to experience				0.007	(0.017)	[-0.024; 0.038]
Conscientiousness				-0.042 *	(0.017)	[-0.075; -0.009]
Extraversion				0.034 *	(0.017)	[0.001; 0.067]
Agreeableness				0.000	(0.016)	[-0.032; 0.032]
Neuroticism				-0.049 **	(0.017)	[-0.086; -0.012]
Additional qualifications				-0.015	(0.035)	[-0.088; 0.058]
English skills				0.112 *	(0.055)	[-0.003; 0.227]
Procurement-specific IT skills				-0.005	(0.017)	[-0.038; 0.028]
<i>adj. R²</i>	0.497 ***			0.514 ***		
<i>Δadj. R²</i>				0.018 **		
<i>F</i>	26.21			19.73		
<i>F of Δadj. R²</i>				3.01		

Note: OLS estimation was used ($n = 461$). All non-binary independent variables were standardized.

Standard errors are shown in parentheses. Bootstrapped (1,000 reps) 95%-confidence intervals are shown in brackets.

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

^a “Further industries” served as the baseline category

^b “Job training” served as the baseline category

Table 4: Regression results of study 1

Concerning the “Big Five” personality dimensions, we found support for some, but not all, of our proposed hypotheses. Hypothesis 1a suggested a negative relationship between openness to experience and total annual salary. However, the full model did not support this hypothesis ($b_7 = 0.007, p = 0.656$). With regard to hypothesis 1b, stating that a high level of conscientiousness is supposed to be positively related to total annual salary, we obtained results somewhat in contradiction to our model. The full model actually indicates that there is a negative relationship between conscientiousness and total annual salary ($b_8 = -0.042, p = 0.013$). The full model further suggests that there is indeed a positive relationship between extraversion and an individual’s total annual salary ($b_9 = 0.000, p = 0.045$), as suggested in hypothesis 1c. However, we did not find any support for hypothesis 1d, which suggested that agreeableness is negatively related to total annual salary ($b_{10} = 0.034, p = 0.999$). Hypothesis 1e suggested a negative relationship between neuroticism and total annual salary, and the full model supports this hypothesis ($b_{11} = -0.049, p = 0.004$).

With regard to the further personal skills that were included to our model, we did not find any support for our hypothesis 2a, which stated that there is a positive relationship between procurement-specific additional qualifications and total annual salary ($b_{12} = -0.015, p = 0.671$). Hypothesis 2b suggested that there is a positive relationship between proficient English skills of non-native English speakers and total annual salary. The full model suggests the same relationship ($b_{13} = 0.112, p = 0.042$) and thus supports our hypothesis. Our last hypothesis 2c, which suggested a positive relationship between procurement-specific IT skills and total annual salary, was not supported by the model ($b_{14} = -0.005, p = 0.774$).

In line with pertinent literature (e.g., Gutteridge, 1973; Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003), both the control model and the full model suggest that most of the included control variables are significant predictors of total annual salary. The full model suggests that actual weekly working hours ($b_1 = 0.170, p < 0.001$), time in actual position ($b_2 = 0.068, p < 0.001$), experience in procurement ($b_3 = 0.171, p < 0.001$), and firm size ($b_4 = 0.075, p < 0.001$) are all positively related to total annual salary. With regard to industry, the full model suggests that only being employed in one of the included industries (chemicals, plastics, rubber) compared to the base case seems to have a significant positive relationship to total annual salary ($b_{5,2} = 0.144, p = 0.017$). Considering educational level, where the lowest educational level served as the

base case in our models, the control model and the full model indeed suggest a positive relationship between most of the included higher educational levels and total annual salary. Especially for individuals holding a bachelor's degree from a University of Applied Sciences ($b_{6,2} = 0.163, p = 0.002$), a master's degree from a University of Applied Sciences ($b_{6,4} = 0.280, p < 0.001$), a master's degree of a University ($b_{6,5} = 0.337, p < 0.001$), or a PhD ($b_{6,6} = 0.575, p < 0.001$), the full model suggests these positive relationships to total annual salary.

2.5 Discussion of the results

The objective of this paper was to identify which personal factors of procurement professionals influence their salary and how important those factors are, compared to other organizational and human capital factors that determine salary as well. The results provided mixed findings with regard to our hypotheses. We found support for some of the hypotheses, but other hypotheses were not supported, or the findings were even contrary to what we hypothesized.

2.5.1 The “Big Five” personality dimensions

Our results suggest that some of the “Big Five” personality dimensions have significant relations to total annual salaries of individuals. Furthermore, the “Big Five” personality dimensions explain some additional variance. The finding that this extra portion of explained variance is rather small, but still significant, is consistent with some previous research (Hurtz & Donovan, 2000).

As expected and in line with research (e.g., Barrick & Mount, 1991; Rode et al., 2008; Spurk & Abele, 2011), we found support for Hypotheses 1c and 1e, indicating that extraversion is positively related to total annual salary, whereas neuroticism is negatively related to total annual salary.

In contrast to our expectations, we did not find any support in our model for our hypotheses 1a and 1d, predicting that openness to experience and agreeableness would be negatively related to total annual salary. Research suggests positive effects of openness for some occupations (Barrick et al., 2001; Rothmann & Coetzer, 2003), but overall rather negative effects, especially on salary levels (Seibert & Kraimer, 2001). We did not find support for any of these suggestions. This can have manifold explanations. One might be the individual structure of our sample. We invited procurement professionals of all levels

to respond to our survey, regardless of whether they were managers or employees. Another reason might be that openness is supposed to predict success for some specific occupations only (Barrick et al., 2001). With regard to agreeableness, some studies suggest that this personality dimension is not a significant predictor of job performance (e.g., Barrick & Mount, 1991; Barrick et al., 2001), which would more be in line with our results, though we cannot directly conclude this from the results.

The results suggest a negative relationship between conscientiousness and total annual salary, which is quite surprising, as we suggested – in line with most previous research (e.g., Judge et al., 1999; Spurk & Abele, 2011) – a positive effect of conscientiousness on total annual salary in hypothesis 1b. However, there actually is literature that indicates such results for some special kinds of tasks (Robertson et al., 2000; Sharma et al., 2013; Yeo & Neal, 2004), so the question is whether jobs in procurement mainly comprise such tasks. A task that procurement jobs usually comprise is bargaining, but conscientiousness is supposed to be unrelated to bargaining success (Barry & Friedman, 1998) and, therefore, this personality trait might not be helpful in this aspect of an individual procurement professional's job. Moreover, conscientious individuals tend to develop task-specific skills more than generalist skills (Studer-Luethi et al., 2012). Thus, our results might imply that procurement professionals should rather be generalists in order to perform well in their job and to be appropriately rewarded. Furthermore, previous research suggests that conscientiousness negatively affects performance outcomes for tasks performed under time pressure (Yeo & Neal, 2004) and that conscientiousness is expected to exacerbate stress reactions (W. Lin et al., 2015), which might lead to the assumption that procurement professionals have to deal with stress. Consequently, individuals that score too high on conscientiousness might not be well suited for such types of jobs.

2.5.2 Personal skills

We only found support for one of our hypotheses referring to work-related personal skills. In line with our hypothesis 2b, the results suggest a positive relationship between English skills of non-native English speakers and total annual salary. This is consistent with results from research that English is indeed important in today's globalized business (Kankaanranta & Louhiala-Salminen, 2010) and thus an important element for (procurement) professionals at all levels (Ehrenreich, 2010).

In contrast to past research on procurement professionals (Larson & Morris, 2008, 2014; Ogden et al., 2002), we did not find any support for our hypothesis 2a, as our results suggest that procurement-specific additional qualifications do not significantly influence total annual salary. This is in line with the findings of Zsidisin et al. (2003) and thus, two possibilities remain. Either, such specific additional qualifications are indeed not relevant to procurement professionals, as generalist skills might be more important here, or maybe the qualifications that we chose in our sample were not suitable.

Regarding procurement-specific IT skills, we did not find support for hypothesis 2c that such skills are positively related to salary. Actually, some research has found that IT skills are indeed not as important, as graduates might be accustomed to the use of IT anyways (Jordan & Bak, 2016). Another factor might be that experience is supposed to be a predictor of salary (e.g., Larson & Morris, 2014), but on the other hand, IT skills are supposed to be worse for older individuals (van Deursen & van Dijk, 2011) – which are mostly those with more experience in procurement. Thus, there might be a conflict here. However, we did not find any significant correlation, nor did a post hoc analysis reveal any interactions between IT skills and experience in procurement.

2.5.3 Other predictors of salary levels

In terms of other potential predictors of total annual salary that we included as control variables, our results mainly confirm that those are relevant factors with regard to salary levels. A closer look into the regression coefficients of the results suggests larger effects of factors such as actual weekly working hours or educational level. Thus, those factors might be able to lead to advantages in salary levels that cannot be compensated for otherwise.

On the firm level, we found that firm size matters, which is in line with past research (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003). However, the effect of firm size is not as big as that of other factors – which is in line with past research as well (Lambert et al., 1991). With respect to industry, our results suggest that most of the included binary variables do not have a statistically significant relationship to total annual salary. Ogden et al. (2002) found significant impacts for some industries, but in their study, industries were aggregated on a much broader level.

On the personal level, we found a strong positive relationship between actual work hours and salary, as suggested by literature (e.g., Gutteridge, 1973). Likewise, our results

suggest that experience in procurement (Larson & Morris, 2008, 2014) and time in the actual position (e.g., Boudreau et al., 2001) are positively related to total annual salary. This is in contrast to Zsidisin et al. (2003) who looked at CPO compensation and did not find support for their hypothesis that years of experience in procurement positively influences CPO compensation. Similarly, Zsidisin et al. (2003) did not find support for the hypothesis that education matters, but in line with other research (Boudreau et al., 2001; Bowles et al., 2001; Larson & Morris, 2008), our results suggest that there is a strong positive relationship between educational level and salary. All education dummies at the master's degree level or above show strong positive relationships to salary, as do some of the other educational dummies representing educational achievements that have to be classified above the baseline category "job training".

2.6 General discussion

2.6.1 Theoretical implications

Our empirical results contribute to theory, since the aim of this paper was to identify which personal factors of procurement professionals influence their salary and how important those factors are, compared to other organizational, workplace-related and human capital factors that determine salary as well.

First, we contribute to the sparse body of research on salaries of procurement professionals by including personal factors of the individual professionals. Past studies that considered salary in procurement focused on organizational characteristics (e.g., firm size, industry), workplace-related factors (e.g., purchasing spend responsibility, working hours), human capital factors (e.g., education level, professional designation, experience) or gender. By including appropriate control variables, our results mainly confirm findings from these studies, indicating that factors such as industry, firm size, working hours, experience in profession and position, and educational level can be important predictors of salary. However, none of these studies scrutinized the impact of personality traits and other personal factors. To the best of our knowledge, we are the first ones to include such personal factors as predictors of salary in procurement.

Second, our results show that personality traits indeed predict total annual salary (e.g., Monti-Belkaoui & Riahi-Belkaoui, 1993; Rode et al., 2008; Spurk & Abele, 2011). However, some of our findings here challenge certain past findings. In our procurement sample, we did not find agreeableness to be a strong predictor of salary (Rode et al.,

2008), and in contrast to Spurk and Abele (2011), conscientiousness did not have positive effects on salary. Our results rather support the position that effects for conscientiousness might vary across studies (Sharma et al., 2013). In line with some other studies, it needs to be considered that conscientiousness is not always related to higher levels of performance and success and can even have negative effects, depending on different factors and tasks (e.g., Yeo & Neal, 2004). The underlying reasons for the results in our sample are not quite clear, and this controversy with regard to conscientiousness suggests that future research focusing on procurement professionals, their personality and the job tasks they perform would be beneficial. Reasons for such a relationship might be that working in procurement requires generalists (Studer-Luethi et al., 2012) that can handle stress well (W. Lin et al., 2015; Yeo & Neal, 2004).

Third, our results indicate that other personal factors can be important as well, but again, our findings are somewhat mixed in terms of their consistency with previous findings. We confirmed that English skills are important for non-native English speakers, supporting that English can be viewed as the lingua franca in a business context (Ehrenreich, 2010; Kankaanranta & Louhiala-Salminen, 2010). However, we could not confirm that procurement-specific additional qualifications (Larson & Morris, 2008, 2014; Ogden et al., 2002) or IT skills in procurement-specific software (Giunipero et al., 2006; Tassabehji & Moorhouse, 2008) are important predictors of total annual salary of procurement professionals.

Fourth, we showed that the impact of personal factors such as personality traits is rather small compared to other predictors of salary and career success, but still significant (Hurtz & Donovan, 2000). Though effects are smaller, personality can explain some amounts of variance, which challenges past research that has even claimed that personality does not predict salary (O. C. H. Lund, Tamnes, Moestue, Buss, & Vollrath, 2007).

Finally, our study demonstrates the utility of the BFI-10 personality inventory when time of participants is scarce (Rammstedt & John, 2007). The exploratory factor analysis that we conducted indicates that though the questionnaire is rather short, compared to other personality inventories, the BFI-10 is a reliable instrument for assessing the “Big Five” personality dimensions.

2.6.2 Managerial implications

Our results also have important implications for practice. Due to the nature of our research topic, these implications bear on managers from different areas within a firm, like human resource managers or managers in procurement.

First, salary levels and pay systems can have economically significant impacts on firm performance (Becker & Gerhart, 1996; Gerhart, Minkoff, & Olsen, 1995). As salary levels – not only of managers, but also of employees – can be viewed as strategic (Larkin et al., 2012), those salary-related strategies are linked to the effectiveness of entire pay systems (Balkin & Gomez-Mejia, 1987). As organizational strategies and pay strategies have to fit, it is important for managers to know about salary levels and salary predictors (Balkin & Gomez-Mejia, 1990). Our study allows managers to understand important predictors of salary even better, so that they can adapt their pay strategies accordingly.

Second, it is important for firms to keep good employees, as they are important for firm performance (Gino & Pisano, 2008). Firms can try to attract employees by paying high salaries compared to their competitors, as salary levels can determine individuals' attraction to a job (Honeycutt & Rosen, 1997; Sevchenko & Ethiraj, 2018). Furthermore, current employees that earn well are less likely to leave (Campbell et al., 2012), and salary is a possible means to strengthen the firm-employee relationship. Again, firms need to know about salary predictors and levels in order to use this and to determine appropriate strategies (Tenhiälä & Laamanen, 2018).

Third, salary structure can be related to how individuals carry out their tasks. This is especially important in light of our findings related to individual personality traits and their impact. Managers need to consider the specifics of tasks in procurement and how this is related to personality. Based on our results, conscientiousness, especially, might have negative effects, suggesting that individuals scoring high on conscientiousness receive relatively lower salaries. This could be argued to be the case because supervisors are not satisfied with the way those individuals carry out their tasks. Managers have to take care that they have the right people in especially stressful positions (W. Lin et al., 2015). If, however, managers are faced with less conscientious individual employees, they can even improve those individuals' task performance via an appropriate pay structure, as less conscientious individuals are supposed to improve task performance if given appropriate incentives (Fong & Tosi, 2007).

Fourth, managers can use salary to reward employees and to motivate others. If they decide to pay high salaries to high performers, other employees might consider those high performers as especially successful, as high salaries indicate success. Individuals are more motivated to learn from these high performers when they perceive them as successful (Quinn, Myers, Kopelman, & Simmons, 2021). Moreover, when salary is considered as some kind of status, managers can trigger both positive or negative emotions of their employees by awarding or withholding status in terms of increasing, holding constant or even decreasing individuals' salaries and salary structures (Urda & Loch, 2013).

Finally, managers can use the measures of personality included in this study if they have the need to assess their employees' personality. We showed that there are short but quite reliable measures to assess individuals' personality, even if time is limited (Gosling et al., 2003; Rammstedt & John, 2007).

2.6.3 Limitations and future research opportunities

This study and its findings need to be considered in the light of certain limitations that persist, but mostly open up opportunities for future research. Obviously, our study is subject to limitations linked to survey-based research in general. Social desirability might be a problem in survey-based research (Nederhof, 1985), and this is especially the case when assessing personality (Woods & Hampson, 2005). Furthermore, there might be problems with common method variance (Craighead et al., 2011). Although we tried to address these issues with our survey design, we cannot assure that they do not persist. Moreover, a longitudinal study design might eliminate concerns about reverse causality that are inherent to cross-sectional survey research.

In a similar vein and with regard to our measures and variables, the bandwidth-fidelity dilemma – basically, the question of whether complex constructs such as personality can be assessed with only five dimensions (Ones & Viswesvaran, 1996) – could be an issue. Moreover, self-ratings of personality provide a comparatively weaker method for assessing personality than outsider ratings (Baker, Victor, Chambers, & Halverson, 2004). From this perspective, short ratings, such as the one we used, are actually supposed to be better for self-ratings, especially when respondents' time is scarce, but of course short instruments come at some psychometric cost (Gosling et al., 2003). This is manifested in the fact that it is not really sensible to assess the respective

two-item constructs by means of a confirmatory factor analysis, due to the complex nature of personality (Hopwood & Donnellan, 2010). However, future research might use more extensive personality measures, take more time for assessment and include outsider ratings (Costa Jr. & McCrae, 1988) to assess personality in all its details and verify its effects on salaries.

Another potential limitation is related to our sample. We targeted procurement professionals in Germany and our survey instrument was in the German language. Although participants are supposed to form a homogeneous group with regard to cultural socialization and traits within this geographical domain, and despite the fact that the “Big Five” measures are supposed to be stable across cultures (Benet-Martínez & John, 1998), differences might emerge between samples from different cultural backgrounds (Boudreau et al., 2001). It might well be that traits can have different effects in different cultural or industrial settings. Consequently, similar studies should be conducted in further cultural settings and across even more industries.

A facet that our paper did not have a special focus on was gender-related differences. Very likely, the gender pay gap persists, though its size remains somewhat ambiguous (e.g., Lips, 2013). Future research might scrutinize its effective size as well as underlying causes of unequal pay between different genders. Furthermore, we did not distinguish between managers and employees in our study, though there might be differences between these groups, especially with regard to HRM strategies and practices (Krausert, 2014). Thus, future research might approach this issue as well.

Our results indicate that high levels of conscientiousness are negatively related to total annual salary in a procurement setting. Future research might scrutinize the underlying reasons in more detail, particularly in light of job specifics of procurement professionals. There, changing tasks and requirements that are to be expected for individuals working in procurement (Frey & Osborne, 2017) might need some special attention and consideration.

In future research, other predictors of salaries in procurement, beyond those known from past research (Larson & Morris, 2008, 2014; Ogden et al., 2002; Zsidisin et al., 2003) and those identified in this study, should be investigated. For example, the criticality of an individual's position can be a predictor of salary (Pfeffer & Davis-Blake, 1987) and, beyond that, further personal factors and characteristics should be

investigated. In general, research with regard to personality is scarce and needs some special attention in supply chain management research (Wieland et al., 2016).

2.7 Conclusion

In sum, the small body of research on salary predictors in procurement has mainly dealt with organizational, workplace-related and some human capital factors, neglecting personal factors. In our study, we sought to identify which personal factors of procurement professionals influence their salary and how important those factors are, compared to other organizational, workplace-related and human capital factors. We investigated the influence of the “Big Five” personality dimensions and three other personal skills on salary. We surveyed a sample of 461 procurement professionals from Germany. Our results suggest that extraversion seems to be positively related to total annual salary, whereas neuroticism and conscientiousness are negatively related to total annual salary. The latter is a surprise, as conscientiousness is mostly supposed to be a positive predictor of work performance and salary. Among the other personal factors included, only appropriate English skills seem to be related to total annual salary. We exhibit that some personal factors indeed make a significant difference with regard to individuals’ salaries, although their effect might not be as big as that of other organizational, workplace-related and human capital factors. Our insights broaden knowledge of salary predictors in procurement, stress the importance of considering personal factors as well, and deliver crucial insights for managers in both procurement and human resource management.

Chapter 3 The effect of experience on supply chain disruptions and recovery time

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Abstract

Prior research on supply chain risk has focused on disruptions (events), firms (organizations), and specific supply chain elements (e.g., suppliers, relationships, tiers) as units of analysis. However, individuals and the role of their personal characteristics and skills have received scant research attention. This study seeks to address this issue with a special focus on the work experience of supply chain executives and employees. To this end, we review the basic concepts of the supply chain disruption and resilience literature, as well as of the experience-related management literature and develop hypotheses that predict the effects of executive and employee experience on the number of supply chain disruptions a firm suffers and the recovery time it needs to return to normal operations. These predictions are tested using survey data collected among supply chain managers. The empirical findings suggest that firms, which have more experienced executives and more experienced employees, face less supply chain disruptions and recover faster than firms with less experienced staff. These findings underscore the importance of experience in dealing with supply chain problems.

3.1 Introduction

Business environments become ever more interconnected and dynamic and thus, less predictable and inherently risky (Reeves et al., 2016). Various supply chain risk management tools and frameworks have been discussed in the literature (Heckmann, Comes, & Nickel, 2015), but no matter which of these approaches is pursued, there still is an invariably higher likelihood of supply chain disruptions to occur if there are more risk sources (Craighead et al., 2007; Marley, Ward, & Hill, 2014). Supply chain disruptions are events that interrupt the flow of materials between the raw materials' production and the end customer (Craighead et al., 2007). Taken as a whole, there are many different possible sources for supply chain disruptions, from natural disasters, strikes, economic disruptions, terrorism, or fires (Jacobs & Singhal, 2017; Kleindorfer & Saad, 2005) to more problem-specific and decision-maker related factors or system inherent weaknesses, that may lie dormant until the system is stressed (Aitken et al., 2016; Rao & Goldsby, 2009). Supply chain disruptions may affect performance through lost sales, stock outs, production shutdowns, premium freight charges, or product substitutions (Christopher & Peck, 2004; Hendricks & Singhal, 2003, 2005).

Against this background, the challenge for firms is to find ways to reactively manage and mitigate supply chain disruptions and to build resilient supply chains. In the supply chain context, resilience has been defined as "the ability of a system to return to its original state or move to a new, more desirable state after being disturbed" (Christopher & Peck, 2004, p. 2). To date, various factors (e.g., complexity) and capabilities (e.g., disruption management orientation), which affect a firm's supply chain-related resilience, have been investigated (e.g., Ambulkar, Blackhurst, & Grawe, 2015; Braunscheidel & Suresh, 2009; Pettit et al., 2010). Other important aspects in this regard are the perception of supply chain risks by supply chain managers and the ability to properly detect early warning signals (Brusset & Teller, 2017; DuHadway et al., 2019; Ellis et al., 2010). These aspects have also been shown to affect the speed with which a firm is able to recover from disruptions (Bendoly, Craig, & DeHoratius, 2018; Bode & Macdonald, 2017).

However, in contrast to organizational antecedents, on which most research has mainly focused on thus far (Annarelli & Nonino, 2016), relatively little is known about the effects of characteristics of supply chain management (SCM) executives and employees on disruption outcomes and recovery processes. In a way, those people who

actually deal with supply chain disruptions and their consequences in their day-to-day work have been largely neglected by prior research. Personal factors, or the “people dimension” is supposed to be one of the most under-researched areas in SCM research (Wieland et al., 2016). This is surprising, given that studies from other management-related fields suggest that personal factors (such as experiences) play a crucial role in explaining performance outcomes (e.g., Delmar & Shane, 2006; Easton & Rosenzweig, 2012, 2015; Strohhecker & Größler, 2013). Humans are expected to be critical to operating systems (Gino & Pisano, 2008) and they can even be a source of competitive advantage (Barnes & Liao, 2012). Besides, much of the supply chain resilience literature is conceptual with only few empirical studies (Tukamuhabwa et al., 2015).

Given these research gaps, the aim of this study is to investigate empirically the impact of both, executive and employee experience, on supply chain disruptions and recovery processes. More specially, we study the relationship between executive and employee experience and recovery time, defined as the time until full recovery is attained (Macdonald & Corsi, 2013). We attempt to contribute to theory and practice by anticipating the effect of pertinent work experience on the way executives and employees deal with anomalous situations in their immediate business environment.

3.2 Theoretical background and research hypotheses

3.2.1 Supply chain disruptions and resilience

Supply chain disruptions are caused by unexpected triggering events that occur in the supply chain or its environment. These events can lead to situations that threaten the involved firms’ normal business operations (Craighead et al., 2007; Wagner & Bode, 2008). They can seriously harm operating performance, lead to financial losses and have negative effects on shareholder value (Christopher & Peck, 2004; Hendricks & Singhal, 2003, 2005; Macdonald & Corsi, 2013). As supply chains become more complex and globalized, there is an increase in the number of supply chain disruption (e.g., Bode & Wagner, 2015; Bozarth et al., 2009; Giannoccaro, Nair, & Choi, 2018). Increasing complexity, that can be caused by manifold complexity drivers (Serdarasan, 2013), also deteriorates supply chain transparency, which in turn hampers the ability to anticipate looming supply chain disruptions and detect early warning signals (Pettit et al., 2010; Skilton & Robinson, 2009).

The early anticipation and detection of a disruption is an important factor to reduce the short- and long-term effects of supply chain disruptions (Blackhurst et al., 2005; Sheffi, 2015). As mentioned above, firms have to manage and mitigate disruptions. They are supposed to build resilient supply chains that are capable to resume normal operations quickly after a disruption occurred (Christopher & Peck, 2004).

The pertinent literature outlined several factors and capabilities that are beneficial in developing resilient supply chains. Firms need the ability to reconfigure supply chain resources and need to have an appropriate risk management infrastructure (Ambulkar et al., 2015; Bode et al., 2011). Furthermore, Pettit et al. (2010) identified 14 unique capabilities that contribute to increasing the overall resilience of supply chains. Among these capabilities are, in accordance to other papers, adaptability, a firm's competitive position (Sheffi & Rice, 2005), flexibility (Pal, Torstensson, & Mattila, 2014; Simchi-Levi, Wang, & Wei, 2018), visibility (Brandon-Jones, Squire, Autry, & Petersen, 2014; Jain et al., 2017), financial slack (Paeleman & Vanacker, 2015), and the aforementioned ability to detect disruptions quickly through monitoring warning signals (Sheffi, 2015).

Several researchers (e.g., Annarelli & Nonino, 2016; Han, Chong, & Li, 2020; Ivanov, Dolgui, Sokolov, & Ivanova, 2017; Kamalahmadi & Parast, 2016) provide reviews on supply chain resilience and recovery literature, and there are studies that provide indicators and frameworks by which firms can assess their supply chains' level of resilience (e.g., Blackhurst, Dunn, & Craighead, 2011; Cardoso, Barbosa-Póvoa, Relvas, & Novais, 2015). Furthermore, specific collaborative activities between firms can increase visibility, velocity, and flexibility, which also increases supply chain resilience (Jain et al., 2017; Scholten & Schilder, 2015). Another factor positively influencing disruption management and resilience is a speedy processing of information after a supply chain disruption (Bode & Macdonald, 2017).

Organizations and individuals can benefit from actively learning from disruptive events and they are supposed to prepare for future disruptions through early detection (Sheffi, 2015; Starbuck, 2009). Therefore, they have to be aware of critical situations and recognize them by acquiring and interpreting information from the supply chain and its environment (Endsley, 1995). The experiences they gain from own or other's failures can reduce the probability of future adverse outcomes (Hall & Johnson-Hall, 2017).

3.2.2 Experience

Organizational experience and learning have been examined from a wide variety of theoretical perspectives (for a review, see Argote, 1999), one of them being the experience-based learning perspective, which holds that organizational learning is a process of gathering experience and drawing inferences from this historical experience in repositories of organizational knowledge for future actions (Cyert & March, 1963; Levitt & March, 1988). The gathering process can be either intentional by pursuing systematic efforts or, as it is often the case, unintentional (Huber, 1991). At its most basic level, experience and learning create the potential for behavioural change (Huber, 1991), which may lead to positive effects on firm performance. A well-known example is the learning curve concept, which states that the cost per unit produced decreases with the cumulative number of units produced (Wright, 1936). But repetitive experiences also help in other contexts (Yelle, 1979). For example, organizational experience in acquisitions can have positive effects on acquisitions outcomes (Haleblian & Finkelstein, 1999) and organizational experience in alliance exploitation has positive effects on R&D project performance (Hoang & Rothaermel, 2010).

In addition, much of the literature on organizational learning also recognizes that infrequent, hazardous experiences, such as severe supply chain disruptions, can be valuable “lessons” and sources of experience (e.g., Nathan & Kovoov-Misra, 2002; Sitkin, 1992). One important component of organizational learning is the competence of individuals within an organization, which they gain through accumulated experience (Brittain, 1989). Thus, personal learning affects organizational learning and organizations can learn through their members, though they are not necessarily dependent on any specific member (D. H. Kim, 1998). Consequently, personal capabilities also need to be considered when dealing with organizational problems.

With regard to supply chain disruptions, organizations can learn from errors that they experience, such as disruptions, by immediately investigating the issue and learning from these events (LaPorte & Consolini, 1991). In a similar vein, they can learn from events that nearly caused negative impacts, so-called near-miss events (Azadegan, Srinivasan, Blome, & Tajeddini, 2019). Furthermore, firms can learn vicariously from errors that other firms experience, either by passive observation, or by engagement in interpersonal interactions (Myers, 2018). As experience grows, the potential for surprising events catching the firm off guard can be reduced (LaPorte & Consolini, 1991;

Rijpma, 1997). On that score, more experienced staff is supposed to have more “lessons learned” (LaPorte & Consolini, 1991).

In accordance with pertinent literature, organizational experience can be estimated by years in the industry (Brittain, 1989). Transferred to the personal level, experience can be estimated by years within a certain organization or position.

3.2.2.1 Executive experience

Prior literature has put a lot of emphasis on organizational factors with regard to disruptions and building resilient supply chains and not so much on personal factors. Hitherto, research focus has been on managerial background characteristics in relation to general organizational outcomes, which can partially be predicted by these characteristics (Hambrick & Mason, 1984), neglecting the importance of individuals within organizations (Brittain, 1989; D. H. Kim, 1998). Particularly supply chain executives are supposed to be of special importance to their organizations, as leaders exert influence on their followers’ attitudes and behaviours and can have an impact on the overall efforts that their groups need to render in order to achieve certain goals (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Sy, Côté, & Saavedra, 2005). Consequently, executives should be in the centre of analysis.

Additionally, leaders’ social-psychological attitudes are supposed to be a critical contingency in organization design and strategy (Lewin & Stephens, 1994). In particular, pertinent research streams focus on implications related to a firm’s strategy and associated aspects, as well as on overall firm performance with top management team (TMT) tenure as one of these characteristics (e.g., Boeker, 1997; Boyd, Chandy, & Cunha Jr., 2010; Buyl, Boone, & Matthyssens, 2011; Finkelstein & Hambrick, 1990; Kumar & Paraskevas, 2018).

A stream of literature that has not only regarded TMT tenure, but also effects of experience on firm outcomes is the literature on new ventures. Having TMT members with diverse prior experience in new ventures is expected to be positively correlated to firm performance and venture survival (Beckman, Burton, & O'Reilly, 2007; Gimmon & Levie, 2010), though this effect might be nonlinear (Toft-Kehler, Wennberg, & Kim, 2014). Likewise, these managers better understand what needs to be done to achieve sustainable firm growth and competitive advantage (Colombo & Grilli, 2010; Davila & Foster, 2007; Oe & Mitsuhashi, 2013) and make less mistakes in market entry or exit

decisions, which is associated with higher post-entry profits and survival (Chen, Croson, Elfenbein, & Posen, 2018).

Organizations should incorporate information from previous experiences about potential failures into their learning process in order to avoid future disruptions (Desai, 2015; Levitt & March, 1988). To this end, senior managers need to develop systems and trainings to enhance acquisition of such knowledge (Hora & Klassen, 2013). In addition, experience shapes executives' perceptions and outlooks on special business situations (Finkelstein, Hambrick, & Cannella, 2008). Corresponding, there is a negative relationship between age and risk taking (Vroom & Pahl, 1971), which is important in conjunction with the fact that riskier supply chains are correlated to a higher probability of disruptions (e.g., Blackhurst et al., 2005; Sampson & Smith, 1982; Tazelaar & Snijders, 2013). Since individual upper echelon executives' characteristics are supposed to be linked to firm performance and organizational outcomes (e.g., Ambulkar, Blackhurst, & Cantor, 2016; Boeker, 1997; Kumar & Paraskevas, 2018; Lewin & Stephens, 1994; Liu, Fisher, & Chen, 2018), we hypothesize:

Hypothesis 1a: *Firms with a more experienced SCM executive suffer less supply chain disruptions than firms with a less experienced executive.*

In terms of supply chain resilience after a disruption, it is important to react as quickly as possible (e.g., Blackhurst et al., 2005; Bode & Macdonald, 2017; Sheffi, 2015). Likewise, literature suggests that decision makers can make faster decisions, the more experience they have (Laker, Froehle, Windeler, & Lindsell, 2018) and the more general expertise they gain in a certain field, the more likely they use intuitive judgment (Tazelaar & Snijders, 2013). Thus, we hypothesize:

Hypothesis 1b: *Firms with a more experienced SCM executive recover faster from supply chain disruptions than firms with a less experienced executive.*

3.2.2.2 Employee experience

Not only the experience of executives is important in avoiding supply chain disruptions and recovering from occurred disruptions, also individual employees and team compositions can matter in managing risks and improving processes (Choo, Nag, & Xia, 2015; Manuj & Mentzer, 2008). As organizations can learn from rare events (Lampel,

Shamsie, & Shapira, 2009), so can their employees. They become more knowledgeable over time, as knowledge can be regarded as “information that is relevant, actionable, and based at least partially on experience” (Leonard & Sensiper, 1998, p. 113). Employees learn implicitly from past disruptions, which creates tacit knowledge. Such knowledge can even better be acquired, if the learning process is not based on a conscious effort (Reber, 1989). Apparently, this applies to cases where employees experience an unexpected disruption. As their employees can become more knowledgeable, these firms are able to obtain competency managing their supply chain and such firms are recognized to be financially more successful (Ellinger et al., 2011).

Pertinent literature has sparsely investigated effects of employee experience on firms and their performance outcomes, although this could deliver valuable insights to human resource management. In addition, there is an impact of human resource management practices on operations management and firm-level investments in employee human capital can be a critical factor for firms (Ahmad & Schroeder, 2003; Onkelinx, Manolova, & Edelman, 2016). Again, a pioneer in this regard is the research on new ventures. For instance, Hoenig and Henkel (2015) figured out that team experience can be a signal of technological quality for venture capitalists. Besides, founding team experience is supposed to enhance new venture survival and sales (Delmar & Shane, 2006).

With regard to disruptions and resilience, experienced employees gathered a greater tacit knowledge than less experienced employees, which they can apply in their everyday business. They are more capable to find and solve problems, and to make accurate decisions (Leonard & Sensiper, 1998; Reber, 1989). Finding problems early can prevent major disruptions from happening, while solving problems eases resilience after a disruption. Additionally, the search for local solutions to correct a problem expands a firm’s opportunities and capabilities (Eggers & Suh, 2019), and such a search is supposed to be more likely to lead to successful outcomes with experienced and knowledgeable employees.

Beyond, there is a positive effect of internal knowledge transfer on supply chain flexibility, which is an important capability for building resilient supply chains (Blome, Schoenherr, & Eckstein, 2014; Pettit et al., 2010). Finally, as it pertains for supply chain executives, the more general expertise employees gain in a certain field, the more likely they use intuitive judgment and thus, they can react to a supply chain disruption faster, or

at least they better know when to report an anomaly to their supervisor (Tazelaar & Snijders, 2013). This leads us to posit the following hypotheses:

Hypothesis 2a. *Firms with more experienced SCM employees suffer less supply chain disruptions than firms with less experienced employees.*

Hypothesis 2b. *Firms with more experienced SCM employees recover faster from supply chain disruptions than firms with less experienced employees.*

Figure 4 visualizes the hypothesized conceptual model.

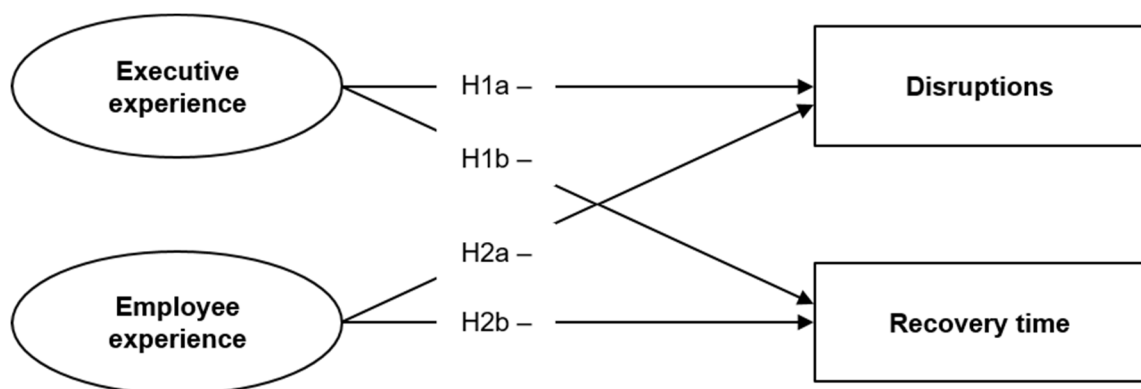


Figure 4: Research model with the hypothesized relationships between executive and employee experience and number of disruptions and recovery time

3.3 Methodology

3.3.1 Sample and data collection

To test our hypotheses on a broad empirical basis, we collected data by means of a self-administered online survey, with the buying firm and the respondents as the unit of analysis. We targeted supply chain executives across different industry sectors located in Germany, Austria and Switzerland (German-speaking part). Within these geographical limits, potential participants are supposed to form a homogeneous group with regard to cultural imprint and traits. The questionnaire asked the respondents about their current position and area of responsibility to ensure that only responses from target group members were used. The initial email blast contained 2,643 addresses. After two follow-ups, 336 responses were generated, yielding a response rate of 12.72 %. However, due to missing values in the single item variables and especially due to responses from non-target group members, the number of usable cases reduced to 223 (i.e., an effective

response rate of 8.44%). Participants were supposed to indicate their current job position and participants in non-leadership roles were removed from the sample. Non-response bias was assessed on the notion that later respondents would be more like non-respondents (Armstrong & Overton, 1977). For all questionnaire items, the responses of later respondents were compared to those of earlier. This comparison indicated absence of non-response bias.

3.3.2 Measures and variables

We followed standard psychometric scale and survey instrument development techniques (DeVellis, 2003). This process included preliminary interviews with supply chain managers, an extensive review of the extant academic and practitioner literature, as well as in-person pretesting with selected managers. The focus was on the two variables *number of disruptions (ND)* and *days until recovery (DR)* from occurred disruptions. For both dependent variables, we relied on single item measures. Prior research suggested the use of single items for constructs that are “doubly concrete” which means that for the respondents, the construct is concrete and unidimensional in terms of both its content (object) and its attributes (Bergkvist & Rossiter, 2007). Respondents were asked to state the total number of disruptions a firm suffered in the respective year, as well as the average number of days until operations attained their normal state, which means average number of days until full recovery from a disruption (Macdonald & Corsi, 2013).

To measure supply chain *executive experience (ExeEx)*, we used a single item again, as respondents were asked to state the number of years that they have been working in their actual position. We measured *employee experience (EmpEx)* with a reflective, three-item scale (five-point Likert-type) construct (Coefficient $\alpha = 0.840$; composite reliability $\rho_c = 0.818$). Participating supply chain executives were asked to make different statements on the average tenure of their employees, whether they have mainly young employees with little work experience (reverse-coded item), and they were asked about the allegiance of their subordinate employees in periods of crisis.

As control variables we included *firm size (FS)* as the number of employees in the focal firm, *firm experience (FEx)* as the number of years a firm has been active in its respective business area, and *upstream horizontal complexity (HC)* as the number of suppliers of the focal firm. This last measure is also in accordance with previous studies that measured upstream horizontal complexity (e.g., Bode & Wagner, 2015; Bozarth et

al., 2009). We controlled for this complexity dimension as supply chain complexity is supposed to be correlated with a higher number of disruptions, with horizontal complexity having the biggest effects (Bode & Wagner, 2015; Lu & Shang, 2017). We had a special focus on the supply base of the focal firm, as supply side factors are supposed to have a higher impact when it comes to supply chain disruption risks than comparable customer side factors (Habermann, Blackhurst, & Metcalf, 2015). Furthermore, there might be negative effects of supply complexity on resilience capabilities (Blome et al., 2014; Gunasekaran, Subramanian, & Rahman, 2015). We used the natural logarithm for number of disruptions, recovery time, executive experience, number of suppliers and firm size to reduce skewedness of the distributions.

Table 5 summarizes descriptive statistics for all variables and Table 6 shows the bivariate correlations. All measurement items and scales are provided in Appendix B.

Variables	Items	<i>M</i>	<i>SD</i>
Disruptions [Number]	1	6.197	15.30
Recovery time [days]	1	1.995	3.14
Firm size [Number of employees]	1	1,467	7,847
Firm experience [years]	1	32.97	35.68
Horizontal complexity [Number of direct suppliers]	1	47.48	78.91
Executive experience [years]	1	7.410	5.96
Employee experience [5-point rating scale]	3	3.763	0.89

Table 5: Descriptive statistics for all variables in study 2

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Disruptions	1						
Recovery time	0.453 **	1					
Firm size	0.304 **	0.210 **	1				
Firm experience	0.074	-0.151 *	0.347 **	1			
Horizontal complexity	0.235 **	0.076	0.331 **	0.341 **	1		
Executive experience	-0.237 **	-0.253 **	-0.149 *	0.066	0.061	1	
Employee experience	-0.100	-0.138 **	0.126	0.140 *	0.273 **	0.150 *	1

Note. Pearson correlation coefficients are shown. $n = 223$.

* $p < 0.05$ (equals $|r| > 0.131$), ** $p < 0.01$ (equals $|r| > 0.172$) (two-tailed).

Table 6: Bivariate correlations for all variables of study 2

3.4 Results

In order to test our research hypotheses, we specified the following two equations (models) and used ordinary least squares (OLS) regression to estimate the parameters. For supply chain disruptions,

$$\ln(ND_i) = b_0 + b_1 * \ln(FS_i) + b_2 * FE x_i + b_3 * \ln(HC_i) + b_4 * \ln(ExeEx_i) + b_5 * EmpEx_i + \varepsilon_i$$

and for resilience,

$$\ln(DR_i) = b_0 + b_1 * \ln(FS_i) + b_2 * FE x_i + b_3 * \ln(HC_i) + b_4 * \ln(ExeEx_i) + b_5 * EmpEx_i + \varepsilon_i$$

We opted for OLS regression instead of seemingly unrelated regression (SUR), as the right-hand side variables are the same for both sets of equation. Table 7 reports the corresponding results. For each model, we scrutinized influence diagnostics and verified that the assumptions underlying OLS estimation were met. Residuals appeared to be approximately normally distributed and neither the scrutinized influence diagnostics nor the Bonferroni-adjusted outlier test raised concerns over outliers. No indications of multicollinearity were found: zero-order correlations were relatively low (Table 6) and the variance inflation factors (maximum: 1.27) were substantially below the commonly suggested thresholds for all models (Cohen et al., 2003). In summary, these analyses did not give reason to assume that the chosen method was inappropriate.

Variables	Disruptions	Recovery time
Intercept	−0.013 [−0.174; 0.149] (0.076)	−0.048 [−0.178; 0.082] (0.060)
Firm size	0.191 *** [0.096; 0.286] (0.055)	0.151 *** [0.067; 0.234] (0.043)
Firm Experience	−0.001 [−0.005; 0.002] (0.001)	−0.004 *** [−0.007; −0.002] (0.001)
Horizontal complexity	0.250 ** [0.074; 0.425] (0.076)	0.112 † [−0.007; 0.232] (0.060)
Executive Experience (H1a, b)	−0.179 ** [−0.307; −0.052] (0.060)	−0.139 ** [−0.229; −0.049] (0.048)
Employee Experience (H2a, b)	−0.124 * [−0.230; −0.017] (0.053)	−0.090 * [−0.178; −0.001] (0.042)
$F(5, 217)$	9.617 ***	8.565 ***
adj. R^2	0.163	0.146

Note: OLS estimation was used ($n = 223$). All independent variables were standardized. Standard errors are shown in parentheses. Bootstrapped (1,000 reps) 95%-confidence intervals are shown in brackets.

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

Table 7: Regression results of study 2

For our first model, the outlined variables explained 16.25% of the variance of the number of disruptions (R^2). Hypothesis 1a proposes a negative relationship between an executive's experience and the number of disruptions and consistent with this

expectation, the results indicate a negative and significant regression coefficient ($b_4^{ND} = -0.179, p = 0.003$). Hypothesis 2a proposes a negative relationship between the employees' experience and the number of supply chain disruptions and again the results indicate a negative and significant regression coefficient ($b_5^{ND} = -0.124, p = 0.020$). In this model, two of our three control variables showed positive and significant effects on the number of supply chain disruptions, indicating that larger firms ($b_1^{ND} = 0.191, p = 0.0007$) and firms with a larger supply base, i.e. a high horizontal complexity ($b_3^{ND} = 0.250, p = 0.0012$), face more disruptions. This relationship between complexity and disruptions is in line with Bode and Wagner (2015). The third control variable, firm experience did not show any significant effect ($b_2^{ND} = -0.001, p = 0.438$).

For the second model, the outlined variables explained 14.56% of the variance in recovery time after a supply chain disruption. Hypothesis 1b suggested a negative relationship between supply chain executive experience and recovery time, meaning that firms that suffer a supply chain disruption recover faster if the responsible executive is more experienced. In accordance with the assumption, the results indicate a negative and significant regression coefficient ($b_4^{DR} = -0.139, p = 0.004$). The results also indicate a negative and significant regression coefficient for the relationship between employee experience and recovery time, providing support for hypothesis 2b ($b_5^{DR} = -0.090, p = 0.031$). In this second model, the control variables indicate that firm size has a significant positive effect on recovery time ($b_1^{DR} = 0.151, p < 0.001$), implying that larger firms recover slower from disruptions. Additionally, there is a negative and significant relationship between firm experience and recovery time, but with only a small effect size ($b_2^{DR} = -0.004, p < 0.001$). For our third control variable, horizontal complexity, there is a positive effect, but it is not statistically significant at the 5%-level ($b_3^{DR} = 0.112, p = 0.063$).

3.5 Discussion

The aim of our study was to shed light on the impact of personal work experience on supply chain disruptions and recovery time and thus, put personal antecedents to disruptions and resilience in the focus of research activities. Summarizing, the proposed models suggest negative direct relationships between the two experience categories, executive experience and employee experience, on both, the number of supply chain disruptions a firm suffers and recovery time. The results indicate support for our predicted

hypotheses and they suggest that humans and their experience indeed can be a critical and relevant factor for firms and their operating systems (Brittain, 1989; Gino & Pisano, 2008).

In this vein, people as critical factors for systems can be one such weakness that has negative repercussions on operational performance if the system is stressed (Aitken et al., 2016). Consequently, our results have implications for theory and practice.

3.5.1 Theoretical implications

The main objective of our study was to anticipate the effect of pertinent work experience on the way executives and employees deal with anomalous situations in their immediate business environment.

Our results indicate that firms with more experienced executives and more experienced employees suffer fewer disruptions than firms with less experienced staff. Hence, the risk of supply chain disruptions that firms face apparently is linked to their employed decision-makers and employees (Rao & Goldsby, 2009). Another factor that could matter in this regard is the fact that more experienced staff is – with a certain probability – older than less experienced staff and might hence be more risk averse (Vroom & Pahl, 1971). Furthermore, firms with a higher degree of experienced personal within their organization can recover faster from such disruptions within their supply chain.

Our study analyses the impact of personal experience on supply chain disruptions and resilience based on data gathered from an online survey among supply chain executives in Germany, Austria and Switzerland. With the setting of our research we aim to address the issues that research on resilience has been mostly conceptual thus far (Tukamuhabwa et al., 2015) and our paper wants to contribute to closing this gap.

Furthermore, the focus of pertinent literature dealing with antecedents of supply chain disruptions and capabilities needed for building resilient supply chains was on organizational factors (e.g., Kleindorfer & Saad, 2005; Pettit et al., 2010), whereas personal factors are supposed to be one of the most under-researched areas in supply chain management research (Wieland et al., 2016). We intend to broaden the body of literature by emphasizing including personal factors of the people that deal with disruptions and their consequences within the firms, as personal learning affects organizational learning

and organizations can learn through their members (D. H. Kim, 1998). Thus, such personal factors should not be neglected in research on disruptions and resilience in operations management. Other research areas indicate as well that personal factors in general (e.g., Boeker, 1997; Buyl et al., 2011; Hambrick & Mason, 1984), and experience as one of these factors in special (e.g., Delmar & Shane, 2006; Easton & Rosenzweig, 2015; Oe & Mitsuhashi, 2013), very well might influence firm outcomes and influence central corporate decisions like strategies and risk taking behaviour.

The results provide first empirical support for the effect of executive and employee experience on the number of supply chain disruptions a firm suffers and consequential recovery times. It appears that firms with more experienced executives and more experienced employees suffer a lower number of supply chain disruptions and recover faster in case they are hit by a disruption. Our results suggest that the competence and experience of individuals also matters for firms in a supply chain management context and not only for other fields of study (Haleblian & Finkelstein, 1999; Hoang & Rothaermel, 2010).

More experienced staff seems to be more aware of potentially critical situations (Endsley, 1995) and thus, might anticipate and detect abnormal situations early (Blackhurst et al., 2005; Sheffi, 2015). Furthermore, more experienced staff is supposed to be able to make faster decisions in case a disruption materializes (Laker et al., 2018). This ability to find problems early, combined with an increased ability to solve them (Leonard & Sensiper, 1998; Reber, 1989), affects the number of disruptions a firm suffers and its recovery abilities.

However, our analysis displayed that there are also effects of firm size, horizontal complexity, and firm experience to consider as well, indicating that a broad interplay of different organizational and personal factors needs to be considered when dealing with supply chain disruptions and resilience.

Finally, with our study we confirm the positive relationship between a high level of horizontal (upstream) supply chain complexity and the frequency of supply chain disruptions, as suggested by pertinent literature (Bode & Wagner, 2015; Lu & Shang, 2017).

3.5.2 Managerial implications

Our findings provide several implications for practice. It is crucial for managers to know what to do to reduce recovery time or even prevent disruptions (Christopher & Peck, 2004). This is an important field of study in order to lower potential losses resulting from supply chain disruptions. In addition to organizational factors, which are already well known from the pertinent literature, managers need to consider personal factors, as our research suggests that there is a significant influence of personal factors on disruptions and recovery time.

Our findings are also relevant to human resource management (HRM). Their practices in fact have an impact on operations management and on manufacturing performance (Ahmad & Schroeder, 2003; Jayaram, Droge, & Vickery, 1999), as well as on organizational resilience capacities (Lengnick-Hall, Beck, & Lengnick-Hall, 2011). However, HRM did not receive much attention from SCM researchers thus far (Gunasekaran et al., 2015).

Based on the study outcomes, human resource management should aim at trying to keep executives and employees within their firm. Here they have to consider that this might be hampered by the facts that people can become less satisfied as their tenure within a given firm increases, that employees continue to be mobile, and that other firms pay premiums to attract appropriately skilled employees (Dobrow Riza, Ganzach, & Liu, 2018; Sevchenko & Ethiraj, 2018). Therefore, HRM ought to establish incentives and develop appropriate strategies to link their executives and employees closer to their firm. Moreover, our results indicate that HRM should put even more emphasis on personal factors and tenure.

Therefore, it is important for managers and persons in charge of human resource management to implement general strategies to avoid a high fluctuation among their workforce. In case that there is not much experienced staff within their firm yet, they should try to overcome this issue by training their staff appropriately and thus, compensate the lack of evolved experience by learning experience (LaPorte & Consolini, 1991; Lengnick-Hall et al., 2011). It is relevant to the firms that this training is within the particular context of the respective firm and that HRM and operations management work closely together (Boudreau, Hopp, McClain, & Thomas, 2003).

Finally, firms should try to capture the experience and tacit knowledge of their long-standing executives and employees in an appropriate way to make better use of it internally, even if these people should leave the firm. They have to avoid fragmented learning, where the link between personal and firm knowledge and experience is broken. In that case, a loss of an individual staff member with its knowledge and experiences would mean an overall loss of these learnings as well (D. H. Kim, 1998).

3.5.3 Limitations and future research opportunities

Our study and its findings are subject to some limitations. We concentrate our study on supply chain executives in manufacturing firms based in German-speaking countries and we rely on single informants within a firm. Thus, a replication of this study across industries, in other geographic regions and with multiple informants would prove its results and increase the generalizability of our results.

Furthermore, the study might be subject to limitations with regard to the survey-based methodological approach that we pursued. There might be problems with common method variance (Craighead et al., 2011) and although we tried to address these issues with our survey design, we cannot assure that they do not persist. Additionally, we rely on cross-sectional data, thus there is the inherent risk of reverse causality. A longitudinal study examining the hypotheses again might resolve all doubt with regard to this risk.

Our study indicates that firm size, which we include as a control variable, has a significant positive effect on recovery time, implying that larger firms recover slower from disruptions. This relationship might be worth further theoretical scrutiny.

A further clear opportunity for future research is the investigation of personal and professional competencies (Cripe & Mansfield, 2011; Thornton, Mueller-Hanson, & Rupp, 2017) in the context of supply chain risk management. There might be interactions between different organizational and personal factors as well. Such findings might lead to better candidate selection decisions. Additionally, future research can analyse experience and other possible personal antecedents of disruptions and resilience in more depth, as well as appropriate strategies for firms to keep executives and employees on a long-term basis.

Another interesting direction for future research can be to develop and test strategies to handle disruptions and to make supply chains more resilient based on such

personal factors. Especially in supply chain resilience there are, as for instance Tukamuhabwa et al. (2015) pointed out, a lot of open topics for future research.

3.6 Conclusion

Thus far, research mainly dealt with organizational antecedents of disruptions and capabilities needed for firm resilience, whereas not much focus has been on personal factors. With our study, we tackle this gap by examining the impact of personal work experience of supply chain executives and employees on the number of disruptions a firm suffers and the recovery time that it needs to come back to normal operations after a disruption occurred. Though our study has to deal with some limitations, we provide valuable insights for theory and practice. Our results suggest that firms with more experienced executives and employees suffer less disruptions than firms with less experienced executives and employees and they can recover faster from such disruptions. These insights can be crucial components for managers that want to avoid supply chain disruptions and build resilient supply chains. Finally, our study can serve as a starting point for various future research opportunities.

Chapter 4 Taking disruptions personal: The effects of personality traits on supply chain resilience

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Abstract

Individuals and the role of their personality have received scant attention in research on supply chain disruptions and resilience, as it mostly focused on organizational factors thus far. This study seeks to address this issue. To this end, we review the basic concepts of the supply chain disruption and resilience literature, as well as of the personality-related literature and develop hypotheses that predict the effects of the “Big Five” personality traits on supply chain resilience of immediate business environments of individuals. These predictions are tested using survey data collected among 293 procurement professionals. The empirical findings suggest that the traits openness to experience, conscientiousness and agreeableness are positively related to supply chain resilience of immediate business environments of individual procurement professionals, whereas neuroticism is negatively related to it. Consequently, our study indicates that personality traits can make a difference when building up resilient supply chains. These findings underscore the importance of considering personal factors and personality types when dealing with supply chain problems. Furthermore, the study theorizes about underlying reasons and mechanisms of these different outcomes and points out possible coherences. Our insights broaden the body of literature on supply chain resilience and stress the importance of personality types in supply management research. In addition, our study delivers important insights for procurement managers that are interested in building resilient supply chains.

4.1 Introduction

In a globalized and interconnected (business) world, supply chains have become more complex and risky (e.g., Blackhurst et al., 2005; Hoole, 2005; Manuj & Mentzer, 2008; Reeves et al., 2016). The risks inherent to such supply chains have always existed (Zsidisin & Henke, 2019), they can arise from operations, dependence on other firms along the supply chain, or from uncertainty in the environment and they need to be managed appropriately, as they might lead to disruptions otherwise (e.g., Hora & Klassen, 2013; Sreedevi & Saranga, 2017; Wagner & Bode, 2006). Consequently, today's globalized and complex supply chains are associated with a higher probability of disruptions caused by sundry events along the supply chain (e.g., Bode & Wagner, 2015; Cardoso et al., 2015; Zhao & Freeman, 2019) that have a negative impact on firm performance (e.g., Bozarth et al., 2009; Gerschberger, Manuj, & Freinberger, 2017; Hendricks & Singhal, 2005). Supply chains that are affected by a disruption need to be resilient, as they face the challenge to return to normal business operations as quickly as possible (Craighead et al., 2007; Sheffi, 2015). Resilience can be defined as “the ability of a system to return to its original state or move to a new, more desirable state after being disturbed” (Christopher & Peck, 2004, p.2).

Literature identified factors and enablers that enhance the level of resilience (e.g., Jain et al., 2017; Pettit et al., 2010), as well as strategies how to respond best to a disruption (e.g., Bode et al., 2011; Tang, 2006). Those include, but are not limited to, an organization's learning orientation (Braunscheidel & Suresh, 2009), adding redundancy (Kamalahmadi & Parast, 2017; Sheffi & Rice, 2005), tighter integration (Brusset & Teller, 2017), flexibility (Brusset & Teller, 2017; Scholten & Schilder, 2015; Sheffi & Rice, 2005), or collaboration between firms (Scholten & Schilder, 2015). Apparently, those factors and strategies mainly focused on organizational aspects (Annarelli & Nonino, 2016).

However, what about individuals that have to make decisions in such situations characterized by high levels of uncertainty and complexity? Apart from very few exceptions (e.g., Mena et al., 2020), pertinent research mainly neglected individual actors that have to make these decisions in order to build resilient supply chains and to deal with occurred disruptions, yet again pointing at the fact that individuals are somewhat under-researched within supply chain management research (Loch & Wu, 2007; Wieland et al., 2016). This is quite surprising, as individuals can be critical to operating systems and as

they can impact the performance of whole firms with the decisions that they make (Gino & Pisano, 2008; Narayanan & Moritz, 2015), though their decision-making can be influenced by how they process and judge information (Fahimnia et al., 2019; Turner & Makhija, 2012). Only few papers acknowledge that individuals can have an impact in creating a resilient supply chain (Ambulkar et al., 2016; Lengnick-Hall et al., 2011; Mena et al., 2020).

To fill this research gap, we want to further scrutinize the impact of individuals on the supply chain resilience of their immediate business environments. To answer our research questions, we conducted an empirical study, thereby addressing the issue that research on supply chain resilience has mostly been conceptual so far with only few empirical studies (Kamalahmadi & Parast, 2016; Tukamuhabwa et al., 2015).

Based on pertinent literature, we hypothesize whether there is a relationship between different personality factors and supply chain resilience of immediate business environments. We test our hypotheses by means of a survey of 293 supply management professionals. Our empirical results contribute to theory and practice by pointing out whether personality traits are of importance with regard to supply chain resilience and which of these traits are the most important ones to consider. Furthermore, we theorize about underlying reasons and mechanisms of potential differences and point out possible coherences.

4.2 Theoretical background

4.2.1 Supply chain disruptions and resilience

In a business context, risk has always existed (Zsidisin & Henke, 2019) and managers, as well as other stakeholders increasingly highlight risks that arise from business operations (Hora & Klassen, 2013). We define risk as being comprised of the two components exposure and uncertainty (Holton, 2004). A considerable amount of uncertainty in a supply chain context stems from supply chains that operate in uncertain environments (Sreedevi & Saranga, 2017) and firms are exposed to supply chain risks such as the reliance on global supply sources or dependence on a certain supplier (Wagner & Bode, 2006).

Another factor that leads to an increasing supply chain disruption risk is an increasing level of complexity (Manuj & Mentzer, 2008) and modern supply chains tend

to become more and more globalized and complex (Hoole, 2005). This complexity can be measured along different dimensions (e.g., Bode & Wagner, 2015; Lu & Shang, 2017), but no matter how it is measured, an increase in complexity seems to make the handling of such supply chains more difficult (C.-Y. Cheng, Chen, & Chen, 2014). Complexity can lead to adverse outcomes for single firms and whole supply chains (e.g., Gerschberger et al., 2017; Giannoccaro et al., 2018), as it increases the risk of a supply chain disruption (Bode & Wagner, 2015; Zhao & Freeman, 2019). Once a disruption risk materializes and a supply chain disruption occurs, this has negative consequences for the affected firm (e.g., Blackhurst et al., 2005; Hendricks & Singhal, 2003, 2005) and sometimes even for whole supply chains (Tang, 2006).

No matter who caused a disruption and why it happened, firms need to detect it and then start a – usually staged – disruption management process in order to get back to normal operations as quickly as possible (Bode & Macdonald, 2017). To go back to a normal or even more desirable performance level can be challenging (Christopher & Peck, 2004) and thus, resilience is a key competency for firms (Pettit et al., 2010). Different reviews on the supply chain resilience literature with different foci exist (e.g., Kamalahmadi & Parast, 2016; Tukamuhabwa et al., 2015). Besides pointing out the fact that research on supply chain resilience has mostly been conceptual so far, those studies, as well as several other publications, also summarize identified indicators of resilience (Cardoso et al., 2015), capabilities that resilient supply chains should have (Pettit et al., 2010) and enablers of resilient supply chain practices (Jain et al., 2017).

Summarizing, a quick response to an occurred disruption is important (Bode & Macdonald, 2017; Craighead et al., 2007), but also other factors and measures can increase resilience, though they usually come at some additional cost (Chopra & Sodhi, 2014). Among those factor are the use of inventories, reserve capacities or other sorts of slack and redundancy (e.g., Kamalahmadi & Parast, 2017; Sheffi & Rice, 2005), supply chain disruption and learning orientation (e.g., Ambulkar et al., 2015; Braunscheidel & Suresh, 2009), flexibility (e.g., Brusset & Teller, 2017; Sheffi & Rice, 2005) or collaboration between firms (Scholten & Schilder, 2015).

However, most of those factors and strategies are researched on a single firm's organizational level (Annarelli & Nonino, 2016), neglecting the role of individuals, although they have to deal with disruptions in their day-to-day work. Thus, we need to

have a closer look at other than organizational factors as well. In the following, we consider the role of individuals in case of a disruption.

4.2.2 Personal factors and the “Big Five” personality dimensions

Individuals make decisions and by doing so, they are critical to the functioning of operating systems and can affect supply chain performance (Gino & Pisano, 2008; Narayanan & Moritz, 2015). At the same time, they can weaken these systems if they primarily pursue only their own interests (Reeves et al., 2016). With regard to supply chain resilience, personal competencies, abilities and behavioral characteristics can be aggregated on an organizational level to increase resilience in case of a disruption (Lengnick-Hall et al., 2011). Hence, individuals can be important in managing supply chain risks and creating resilient supply chains (Ambulkar et al., 2016). Though, the decisions that these individuals make can be influenced by human judgment and personal preferences (Fahimnia et al., 2019; Katsikopoulos & Gigerenzer, 2013). The reason is that individual decision-makers process information differently, pursue different problem solving approaches and consequently make different choices (Cantor & Macdonald, 2009; Turner & Makhija, 2012).

Those behavioral issues that affect decision-making can emerge in different attitudes of individuals with regard to cognition, perception, choice-preferences, or risk-taking propensity (e.g., Kahneman & Tversky, 1979; Mena et al., 2020). There is evidence that those different attitudes can be traced back to differences in underlying personality factors of those individuals (Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005).

Human personality factors have been studied for decades and most of the manifold existing frameworks and questionnaires for personality assessment are based on the “Big Five” personality dimensions (Goldberg, 1990). Those five dimensions are supposed to be relatively orthogonal and they have been derived, described and reviewed in detail (e.g., Goldberg, 1993; Norman, 1963). Briefly, the “Big Five” personality dimensions are openness to experience (being intellectual, refined and imaginative), conscientiousness (being tidy, responsible and scrupulous), extraversion (being talkative, frank and sociable), agreeableness (being good-natured, gentle and cooperative), and neuroticism (being anxious, insecure and moody), which is sometimes also referred to as its opposite, emotional stability (Norman, 1963).

Additionally, there are many other research frameworks to assess personality like the Hogan Personality Inventory (R. Hogan & Hogan, 1995) or the HEXACO personality framework (K. Lee & Ashton, 2004). However, the “Big Five” factor structure is widely accepted (Goldberg, 1993) and offers several advantages to other frameworks. The broader “Big Five” personality traits are supposed to be superior compared to more fine-grained traits when it comes to prediction and explanation in research and an empirical generalization of such narrower traits (McCrae et al., 1996; Ones & Viswesvaran, 1996). Furthermore, they are proven to be reliable (e.g., Fiske, 1949; Goldberg, 1990; Goldberg, 1993; Norman, 1963) and are stable for working-age adults (Cobb-Clark & Schurer, 2012; Costa Jr. & McCrae, 1988) across cultural backgrounds (Benet-Martínez & John, 1998; Costa Jr., Terracciano, & McCrae, 2001). On top, there are short versions of the “Big Five” inventory available, that do not impair the validity of scorings and results, but can be used when time of study participants is limited (e.g., Gosling et al., 2003; Rammstedt & John, 2007; Woods & Hampson, 2005).

In literature, the influence of “Big Five” traits on criteria like personal preferences, decision-making, performance, and career success have been investigated throughout different areas of research and for various kinds of tasks (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000). The “Big Five” characteristics can influence how people negotiate (Barry & Friedman, 1998; Sharma et al., 2013) or how they behave in business situations (e.g., Judge et al., 1999; Seibert & Kraimer, 2001). In addition, the impact of single other traits than the “Big Five”, oftentimes negatively connoted traits like narcissism or psychopathy, have been studied in various fields of research (e.g., Buyl, Boone, & Wade, 2019; Timmer & Kaufmann, 2019).

4.3 Hypotheses and research model

Supply chain disruptions are unplanned events that are characterized by high levels of uncertainty (Craighead et al., 2007). Individuals’ personality in turn seems to have the greatest influence in such dynamic, unpredictable, and changing environments, as such situations do not allow standardized responses (Miller & Toulouse, 1986). Additionally, personality is supposed to explain some amount of variance with regard to individuals’ job performance (Hurtz & Donovan, 2000). Thus, we want to test the influence of the “Big Five” personality traits on the supply chain resilience of immediate business environments of individuals.

4.3.1 Openness to experience

Individuals that score high on openness to experience are supposed to be intellectual, refined, unconventional, innovative and imaginative (Norman, 1963; Weller & Tikir, 2011). Openness can be viewed as the reflection of intelligence and such individuals oftentimes tolerate uncertainty (e.g., Nicholson et al., 2005). This is accompanied by factors such as creativity, curiosity, fantasy, achievement orientation, and desire for knowledge (Borghans, Duckworth, Heckman, & ter Weel, 2008; George & Zhou, 2001; J. Hogan & Holland, 2003). Furthermore, they have a greater willingness to take risks (Lauriola & Levin, 2001; Nicholson et al., 2005; Weller & Tikir, 2011).

In literature on top management teams, firms with CEOs that score high on this personality trait show high levels of strategic flexibility as those CEOs are more likely to initiate strategic change (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010). On a personal level, openness to experiences is positively related to job dedication, job involvement and interpersonal facilitation (Flint-Taylor et al., 2014; Hurtz & Donovan, 2000), as well as it is supposed to be a valid predictor for training proficiency and high attitudes towards learning (Barrick & Mount, 1991; Barrick et al., 2001; Salgado, 1997). Furthermore, openness is positively related to management skills (Rothmann & Coetzer, 2003). In negotiation contexts, open individuals seem to have a higher willingness to pursue creative strategies towards more integrative deals, as they ask many questions about different things and show more cooperative behavior (Barry & Friedman, 1998; Kyl-Heku & Buss, 1996; Sharma et al., 2013). Furthermore, they pursue integrating styles in managing interpersonal conflicts, rather than avoiding styles (Antonioni, 1998). In stressful situations, open individuals perceive less stress and cope well with such situations (Penley & Tomaka, 2002).

However, even though Tett, Jackson, and Rothstein (1991) found openness to experiences to be positively related to general job performance, various studies claim that it is not a relevant trait with regard to most job performance criteria except training proficiency (e.g., Barrick & Mount, 1991; Barrick et al., 2001; Salgado, 1997). Strohhecker and Größler (2013) even found high scores on openness being negatively linked to job performance in inventory management. Additionally, open individuals show lower organizational commitment (Flint-Taylor et al., 2014). Although being linked to positive results in integrative negotiations, the trait does not seem to be relevant in

distributive negotiation settings and does not explain personal bargaining success (Barry & Friedman, 1998; Sharma et al., 2013).

Given the above arguments, we conclude that especially an unconventional approach, creativity and fantasy – a factor that is supposed to be counterproductive in routine tasks, but very productive in creative work (Borghans et al., 2008) – can be important elements in situations that comprise a relatively high degree of uncertainty, such as supply chain disruptions. Furthermore, it might be helpful to approach such situations in a more collaborative and integrative way, as collaborative activities are supposed to enhance resilience capabilities (e.g., Scholten & Schilder, 2015). Thus, we hypothesize:

***Hypothesis 1a:** There is a positive relationship between openness to experience and supply chain resilience of immediate business environments.*

4.3.2 Conscientiousness

Individuals that score high on conscientiousness are tidy, responsible, calm and scrupulous (J. Hogan & Holland, 2003; Norman, 1963). Conscientious individuals keep focused on the tasks they prioritize (Kyl-Heku & Buss, 1996; Weller & Tikir, 2011), manage their time effectively (Kyl-Heku & Buss, 1996), they are task-specific experts (Studer-Luethi et al., 2012), they put a lot of effort in their work (Fong & Tosi, 2007) and show high levels of job involvement (Flint-Taylor et al., 2014). This high level of engagement is supposed to translate into task performance and active learning (Bakker, Demerouti, & ten Brummelhuis, 2012). Furthermore, they show less counterproductive work behavior on an organizational level (Mount et al., 2006), meaning that they care for their firms. Conscientiousness is supposed to have the highest validity of all “Big Five” personality traits with regard to job performance (Borghans et al., 2008; Hurtz & Donovan, 2000). It seems to positively affect job performance across nearly all occupations and criterion types (Barrick & Mount, 1991; Barrick et al., 2001; Fong & Tosi, 2007; Salgado, 1997; Tett et al., 1991) such as task performance, job dedication, interpersonal facilitation and teamwork (Barrick et al., 2001; Hurtz & Donovan, 2000).

Moreover, conscientiousness is supposed to be a protective factor from stress, conscientious individuals can cope with stress well (e.g., Grant & Langan-Fox, 2006; Penley & Tomaka, 2002). Individuals scoring high on this trait perceive more personal

responsibility for the emergence of such situations and thus, more actively cope them (Penley & Tomaka, 2002). With regard to interpersonal conflict management, conscientiousness is positively related to integrative conflict management styles (Antonioni, 1998).

However, although conscientiousness is mostly supposed to affect job performance in a positive way, it might still be rather unrelated to some performance criteria (Rothmann & Coetzer, 2003; Strohhecker & Größler, 2013) or even be negatively related to some performance outcomes like decisiveness or flexibility (Robertson et al., 2000; Yeo & Neal, 2004). In a similar vein, CEOs that score high on conscientiousness are less likely to initiate strategic change and their firm's show lower levels of strategic flexibility (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010). However, as soon as such change is initiated they take care of its proper implementation (Herrmann & Nadkarni, 2014). Moreover, conscientious individuals have a lower risk taking propensity (Nicholson et al., 2005; Weller & Tikir, 2011), show lower levels of creative behavior (George & Zhou, 2001) and the trait is negatively associated with wellbeing when failure is experienced (Boyce et al., 2010). Despite the fact that conscientious individuals are protective from stress and can cope with it well, the trait is supposed to exacerbate stress reactions, once individuals perceive stress (W. Lin et al., 2015). In negotiation contexts, it is supposed to be unrelated to bargaining success in distributive settings and so it is to integrative agreements (Barry & Friedman, 1998; Sharma et al., 2013).

Contemplating the arguments above, positive associations of conscientiousness with job engagement, overall work performance, active learning and coping with stressful situations in combination with an integrative and collaborative conflict management style seem to clearly outweigh potential negative associations with regard to decisiveness, creativity and flexibility in situations with a high level of uncertainty and where collaborative handling styles are demanded. Hence, we hypothesize:

Hypothesis 1b: *There is a positive relationship between conscientiousness and supply chain resilience of immediate business environments.*

4.3.3 Extraversion

Extraverts are supposed to be talkative, frank, adventurous, sociable and charismatic (Bono & Judge, 2004; Norman, 1963). Individuals that score high on this personality trait are oftentimes supposed to be more willing to take risks and also CEOs with this

personality trait seem to be overly willing to engage in riskier actions like acquisitions (Malhotra, Reus, Zhu, & Roelofsens, 2018; Nicholson et al., 2005). However, there are also studies that did not find evidence for this (Weller & Tikir, 2011).

With regard to job performance, findings in literature are mixed as well. Some meta-studies predict with a rather low, but stable validity that high levels of extraversion appear to influence performance in some activities, especially in sales and managerial jobs (Borghans et al., 2008; Hurtz & Donovan, 2000) and more general in jobs that include social interaction and teamwork (Barrick & Mount, 1991; Barrick et al., 2001). By contrast, other studies suggest that extraversion does not validly explain job performance for different criteria (Rothmann & Coetzer, 2003; Salgado, 1997; Strohhecker & Größler, 2013). Furthermore, extraversion does not seem to be significantly related to job involvement, creativity or management skills (Flint-Taylor et al., 2014; Rothmann & Coetzer, 2003). These findings might be due to the fact that some researchers consider the extraversion personality trait as a too broad measure for the underlying components (J. Hogan & Holland, 2003). Nonetheless, extraverts seem to perform well in stressful situations and they are supposed to be able to cope with and handle stressful situations well, though they often feel responsible for the emergence of such situations (Grant & Langan-Fox, 2006; Penley & Tomaka, 2002). Previous studies demonstrate that CEOs scoring high on extraversion more often initiate strategic changes and their firms show higher levels of strategic flexibility (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010). However, this trait is still negatively related to the implementation of such strategic changes (Herrmann & Nadkarni, 2014).

With regard to negotiation contexts, findings in literature are mixed as well. On the one hand, extraverts put more efforts in negotiations (Kyl-Heku & Buss, 1996) and they show more cooperative behavior, which especially helps them in more complex, integrative tasks (Barry & Friedman, 1998; Sharma et al., 2013). On the other hand, they adopt rather extreme positions (i.e. higher first-offers) in distributive settings, but are still not more successful in most settings (Barry & Friedman, 1998). Although they show behavior that is more cooperative in integrative settings, extraverts do not really seem to contribute to finding integrative solutions as well (Barry & Friedman, 1998; Sharma et al., 2013). With respect to managing interpersonal conflicts, they rather pursue integrating styles than avoiding styles, but still they are prone to deploying rather dominating styles (Antonioni, 1998).

Weighing up all these mixed findings from literature, we argue that especially extraverts' integrative approaches in negotiation situations and in handling interpersonal conflicts, together with their ability to cope with stress well and to be successful in such uncertain, stressful situations are of capital importance. Consequently, we hypothesize:

Hypothesis 1c: *There is a positive relationship between extraversion and supply chain resilience of immediate business environments.*

4.3.4 Agreeableness

Agreeable individuals are good-natured, gentle, cooperative and altruistic (Norman, 1963; Rothmann & Coetzer, 2003). They shy away from taking risks (Nicholson et al., 2005; Weller & Tikir, 2011), and are supposed to be trusting, straightforward and predictable (Barrick & Mount, 1991; J. Hogan & Holland, 2003). Furthermore, they have a relationship orientation and hence, they do not manipulate others, tend to cooperate and get along well with them (Kyl-Heku & Buss, 1996; Sharma et al., 2013; Weller & Tikir, 2011).

Accordingly, agreeableness is positively related to interpersonal facilitation and with regard to overall job performance, its impact, if present, seems to be small but consistent (Hurtz & Donovan, 2000). However, the trait does not seem to be as predictive as other traits (Borghans et al., 2008). Several studies actually did not find any significant impact of agreeableness on overall work performance at all (e.g., Barrick & Mount, 1991; Barrick et al., 2001; Strohhecker & Größler, 2013). Similarly, agreeableness is relatively unrelated to job involvement (Flint-Taylor et al., 2014). Still, there is evidence that it is a predictor of some subcategories of overall work performance like training proficiency (Salgado, 1997) or teamwork (Barrick et al., 2001). Relating to managerial performance, findings are extremely mixed, ranging from a positive relationship (Rothmann & Coetzer, 2003), over no relationship (Barrick & Mount, 1991) to a slightly negative relationship (Salgado, 1997). CEOs with this personality trait initiate less strategic change and it is argued that high levels of agreeableness can give rise to passivity (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010). However, agreeable individuals show less counterproductive interpersonal work behaviors than others and they engage more often in organizational citizenship behavior (e.g., Mount et al., 2006). Moreover, the trait might foster creativity (Nadkarni & Herrmann, 2010).

In a negotiation context, agreeable individuals are susceptible to anchoring and on average, they achieve lower individual gains in distributive bargaining (Barry & Friedman, 1998). Surprisingly, the personality trait does not seem to be related to positive outcomes in integrative bargaining, but the cooperative tendencies associated with this trait apparently creates a constructive climate in negotiations (Barry & Friedman, 1998; Sharma et al., 2013). In situations with high levels of stress, whether an individual shows high levels of agreeableness or not does not seem to be of importance, as there is no significant relationship found between agreeableness and stress (Penley & Tomaka, 2002). When it comes to coping with stress, agreeable individuals tend to prefer coping strategies that include social support (Penley & Tomaka, 2002). In conflicts, they prefer integrative conflict management styles, but also have a tendency towards avoiding styles (Antonioni, 1998).

Building on the above logic, we argue that especially the relationship orientation of agreeable individuals, their integrative conflict management style and the fact that they foster a constructive climate in negotiations are important in situations with high uncertainty, when a disruption occurred and thus, we hypothesize:

Hypothesis 1d: *There is a positive relationship between agreeableness and supply chain resilience of immediate business environments.*

4.3.5 Neuroticism

Neurotics are anxious, insecure, emotional, moody and worried (Barrick & Mount, 1991; Norman, 1963), they are viewed as less charismatic (Bono & Judge, 2004) and they complain more often than others and are not flexible (Sharma et al., 2013). Furthermore, neuroticism is negatively related to risk-taking (Lauriola & Levin, 2001; Nicholson et al., 2005; Weller & Tikir, 2011). In literature, this personality trait is mainly linked to negative associations with regard to job related capabilities and outcomes (Barrick & Mount, 1991; Hurtz & Donovan, 2000; Rothmann & Coetzer, 2003). Besides, it is supposed to be more predictive than most other personality traits (Borghans et al., 2008) and a much more important performance predictor than oftentimes realized (J. Hogan & Holland, 2003; Hurtz & Donovan, 2000).

Although there are studies that did not find significant evidence or only relatively low correlations for a negative effect on overall job performance (Barrick & Mount, 1991; Strohhecker & Größler, 2013), others did find such evidence (Barrick et al., 2001; Hurtz

& Donovan, 2000; Salgado, 1997). Additionally, almost all studies found negative relationships to partial aspects of overall work performance and job related capabilities. Specifically, neuroticism is supposed to be negatively related to task performance, job dedication, interpersonal facilitation and teamwork (Barrick et al., 2001; Hurtz & Donovan, 2000). Neurotics are less creative, perform worse in management tasks and are unable to function effectively on their own, as the trait is negatively linked to autonomy (Barrick & Mount, 1991; Kyl-Heku & Buss, 1996; Rothmann & Coetzer, 2003). CEOs that score high on this trait initiate less strategic change and their firms show a lower strategic flexibility (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010). Moreover, neurotic individuals are expected to work less hard, to have problems with task prioritization and to feel more workplace pressure (Flint-Taylor et al., 2014; Kyl-Heku & Buss, 1996).

Neurotics have a higher stressor exposure, consequently perceive more stress, show a low perceived stress coping ability and their coping is less problem-focused (Grant & Langan-Fox, 2006; Penley & Tomaka, 2002). Furthermore, they seem to negatively influence negotiation climate and have a negative performance rating in negotiations. However, the overall role of neuroticism with regard to negotiation outcomes remains somewhat unclear (Sharma et al., 2013). In conflicts, neurotic individuals prefer avoiding conflict management styles and the trait does not show any significant relationship to an integrative style. At least, they do not pursue dominating conflict management styles (Antonioni, 1998). Considering all these arguments, we hypothesize:

Hypothesis 1e: *There is a negative relationship between neuroticism and supply chain resilience of immediate business environments.*

Figure 5 depicts the hypothesized research model.

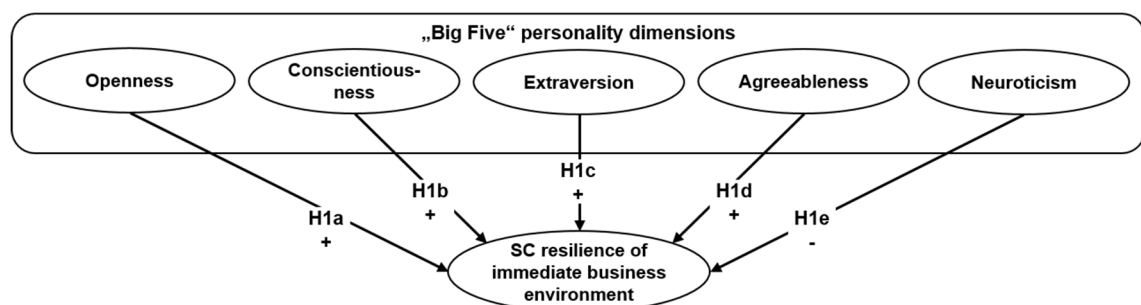


Figure 5: Research model with the hypothesized relationships between the “Big Five” dimensions and supply chain resilience of immediate business environment

4.4 Methodology

4.4.1 Sample and data collection

In our study, we sought to identify whether there is a relationship between the variables of interest. Therefore, we collected data by means of a self-administered online survey, with individual procurement professionals as the unit of analysis. We targeted those professionals across different industry sectors located in Germany, and consequently the survey instrument was in the German language. The questionnaire asked the respondents about their current position and their experience as procurement professionals to ensure that only responses from target group members were used. Furthermore, we assessed whether the respondents already experienced supply chain disruptions, as we assumed that respondents could only make reliable statements with regard to disruptions and resilience if they ever experienced such a situation themselves. We promoted our survey via social networks such as LinkedIn and Twitter, as well as via an online newsletter distributed by the “Association of Supply Chain Management, Procurement and Logistics,” a German-based professional association for supply chain managers, buyers and logisticians. In exchange for participation, respondents were offered an executive summary of the results of the survey. We collected 461 usable responses. However, due to answers from participants that never experienced a supply chain disruption by themselves and due to missing values, especially in the measure for supply chain resilience of immediate business environment (see below), the number of usable cases reduced to 293. Respondents (15.7% female) had an average of 11.77 years (s.d. = 7.85) of relevant work experience in procurement positions.

Non-response bias was assessed based on the assumption that later respondents would be more like non-respondents (Armstrong & Overton, 1977). For all questionnaire items, the responses of later respondents were compared to those of earlier respondents. This comparison indicated absence of non-response bias. We addressed potential common method variance problems through assurances of anonymity and confidentiality, as well as an appeal to make subjective assessments in case the respondents did not know the exact answer to a question (Chang et al., 2010; Podsakoff et al., 2003). Furthermore, the survey instrument did not provide any information or hints on how the variables under investigation were related (e.g., Craighead et al., 2011; Podsakoff et al., 2003). Additionally, an attention check was included. Participants had to state the shares of

strategic, tactical and operational tasks that they have to fulfil in their everyday work, which naturally had to add up to 100%.

4.4.2 Measures and variables

We followed standard psychometric scale and survey instrument development techniques (DeVellis, 2003). This process included preliminary interviews with procurement professionals, an extensive review of the extant academic and practitioner literature, as well as in-person pretesting with selected procurement professionals and PhD students.

4.4.2.1 Dependent variable

The dependent variable *supply chain resilience of immediate business environment (SCRes)* was assessed by an adoption of the reflective four item resilience construct (Coefficient $\alpha = 0.910$; composite reliability $\rho_c = 0.935$) provided by Ambulkar et al. (2015). The respondents had to rate the items by answering four statements (e.g., “In the working area where I personally bear responsibility, we are able to cope with changes brought by the supply chain disruption”) on a seven-point rating scale (ranging from 1 – “disagree strongly” to 7 – “agree strongly”). The items can be found in Appendix C.

4.4.2.2 Independent variables

To assess the “Big Five” personality dimensions *openness to experience (O)*, *conscientiousness (C)*, *extraversion (E)*, *agreeableness (A)* and *neuroticism (N)*, we used the 10-item Big Five Inventory (BFI-10) by Rammstedt and John (2007). The use of such short measures of personality is especially suitable when respondents’ time is limited (Gosling et al., 2003; Rammstedt & John, 2007) – which we assume to be very much the case in our research setting, addressing procurement professionals via an online-survey. Furthermore, the broader “Big Five” personality traits are supposed to be superior compared to more fine-grained traits (Ones & Viswesvaran, 1996). In the original paper (Rammstedt & John, 2007), the BFI-10 is provided in both English and German, and respondents were asked whether they agreed or disagreed with statements about their personality (e.g. “I see myself as someone who does a thorough job.”). The used BFI-10 measures each of the five personality dimensions with two items on a seven-point rating scale (ranging from 1 – “disagree strongly” to 7 – “agree strongly”). One of the two items for each factor was reverse-coded, so that we could ask questions that were unidirectional measures of the two poles of the respective personality dimension, and we combined the scores for the two items for each factor (Rammstedt & John, 2007; Woods & Hampson,

2005). The BFI-10 has proven to be efficient in similar managerial research settings (e.g., Bledow et al., 2013) and has been found to retain significant levels of reliability and validity (Rammstedt & John, 2007). However, it is not advisable to perform a confirmatory factor analysis (CFA) to demonstrate the fit of the BFI-10 measure, as personality measures usually perform poorly when they are evaluated with CFA, although their fit can be demonstrated otherwise (Hopwood & Donnellan, 2010; McCrae et al., 1996). Potential reasons for this might be the inherent complexity of personality and related measurement issues (Hopwood & Donnellan, 2010), or issues related to some assumptions underlying the use of CFA models and their interpretation (Hopwood & Donnellan, 2010; McCrae et al., 1996).

BFI-10 Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
BFI-10 Question 1 [Extraversion reversed]	0.874				
BFI-10 Question 2 [Agreeableness]					0.733
BFI-10 Question 3 [Conscientiousness reversed]				0.494	
BFI-10 Question 4 [Neuroticism reversed]			0.462		
BFI-10 Question 5 [Openness reversed]		0.711			
BFI-10 Question 6 [Extraversion]	0.753				
BFI-10 Question 7 [Agreeableness reversed]					0.482
BFI-10 Question 8 [Conscientiousness]				0.813	
BFI-10 Question 9 [Neuroticism]			0.994		
BFI-10 Question 10 [Openness]		0.855			

Note. All factor loadings above the cutoff value of 0.32 are shown.

Table 8: Loadings of exploratory factor analysis of study 3

In order to demonstrate the fit of the BFI-10, an exploratory factor analysis (EFA) was conducted with the 10 different items as input factors. First, we performed a parallel analysis, as this is supposed to be one of the most accurate factor retention methods (Hayton et al., 2004). Results of the parallel analysis suggested that the total number of factors should be five. As we have to expect some weak to moderate correlation between the “Big Five” personality dimensions (Digman, 1997), we opted for oblimin rotation (Yong & Pearce, 2013). Thus, factor analysis with five as the number of factors and oblimin rotation was performed. The Kaiser-Meyer-Olkin measure of sampling adequacy – computed with the correlation matrix of the 10 items – was 0.54, which is above the commonly suggested threshold of 0.5, indicating that the data were acceptable and sufficient for EFA (Dziuban & Shirkey, 1974; Yong & Pearce, 2013). Considering a cutoff of 0.32 for the factor loadings (Tabachnick et al., 2007; Yong & Pearce, 2013),

there were no crossloadings. This means that there were no items that loaded at 0.32 or higher on two or more factors (Costello & Osborne, 2005). Thus, each item loaded on exactly one factor and, as expected, the respective items loaded on the factors that they were supposed to, as proposed by the BFI-10. Table 8 shows the results of the EFA, Figure 6 the scree plots of the performed parallel analysis.

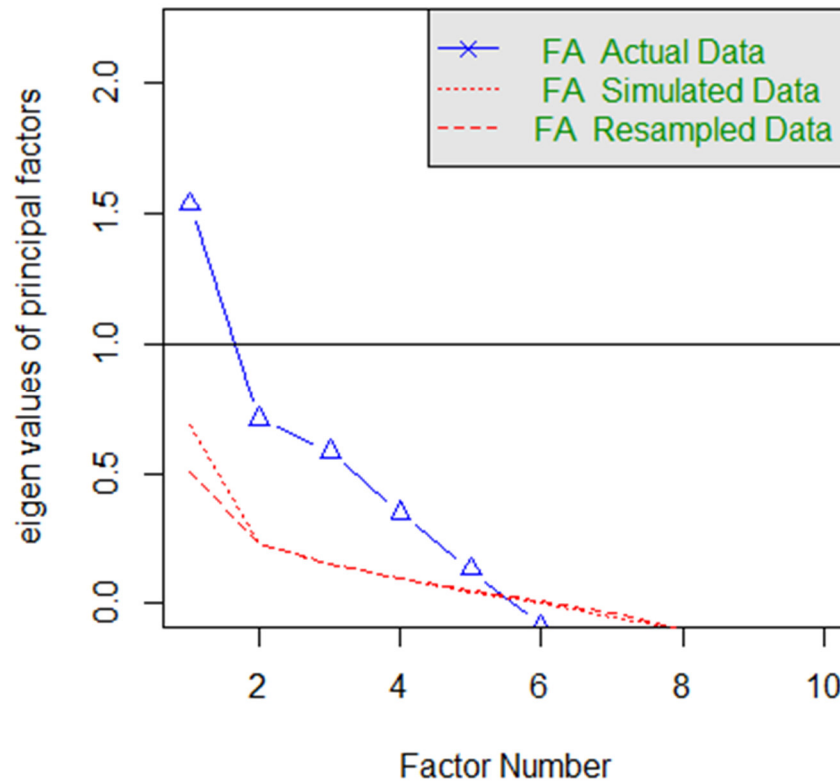


Figure 6: Parallel analysis scree plots of study 3

4.4.2.3 Control variables

As control variables, we included variables on the firm level and on the level of the individual respondents. On the firm level, we controlled for *firm size (FS)* as the number of employees in the focal firm, and *firm experience (FEx)* as the number of years the firm has been active in its respective business area. On the level of the individual respondents, we controlled for *experience in procurement (EP)* and *time in actual position (TP)*. Both had to be indicated in full years. Furthermore, we included the total number of suppliers that the respondent is responsible for, as a further control variable. The variable can be considered as a measure for the *individual's upstream horizontal complexity (IHC)* (Bode & Wagner, 2015; Bozarth et al., 2009). For all control variables, we used the natural logarithm of the respective numbers to reduce skewedness of the distributions.

Table 9 summarizes descriptive statistics for all variables and Table 10 shows the bivariate correlations. All measurement items and scales are provided in Appendix C.

Variables	Items	<i>M</i>	<i>SD</i>
Supply chain resilience of immediate business environment [7-point rating scale]	4	5.30	1.11
Openness [7-point rating scale]	2	4.81	1.33
Conscientiousness [7-point rating scale]	2	5.84	0.86
Extraversion [7-point rating scale]	2	5.05	1.20
Agreeableness [7-point rating scale]	2	4.04	1.04
Neuroticism [7-point rating scale]	2	2.84	1.07
Firm size [Number of employees]	1	8,011.32	30,900.53
Firm experience [years]	1	62.90	44.64
Experience in procurement [years]	1	11.77	7.85
Time in actual position [years]	1	7.84	7.51
Individual's upstream horizontal complexity [Number of suppliers responsible for]	1	229.53	463.66

Table 9: Descriptive statistics for all variables in study 3

4.5 Results

To test our research hypotheses and determine the influence of the “Big Five” personality traits on supply chain resilience of immediate business environments, we entered the control variables as a block in a first step. In a second step, we added the “Big Five” personality traits to the model and thus, we estimated the following models:

Control model

$$SCRes_i = b_0 + b_1 * \ln(FS_i) + b_2 * \ln(FEx_i) + b_3 * \ln(EP_i) + b_4 * \ln(TP_i) + b_5 * \ln(IHC_i) + \varepsilon_i$$

Full model

$$SCRes_i = b_0 + b_1 * \ln(FS_i) + b_2 * \ln(FEx_i) + b_3 * \ln(EP_i) + b_4 * \ln(TP_i) + b_5 * \ln(IHC_i) + b_6 * O_i + b_7 * C_i + b_8 * E_i + b_9 * A_i + b_{10} * N_i + \varepsilon_i$$

We used ordinary least squares (OLS) regression to estimate our models. Table 11 summarizes the corresponding results. We scrutinized influence diagnostics and verified that the assumptions underlying OLS estimation were met. Residuals appeared to be approximately normally distributed and neither the scrutinized influence diagnostics nor the Bonferroni adjusted outlier test raised concerns over outliers.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Supply chain resilience of immediate business environment	1										
Openness	0.180 **	1									
Conscientiousness	0.289 ***	0.048	1								
Extraversion	0.057	0.135 *	0.121 *	1							
Agreeableness	0.166 **	-0.067	0.035	-0.056	1						
Neuroticism	-0.247 ***	-0.164 **	-0.158 **	-0.177 **	-0.117 *	1					
Firm size	-0.057	-0.030	0.004	0.112 †	0.104 †	-0.184 **	1				
Firm experience	0.049	-0.058	-0.042	-0.052	0.108 †	-0.004	0.261 ***	1			
Experience in procurement	0.086	0.027	-0.011	-0.054	0.068	-0.070	0.133 *	0.128 *	1		
Time in actual position	0.188 **	-0.035	0.071	-0.034	0.072	-0.002	0.170 **	0.142 *	0.518 ***	1	
Individual's upstream horizontal complexity	-0.001	0.031	0.046	0.003	0.040	-0.040	0.117 *	0.125 *	0.098 †	0.082	1

Note. Pearson correlation coefficients are shown. $n = 293$.

† $p < 0.10$ (equals $|r| > 0.096$), * $p < 0.05$ (equals $|r| > 0.115$), ** $p < 0.01$ (equals $|r| > 0.150$), *** $p < 0.001$ (equals $|r| > 0.191$) (two-tailed).

Table 10: Bivariate correlations for all variables of study 3

No indications of multicollinearity were found: zero-order correlations were relatively low (Table 10) and the variance inflation factors (maximum: 1.417) were below the commonly suggested thresholds for all models (Cohen et al., 2003). In summary, these analyses did not provide any reason to assume that the chosen method was inappropriate. Both the control model ($p = 0.019$) and the full model ($p < 0.001$) were statistically significant. The control model explained only 2.90% of the variance of *SCRes*. However, for the full model, there was a substantial and significant ($p < 0.001$) increase in the explained variance of *SCRes* to 18.75%.

Variables	Model 1: Control variables	Model 2: Full model
Intercept	5.300 *** (0.064) [5.188; 5.404]	5.300 *** (0.059) [5.206; 5.392]
<i>Controls</i>		
Firm size	-0.113 † (0.067) [-0.238; 0.004]	-0.167 ** (0.063) [-0.285; -0.058]
Firm experience	0.055 (0.067) [-0.057; 0.168]	0.079 (0.062) [-0.029; 0.184]
Experience in procurement	-0.013 (0.075) [-0.124; 0.101]	-0.030 (0.070) [-0.130; 0.069]
Time in actual position	0.228 ** (0.076) [0.101; 0.361]	0.221 ** (0.070) [0.110; 0.332]
Individual's upstream horizontal complexity	-0.012 (0.065) [-0.122; 0.098]	-0.039 (0.060) [-0.148; 0.067]
<i>Main effects</i>		
Openness to experience		0.171 ** (0.060) [0.060; 0.281]
Conscientiousness		0.263 *** (0.060) [0.155; 0.367]
Extraversion		0.007 (0.061) [-0.100; 0.115]
Agreeableness		0.159 ** (0.060) [0.047; 0.274]
Neuroticism		-0.219 *** (0.063) [-0.325; -0.118]
<i>adj. R²</i>	0.0290 *	0.1875 ***
<i>Δadj. R²</i>		0.1585 ***
<i>F</i>	2.75	7.74
<i>F of Δadj. R²</i>		12.20

Note: OLS estimation was used ($n = 293$). All non-binary independent variables were standardized.

Standard errors are shown in parentheses. Bootstrapped (1,000 reps) 95%-confidence intervals are shown in brackets.

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

Table 11: Regression results of study 3

With regard to the “Big Five” personality dimensions, we found support for most of our hypotheses. The first hypothesis 1a suggested a positive relationship between openness to experience and *SCRes*, and the full model supports this hypothesis ($b_6 = 0.171, p = 0.005$). Hypothesis 1b, suggesting a positive relationship between conscientiousness and *SCRes*, was supported by the full model as well ($b_7 = 0.263, p < 0.001$). However, we did not find support for hypothesis 1c, proposing a positive relationship between extraversion and *SCRes* ($b_8 = 0.007, p = 0.903$). Hypothesis 1d suggested a positive relationship between agreeableness and *SCRes* and the full model

supported this as well ($b_9 = 0.159, p = 0.009$). Finally, we found support for our fifth hypothesis 1e as well, indicating that there is a negative relationship between neuroticism and *SCRes* ($b_8 = -0.219, p < 0.001$).

Considering the control variables, the models suggest that only some of the included control variables indeed might have a relationship with *SCRes*. The full model suggests that there is a negative relationship between firm size and *SCRes* ($b_1 = -0.167, p = 0.009$) and that there is a positive relationship between time in actual position and *SCRes* ($b_4 = 0.221, p = 0.002$). The other three control variables firm experience ($b_2 = 0.079, p = 0.205$), experience in procurement ($b_3 = -0.030, p = 0.668$), and individual's upstream horizontal complexity ($b_5 = -0.039, p = 0.514$) did not show any statistically significant effects in our models.

4.6 Discussion of the results

The purpose of this paper was to test the influence of the “Big Five” personality traits on the supply chain resilience of immediate business environments of individuals. The results provided support for most of our hypotheses dealing with the “Big Five” personality dimensions. Subsequently, the research findings will be discussed, before giving a conceptual outlook based on the results and pointing out implications for theory and practice, potential limitations and avenues for future research.

4.6.1 “Big Five” personality dimensions as predictors of supply chain resilience of immediate business environment

Our results indicate that the “Big Five” personality dimensions, which are stable for working-age adults and across cultural backgrounds (e.g., Benet-Martínez & John, 1998; Cobb-Clark & Schurer, 2012; Costa Jr. & McCrae, 1988), can have an impact on supply chain resilience of immediate business environments. Thus, individuals might indeed deal differently with organizational problems and their decision-making might be influenced by their personality and judgment (Fahimnia et al., 2019; Turner & Makhija, 2012). Assuming that individuals can be critical to the functioning of operating systems (Gino & Pisano, 2008) and that personality can be a valid predictor of job performance (e.g., Barrick & Mount, 1991; Barrick et al., 2001), we have a closer look at our hypotheses.

In contrast to findings from literature stating that the impact and portion of explained variance from personality dimensions is usually rather small (Hurtz &

Donovan, 2000), our findings suggest that the impact of the personality traits on resilience of immediate business environment is quite substantial. In line with our expectations, we found support for the predicted positive relationships between openness to experience, conscientiousness and agreeableness and resilience, as well as for the predicted negative relationship between neuroticism and resilience. However, we did not find statistically significant support for the proposed positive relationship between extraversion and resilience. This somehow fits to the fact that findings in literature with regard to the relationship between extraversion and job performance are mixed. While some studies find support for a positive relationship (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000), others do not find such support (e.g., Rothmann & Coetzer, 2003; Strohhecker & Größler, 2013).

A closer look into the regression coefficients of the standardized independent variables in our results suggests that among the four statistically significant “Big Five” personality traits conscientiousness and neuroticism seem to have the strongest impact on resilience. This confirms that those are especially valid and particularly promising predictors of job performance (Barrick et al., 2001; Robertson et al., 2000; Rothmann & Coetzer, 2003). The regression coefficient of agreeableness is the smallest of those with statistically significant results, suggesting that this trait might not be as predictive as other traits (Borghans et al., 2008). Nevertheless, there still is a positive relationship between this personality trait and resilience. Interestingly, self-ratings of study participants are second lowest for agreeableness, just after neuroticism. Reversing the neuroticism scale to its opposite emotional stability, the score of agreeableness is the lowest of all five traits. As the relationship between agreeableness and resilience is still positive, individuals in supply chain disruption situations might want to work on being more agreeable in such situations.

4.6.2 Other potential predictors of supply chain resilience of immediate business environment

With regard to other variables that might potentially have a relationship with resilience, the control model suggests that the included variables only explain very small amounts of variance in supply chain resilience of immediate business environment. For firm experience, experience in procurement and individual’s upstream supply chain complexity, the results from both models suggest that there is no significant relationship to resilience. For horizontal complexity, the regression coefficient actually is negative,

but the results are not statistically significant. Consequently, we cannot make a valid statement whether an increase in complexity makes the management of interactions in supply chains difficult, as suggested by literature (C.-Y. Cheng et al., 2014; Gerschberger et al., 2017).

In both models, the results suggest a negative effect of firm size on resilience, with quite significant values in the full model. This might imply that larger firms recover slower from disruptions. By contrast, and with even more significant results in both models, we found that time in actual position is positively related to resilience, indicating that individuals that are more experienced in their actual job can deal better with occurring disruptions.

4.7 Conceptual outlook based on the results

The purpose of this study was to test the influence of the “Big Five” personality traits on the supply chain resilience of immediate business environments of individuals. The results provided support for most of the hypotheses dealing with the “Big Five” personality dimensions. The analysis of the data sample indicated that the “Big Five” personality dimensions might have an impact on supply chain resilience of immediate business environments. In line with our hypotheses, the study found support for the predicted positive relationships between openness to experience, conscientiousness and agreeableness and resilience, as well as for the predicted negative relationship between neuroticism and resilience. Especially conscientiousness and neuroticism seem to have a strong impact on supply chain resilience of immediate business environments.

Based on these results, it would be worthwhile to learn more about the underlying reasons and mechanisms that make for these differences. In essence, differences are most likely to arise from how individuals approach disruptions and which decisions they make in case of a disruption. Thus, the following sections aim to theorize about personality-related reasons and mechanisms of such potential differences in supply chain resilience and highlight potential methodological approaches for future research on this topic.

4.7.1 Reconsidering supply chain disruptions and resilience

In order to identify the most decisive factors in this context, we will briefly reconsider factors and enablers of supply chain resilience and consequently focus on those that might be linked to individuals and their personality traits. As outlined above, the most important

factors, enablers and strategies that enhance the level of resilience were researched on a single firm's organizational level (Annarelli & Nonino, 2016), although individuals can be critical to operating systems (Gino & Pisano, 2008). They can impact the performance of whole firms with the decisions that they make (Narayanan & Moritz, 2015) though their decision making can be influenced by how they process and judge information (Fahimnia et al., 2019; Turner & Makhija, 2012). Beyond single firms and with regard to the supply chains that those firms are part of, structural aspects like networks characteristics can be important factors of resilience (Dixit, Verma, & Tiwari, 2020). The enablers of building resilient supply chains include an organization's learning orientation (Braunscheidel & Suresh, 2009), adding redundancy to the supply chain (Kamalahmadi & Parast, 2017; Sheffi & Rice, 2005), tighter integration (Brusset & Teller, 2017), flexibility (Brusset & Teller, 2017; Scholten & Schilder, 2015; Sheffi & Rice, 2005), or collaboration between firms (Scholten & Schilder, 2015).

The latter, collaboration between the involved firms, seems to be an important aspect in building resilient supply chains and has been researched extensively (Namdar, Li, Sawhney, & Pradhan, 2018; Scholten & Schilder, 2015; Soni et al., 2014). Simultaneously, this aspect cannot be considered without taking a closer look at buyer-supplier relationships, as collaboration activities are linked to relational interactions (Min et al., 2005). In this regard, it has to be considered that individuals and their behavior play an important role in buyer-supplier relationships (e.g., Barnes & Liao, 2012; Granovetter, 1985; Tangpong et al., 2010; Zhang, Viswanathan, & Henke, 2011). At this point, bridging to the few papers that acknowledge that individuals can have an impact in creating a resilient supply chain (Ambulkar et al., 2016; Lengnick-Hall et al., 2011; Mena et al., 2020) seems to be appropriate. In interorganizational relationships, there are always individuals involved and those individuals' personality traits can influence the way they behave in certain business situations (e.g., Judge et al., 1999; Seibert & Kraimer, 2001).

With regard to collaboration, especially the willingness to share information (Scholten & Schilder, 2015; Soni et al., 2014) and an individual buyer's warning capability (Namdar et al., 2018) appear to be relevant. This is no surprise, as crisis or disruption management can be viewed as information-processing situations and as information processing is an important part in a business context (Egelhoff & Sen, 1992; Van Zandt, 1999). Thus, collaboration might be a core capability in supply chain management and in the management of disruptions (Min et al., 2005).

Once they occur, supplier-induced disruptions can affect whole supply chains (Tang, 2006). They are critical events that can alter future collaboration (Reimann, Kosmol, & Kaufmann, 2017) and have an impact on firm strategies (Clemons & Slotnick, 2016). Consequently, such disruptions can affect buyer-supplier relationships, and in this regard, the role of individuals' personalities is here, too, important (Reimann et al., 2017; Tangpong et al., 2010). Social exchanges between individuals that fulfil a corporate role are inherent to disruption situations and thus, they include some sort of social exchange (Cook, Cheshire, Rice, & Nakagawa, 2013). Hence, we need to have a closer look at buyer-supplier relationships and collaboration mechanisms in case of a disruption.

4.7.2 Buyer-supplier relationships and social capital

The links in global supply chains face the risks of supply chain disruptions, and firms oftentimes do not recover quickly from such events (Hendricks & Singhal, 2005; Manuj & Mentzer, 2008). If a supplier is to blame for such a disruption, this can lead to changes in existing buyer-supplier relationships, as those relationships can be considered as a sequence of decisions to collaborate made by the buyer, where the buyers needs to permanently evaluate the performance of suppliers (Reimann et al., 2017; Selnes, 1998; Yang & Chen, 2019).

In general, buyer-supplier relationships differ, depending on different aspects like how much the firms are interlinked, how they regard each other, or the position and embeddedness of a supplier in a supply network (e.g., Brass, Butterfield, & Skaggs, 1998; Y. Kim & Choi, 2015). In this regard, the first tier suppliers have the most direct impact on a buying firm and in case of a disruption, managers need to quickly detect such situations and understand which potential weaknesses are in their supply chain (Blackhurst et al., 2018; Lu & Shang, 2017).

As pointed out above, disruption situations can be viewed as information-processing situations (Egelhoff & Sen, 1992) and inter-organizational communication and the sharing of information are critical factors in such situations – as they are in general for collaboration between firms (Handfield, 1993; Paulraj et al., 2008; Van Zandt, 1999). The effectiveness of knowledge transfer and joint decision-making can be important for performance (Clemons & Slotnick, 2016; Revilla & Knoppen, 2015) and the importance of collaboration, communication and information-sharing is supposed to be a fundamental capability with regard to SCM and resilience (Min et al., 2005; Pettit et al.,

2010). Specific collaborative activities increase supply chain resilience (Scholten & Schilder, 2015; Soni et al., 2014; Tukamuhabwa et al., 2015) and also the buyer's warning capability is an important aspect in this regard (Namdar et al., 2018).

Supplier-induced disruptions send negative signals from a supplier to a buyer and how relationships evolve can be contingent on the type of recovery action and trust repair initiated by the supplier that is responsible for the disruption (L. Cheng, Craighead, Wang, & Li, 2019; Kaufmann, Carter, & Esslinger, 2018). However, there can be different perceptions in case of a disruption (Ro, Su, & Chen, 2016) and these perceptions depend on the people involved and potential friendships and information-sharing between them (Borgatti & Li, 2009).

Another factor to consider is that individuals process information differently and especially in case of a disruption and with other actors involved, they do not solely make decisions in a rational manner (Polyviou, Rungtusanatham, Reczek, & Knemeyer, 2018; Turner & Makhija, 2012; Urda & Loch, 2013). In this regard, trust and fairness perceptions are an important element (Adams, 1965; Eckerd, Hill, Boyer, Donohue, & Ward, 2013; Zhang et al., 2011). Thus, the willingness to collaborate and share information also depends on how the involved parties approached each other in the past and whether social networks and interactions between individuals exist in interorganizational relationships (Cook et al., 2013; Galaskiewicz, 2011; Thomas, Thomas, Manrodt, & Rutner, 2013).

Consequently, individuals and their personalities are an important factor in buyer-supplier relationships (Barnes & Liao, 2012; Tangpong et al., 2010), as their (economic) behavior is affected by the social relations that they have (Granovetter, 1985). The relational and social capital – defined as resources embedded in social networks (N. Lin, 2001) – in institutionalized buyer-supplier relationships is supposed to be important, as it can lead to improved outcomes and especially the supply management function is potentially important to build up social capital (Bernardes, 2010; Bourdieu, 1985; Cousins, Handfield, Lawson, & Petersen, 2006).

4.7.3 Personal factors and the “Big Five” personality dimensions in strained buyer-supplier relationships

It seems to become clear that individuals that are willing to invest in personal relationships can expect positive economic returns (Adler & Kwon, 2002; Autry &

Griffis, 2008) and in addition, as described earlier, individuals' personalities and personal relationships to others seem to be important in buyer-supplier relationships (Galaskiewicz, 2011; Tangpong et al., 2010). Equally important is the role of emotions in social relationships (Antonakis, Ashkanasy, & Dasborough, 2009) and in case the buyer-supplier relationship experiences a disruption, the emotional processing of such a disruption can lead to immediate and reactionary responses from the involved individuals (Eckerd, Boyer, Qi, Eckerd, & Hill, 2016). Emotions and emotion regulation abilities in turn depend on personality traits of individuals (Hughes, Kratsiotis, Niven, & Holman, 2020).

Taking up the overarching topic of collaboration, there is indication that individuals with a high level of organizational awareness show higher levels of collaborative awareness and rather tend to collaborate than individuals with lower levels of organizational awareness (Barnes & Liao, 2012). In a relationship where individuals with a high collaborative awareness are involved, there is a collaborative climate in general and collaborative climate, in turn, is positively related to team performance (P. K. C. Lee, To, & Yu, 2013).

With these general guiding principles in mind, we will have a closer look at those "Big Five" personality dimensions for which we found a relationship to supply chain resilience of immediate business environment.

4.7.3.1 Openness to experience

Individuals that score high on openness to experience do not always show high levels of organizational commitment on the one hand (Flint-Taylor et al., 2014). On the other hand, they tend to show high levels of job involvement and oftentimes stand out by showing high levels of creativity (Flint-Taylor et al., 2014; George & Zhou, 2001). Furthermore, such individuals especially seem to be able to cooperate well with other professions (i.e. for a buyer scoring high on openness, it is easy to cooperate with a salesperson) and this personality trait is supposed to be positively linked to cooperative behaviour in general (Avrech Bar, Katz Leurer, Warshawski, & Itzhaki, 2018; Barry & Friedman, 1998).

Additionally, open individuals show high levels of interpersonal facilitation (Hurtz & Donovan, 2000), they capture integrative styles in conflict management (Antonioni, 1998) and with regard to emotions and emotion regulation, they are able to regulate their

emotions by eliminating stressors through planning, by seeing the positive things of a situation and by being mindful (Hughes et al., 2020).

Summarized, the personality trait openness to experience seems to make it more likely that individuals pursue collaborative approaches in relationships and accordingly, we propose:

Proposition 1: *Individuals that score high on openness to experience are more likely to pursue collaborative approaches in buyer-supplier relationship, which is positively associated to supply chain resilience of their immediate business environments.*

4.7.3.2 Conscientiousness

Conscientious individuals neither might be the most creative individuals, nor are they the most flexible ones (George & Zhou, 2001; Herrmann & Nadkarni, 2014). But they show high levels of job involvement (Flint-Taylor et al., 2014), they are protective from stress (Bartley & Roesch, 2011), and they tend to pursue integrative conflict management styles (Antonioni, 1998). The trait is supposed to be positively linked to the ability to cooperate well with other professions and to good performance in collaborative tasks (Avrech Bar et al., 2018; Kelsen & Liang, 2019).

With regard to emotion regulation, conscientious individuals are, similar to open individuals, able to regulate their emotions by eliminating stressors through planning and by seeing the positive things of a situation. They are mindful as well and they accept situations as they are (Hughes et al., 2020). Hence, we propose:

Proposition 2: *Individuals that score high on conscientiousness are more likely to pursue collaborative approaches in buyer-supplier relationship, which is positively associated to supply chain resilience of their immediate business environments.*

4.7.3.3 Agreeableness

Individuals that score high on agreeableness are supposed to be good team players and to be good at teamwork (Barrick et al., 2001). They care for a good climate in negotiations and show high levels of relationship orientation and interpersonal facilitation (Hurtz & Donovan, 2000; Sharma et al., 2013). They tend to show lower levels of counterproductive interpersonal work behaviour (Mount et al., 2006) and higher levels of organizational citizenship behaviour (Ilies et al., 2006). In conflict situations, they prefer

integrative conflict management styles (Antonioni, 1998) and the trait is positively related to the ability to cooperate with other professions as well (Avrech Bar et al., 2018).

Furthermore, agreeableness is supposed to be positively correlated to emotion regulation ability (Lopes, Salovey, Côté, Beers, & Petty, 2005) Agreeable individuals can regulate their emotions by eliminating stressors, they are mindful in such situations and try to focus on positive aspects (Hughes et al., 2020). Consequently, we clearly propose:

Proposition 3: *Individuals that score high on agreeableness are more likely to pursue collaborative approaches in buyer-supplier relationship, which is positively associated to supply chain resilience of their immediate business environments.*

4.7.3.4 Neuroticism

Neurotics struggle when it comes to teamwork and the trait is negatively related to interpersonal facilitation (Barrick et al., 2001; Hurtz & Donovan, 2000). They are not as creative as others (Rothmann & Coetzer, 2003) and their presence in negotiations is oftentimes associated to a negative influence on negotiation climate (Sharma et al., 2013). In conflict management, they prefer avoiding conflict management styles (Antonioni, 1998).

Furthermore, neuroticism is supposed to be the most significant trait in terms of emotion regulation and with significant negative correlations to different types of emotion regulation (Kokkonen & Pulkkinen, 2001). They cannot manage to regulate their emotions by eliminating stressors, the trait is negatively linked to mindfulness in such situations and neurotics have difficulty in focusing on positive aspects (Hughes et al., 2020). Neuroticism seems to make it less likely that individuals pursue collaborative approaches in relationships and hence, we propose:

Proposition 4: *Individuals that score high on neuroticism are less likely to pursue collaborative approaches in buyer-supplier relationship, which is negatively associated to supply chain resilience of their immediate business environments.*

4.7.4 Suggested methodological setup

In order to test the suggested propositions about the impact of individuals on the supply chain resilience of their immediate business environments empirically, we propose the

setup of a scenario-based experiment, as this is supposed to be well-suited to understand how and why supply chain managers make decisions (e.g., Atzmüller & Steiner, 2010; Rungtusanatham, Wallin, & Eckerd, 2011). Individual procurement professionals should serve as the unit of analysis and the scenarios should be as realistic decision situations as possible with different legitimate choices.

An appropriate form of such a scenario-based experiment could include the use of vignettes, which are systematically elaborated descriptions of concrete situations that include the manipulation of some factors included (Alexander & Becker, 1978). This would be an appropriate methodology to learn about judgements, preferences and decisions of individual decision-makers (Rungtusanatham et al., 2011). The use of the vignette technique could be combined with a traditional survey, as this is supposed to be a promising research approach to investigate personal attitudes and judgements (Atzmüller & Steiner, 2010). The traditional survey should prompt for some demographics, it could be used to assess immediate business environment resilience (e.g., Ambulkar et al., 2015) and individuals' personality traits (e.g., Rammstedt & John, 2007). However, personality might as well be assessed by means of a more extensive personality measure that might even include outsider ratings (Costa Jr. & McCrae, 1988). With regard to data analysis, it will be important to assess the psychometric properties of the multi-item constructs properly and to use an adequate regression model afterwards.

When having a closer look at the propositions, it should not be neglected, that there might be other factors to consider that are needed to build a resilient supply chain. Consequently, a future study on this topic shall include organizational enablers of supply chain resilience like flexibility or redundancy, as well as distinct company factors like firm size, horizontal complexity, or firm experience as well. Future research might scrutinize resilient supply chains considering all these organizational, structural and personal factors, and investigating their interplay. At the end of this process, there might be a holistic model of supply chain resilience.

4.7.5 Summary of the conceptual outlook

Unquestionable, many different factors can be important when it comes to building resilient supply chains. Those can be organizational factors as well as personal factors of individuals that work in critical positions along the supply chain. Although, there has already been a decent amount of studies addressing supply chain resilience, this is still a

promising field of future research. A large portion of these studies has only considered supply chain resilience on a conceptual basis and from a purely organizational perspective.

In the empirical part of this study, we were able to show that there are relationships between four of the five “Big Five” personality traits – openness to experience, conscientiousness, agreeableness, and neuroticism – and supply chain resilience of immediate business environments. Still, some more research will be necessary in the future in order to scrutinize the underlying reasons and mechanisms of these relationships. In the preceding part of this study, we theorized about these reasons and mechanisms and pointed out possible coherences. Conclusively, this can be a fruitful field of future research and it should be promising to conduct future studies in this area.

4.8 General discussion

4.8.1 Theoretical implications

By investigating the question whether personality traits are related to supply chain resilience of immediate business environments of individual procurement professionals our study contributes to theory in several ways.

First, we pursue a recent trend to scrutinize relationships between decision-making and resilience at a personal level (Mena et al., 2020) and target the under-researched “people dimension” in supply chain management (Loch & Wu, 2007; Wieland et al., 2016). Furthermore, we address the fact that research on supply chain resilience mainly considered organizational factors thus far (Annarelli & Nonino, 2016; Jain et al., 2017; Pettit et al., 2010) and we broaden the body of literature here by including personal factors and traits. Our results indicate that there are relationships between personality traits and resilience and consequentially, personality can be an important factor that should not be neglected with regard to supply chain resilience.

Second, we address the issue that research on supply chain resilience has mostly been conceptual thus far, with only few empirical studies (Kamalahmadi & Parast, 2016; Tukamuhabwa et al., 2015). Our study helps closing this gap by empirically investigating the relationships between the “Big Five” personality traits and resilience of immediate business environments.

Third, we adapted the resilience measure by Ambulkar et al. (2015) and transferred it to a personal level. Our results indicate that the measure still has a very good reliability. Hence, the measure can be used appropriately in a personalized, individual context as well.

Fourth, we proved that the BFI-10 inventory (Rammstedt & John, 2007) is a valid and reliable predictor of individuals' personality and that the use of such extremely short personality measures can be favorable when participant's time is limited.

Fifth, we were able to show that personality traits can explain quite large amounts of variance in resilience of immediate business environments, indicating that the impact of personality is not necessarily rather small (Hurtz & Donovan, 2000). To the contrary, personality dimensions can explain variance in individuals' performance and our study extends the body of knowledge by another dimension, where personality traits are associated with individual outcomes (Barrick et al., 2001; Rothmann & Coetzer, 2003).

Finally, the conceptual outlook provided in this study guides a way to scrutinize the underlying reasons and mechanisms of personality-related differences in supply chain resilience. It highlights potential methodological approaches and provides a path for future research and theoretical evolution of this field.

4.8.2 Managerial implications

As modern, global supply chains become more risky with an increasing frequency of disruptions (Manuj & Mentzer, 2008; Zhao & Freeman, 2019) from which firms often do not recover quickly (Hendricks & Singhal, 2005), firms need to know what to do in order to detect disruptions and respond to them as fast as possible (Sheffi, 2015). In a similar vein, managers know that they should take action to protect their supply chains, though comparatively few do so thus far (Chopra & Sodhi, 2014). Hence, our results provide important managerial implications as well.

Individuals can play a decisive role in situations where a supply chain disruption occurs. They gather and process information differently (Turner & Makhija, 2012) and their decision-making – which could be influenced by their cognitive capabilities and judgment (Fahimnia et al., 2019) – can influence the choices they make.

Furthermore, firms need to hold employees that exhibit high scores on personality traits that have positive relationships with resilience, as those individuals can be important

for the performance of firms and whole supply chains (Gino & Pisano, 2008; Narayanan & Moritz, 2015). By successfully managing to keep those employees scoring high on relevant personality traits, firms can gather a competitive advantage (Barnes & Liao, 2012).

Finally, our results provide an indication which personality traits are important in case of a disruption and in subsequent recovery actions. Consequently, firms can establish resilience capabilities through strategically managing human resources (Lengnick-Hall et al., 2011). Thus, our results give guidance on which aspects they should focus and hence, choose and develop those employees for relevant positions whose personality characteristics appear to fit best.

4.8.3 Limitations and future research opportunities

This study and the presented findings are subject to some limitations. Yet, most of these limitations open up promising avenues for future research.

Our study has to deal with limitations that affect survey research in general. Although we tried to address this issue with our survey design, we cannot preclude potential problems with regard to common method variance (Craighead et al., 2011) and thus, our results might be biased through our method selection (Podsakoff et al., 2003). Furthermore, and although the fact that people are supposed to be pretty accurate reporters of their (job) situation (Spencer, 1990), there might be problems with regard to social desirability (Nederhof, 1985). This is especially true for research that assesses human personality, as is the case here (Baker et al., 2004; Woods & Hampson, 2005). Consequently, a longitudinal study design that does not only resort on self-ratings might resolve these issues.

Another potential limitation persists with regard to our measure of the “Big Five” personality dimensions. We relied on a very brief measure consisting of only ten items measuring the five personality traits, as we assumed that this would be best in case that respondents’ time is limited (Rammstedt & John, 2007). However, it remains somewhat unclear whether or not complex constructs like personality can be assessed with only five dimensions and with brief measures for each personality dimension (e.g., Ones & Viswesvaran, 1996). Moreover, we could not assess the respective two-item constructs by means of a confirmatory factor analysis, due to the complex nature of personality (Hopwood & Donnellan, 2010). We included an exploratory factor analysis instead to

assure reliability of our measure, but as there might be potential issues with this methodology as well (e.g., Hayton et al., 2004), this could result in further limitations of this study. Thus, future research might be conducted with measures that assess personality in more detail, although this would take more time for respondents.

Furthermore, we concentrate our study on procurement professionals mainly located in German-speaking countries. Although the “Big Five” measures are supposed to be stable across cultures (Benet-Martínez & John, 1998; Costa Jr. et al., 2001), different traits might lead to different outcomes in different cultural settings or across different industries. Consequently, future research should focus on different cultural settings and industries to confirm the results.

In a similar vein, we need to be careful with regard to the generalizability of our results, as we consider a personal level. Statements that hold true in an individual setting and with regard to an individual’s work environment might not necessarily provide information about whole systems, that the individuals interact with (Ketokivi, 2019).

Our results indicate that larger firms might not only suffer more from disruptions (Hendricks & Singhal, 2003), but that work environments of individuals in larger firms might also recover slower from disruptions. Future research might further scrutinize this relationship and the underlying mechanisms.

Furthermore, the study indicates that personal traits can make a difference with regard to supply chain resilience. Consequently, future research should consider personality traits and further personal factors in research settings in supply management where individuals are involved.

Finally, future research should not only consider personality traits and further personal factors, but also scrutinize underlying mechanisms and reasons for differences in performance outcomes caused by these traits and factors. Based on the conceptual outlook provided in this study, future research should try to find out why differences in personality traits of individual procurement professionals lead to different outcomes with regard to supply chain resilience of these individuals’ immediate business environments.

4.9 Conclusion

Research on supply chain resilience mostly focused on organizational factors thus far. However, individuals and the decisions they have to make in such situations with high

levels of uncertainty are supposed to be important as well. In our study, we sought to close this gap by having a closer look at personality factors of the individuals that experience such situations. Specifically, we focused on the “Big Five” personality dimensions and investigated whether there are relationships between these personality dimensions and supply chain resilience of immediate business environments of individual procurement professionals. We tackled our research question by means of a survey sample of 293 procurement professionals. The results show positive relationships between the personality traits openness to experience, conscientiousness and agreeableness and resilience, whereas there is supposed to be a negative relationship between neuroticism and resilience. Our study indicates that personal traits can make a difference when building up resilient supply chains and consequently, firms ought to consider them as well when building resilience capabilities. Furthermore, the study theorizes about underlying reasons and mechanisms of these differences and points out possible coherences. Our insights broaden the body of literature on supply chain resilience and stress the importance of considering personal factors and personality types in supply management research. In addition, our study delivers important insights for procurement managers that are interested in building resilient supply chains.

Chapter 5 Summary, limitations, and outlook

This chapter provides a conclusory view on the research from the three essays presented in the preceding chapters. It captures the initial research questions delineated in chapter 1 and summarizes the main answers to these questions. Afterwards, possible limitations of this dissertation research are discussed and promising avenues for future research are offered.

5.1 Summary

The first chapter of this dissertation provided a brief overview on pertinent research in the areas of supply management, disruptions and resilience, which mainly focused on organizational factors thus far. Though there is a recent trend to explore these topics at a personal level (Mena et al., 2020), the overview revealed gaps in pertinent literature and derived three research questions that are the essential elements of this dissertation. These research questions aimed at further scrutinizing the role of individuals in supply chain environments and put the individual procurement professionals at the center of this research. The three studies of this dissertation project sought to close the identified gaps by having more focus on the people dimension in supply management. In particular, the studies focused on personality types and characteristics that might affect how individuals behave in business life and consequent implications on personal performance, as well as on the performance of their immediate business environments. The results are summarized below.

5.1.1 Research question 1: Personal success of procurement professionals

Individuals are part of complex business environments. Acting in these environments, they range between their firm's interests and their own interests and they permanently have to make decisions, also with regard to their own career. Personal factors can influence how individuals behave in business situations and how they make such decisions. Hence, these factors can determine personal career success factors like salary levels. However, the influence of personality traits and other skills on career success remained unclear for procurement professionals. Another unclear, yet potentially important question is how important those factors are compared to other organizational,

workplace-related and human capital factors that determine personal career success. Thus, study 1 in chapter 2 addressed the following research question:

Research question 1 *Which factors of procurement professionals determine their personal career success and how important are those factors compared to other factors that determine their personal career success?*

To answer this research question, the study draws on personality literature and other literature that deals with career success. By means of a survey sample of 461 procurement professionals from Germany, the influence of the “Big Five” personality traits and three other personal skills on salary as a measure of personal extrinsic career success were scrutinized. Additionally, further factors that are supposed to influence salary were included.

The results show that extraversion is positively related to total annual salary, whereas neuroticism and conscientiousness are negatively related to it. The latter relation is somewhat unexpected, as conscientiousness is supposed to have a positive relationship to salary in the majority of pertinent literature. Potential reasons for this were discussed in more detail in study 1. For the other two “Big Five” personality factors, openness to experience and agreeableness, our results did not reveal any clear relationship to salary. In a similar vein, we did not find any support for our hypotheses that procurement-specific additional qualifications and IT skills are positively related to salary.

However, the study reveals a positive relationship between English skills of non-native English speakers, which was included as another work-related personal skill, and salary. Furthermore, the results indicate that other factors that are supposed to influence salary as well and thus, were included as control variables, have a relationship to total annual salary. On the firm level, we found that firm size matters, whereas the industry in which the individual is employed is not always important. On the personal level actual work hours, experience in procurement, and time in the actual position were important. Moreover, there is a strong relationship between the educational level and total annual salary.

Altogether, the results highlight that some personal factors indeed make a significant difference with regard to individuals’ salaries, although their effect might not be as large as that of other organizational, workplace-related and human capital factors. They explain some additional variance and although this extra portion of explained variance is rather small, it is still significant.

Study 1 is the first study in a procurement context to scrutinize the impact of personality and other personal factors on salary. It contributes to the expansion of knowledge of salary predictors in operations management professions and stresses the importance of considering personal factors as well. Furthermore, the study delivers insights that can be crucial for managers in both procurement and human resource management.

5.1.2 Research question 2: Personal experience in supply chain disruption and recovery processes

Individuals have to make decisions in evermore global and complex supply chains. Those decisions not only have consequences for themselves, as pointed out above, but also for their direct work environments. Consequently, individuals can be important for their firms. However, most studies solely dealt with organizational antecedents of disruptions and capabilities needed for firm resilience. Only a scarce body of literature included personal factors to supply management research thus far. To tackle this gap, study 2 in chapter 3 focuses on one of such personal factors. It considers how experience is related to the number of supply chain disruptions in an individual's work environment and on recovery time after a disruption. The research question was formulated as follows:

Research question 2 *What is the role of executive / employee experience in preventing supply chain disruptions and in detecting and recovering from disruptions, once they occurred?*

As the formulation of the research question shows, we consider this from two theoretical perspectives, suggesting that managers and employees both can be important. In study 2, hypotheses are developed that predict the effects of executive and employee experience on the number of supply chain disruptions a firm suffers and the recovery time it needs to return to normal operations. These predictions were tested using survey data collected among 223 supply chain managers. The empirical findings of study 1 suggest that firms, which have more experienced executives and employees, face less supply chain disruptions and recover faster from disruptions than firms with less experienced staff. These findings underscore the importance of experience in dealing with supply chain problems. However, the analysis displayed that there are also effects of firm size, horizontal complexity, and firm experience to consider as well. These findings indicate

that a broad interplay of different organizational and personal factors needs to be considered when dealing with supply chain disruptions and resilience.

Furthermore, the setting of study 2 aims to address the issue that research on recovery processes and resilience has been mostly conceptual thus far (Tukamuhabwa et al., 2015). In addition, the study intends to broaden the body of literature by emphasizing including personal factors of the people that deal with disruptions and their consequences within firms. For firms, the study implies that they should try to keep experienced employees. One way to achieve this can be to attract them by paying high salaries and therewith make it less likely that current employees leave (Campbell et al., 2012). Thus, it once again becomes apparent that firms need to know about salary predictors and salary levels, as pointed out in study 1 of this dissertation project.

Besides trying to keep current executives and employees, firms should as well train their staff appropriately in order to have a lower number of disruptions and be more resilient in case of a disruption. Evidently, resilience can be built by having individuals that contribute to a high level of resilience in their direct work environment.

In sum, study 2 is one of the first studies to include personal aspects in disruption and resilience literature. It provides valuable insights for theory and practice and it can serve as a starting point for various future research opportunities.

5.1.3 Research question 3: Personality traits and supply chain resilience

Supply chains that are hit by a disruption need to be resilient in order to go back to normal operations as quickly as possible. Disruptions are situations with a high level of uncertainty, but still, decisions have to be made by individuals that have to deal with them. Those decisions cannot only affect their direct work environment, but also their firm and even whole supply chains. Individuals' personality in turn seems to have the greatest influence in such dynamic, unpredictable, and changing environments, as such situations do not allow standardized responses (Miller & Toulouse, 1986). Consequently, study 3 focuses on individuals' personality traits in order to understand how they influence personal behaviors in situations where a supply chain disruption occurred. The underlying research question was:

Research question 3 *What is the relationship between personality traits and supply chain resilience of immediate business environments?*

The study was designed to determine whether there is a relationship between the “Big Five” personality traits and the supply chain resilience of immediate business environments of individuals. 293 usable responses were collected by means of a self-administered online survey among procurement professionals. The results of the empirical part of study 3 reveal positive relationships between the personality traits openness to experience, conscientiousness, and agreeableness and resilience. For neuroticism, the collected data suggests a negative relationship to resilience. Consequently, personality indeed seems to influence resilience of personal work environments. As personal competencies can be aggregated on an organizational level to increase resilience (Lengnick-Hall et al., 2011), study 3 indicates that personality traits can make a difference when building up resilient supply chains.

Another aspect that the results of study 3 exhibited was that time in actual position is positively related to resilience and the standardized regression coefficients suggest that this relationship might be quite substantial. This indicates that individuals, which are more experienced in their job, can deal better with occurring disruptions, as it is suggested as well by the results of study 2 of this dissertation project.

Furthermore, the subsequent conceptual part of the study theorizes about underlying reasons and mechanisms of these differences in supply chain resilience of immediate business environments and points out possible coherences. The conceptual part provided in study 3 guides a way for future research to scrutinize the underlying reasons and mechanisms of personality-related differences in supply chain resilience.

The study broadens the body of literature on supply chain resilience and transfers an existing resilience construct to a personal level. The results indicate that the measure still has a very good reliability and hence, it can be used in a personalized, individual context as well in future research. Furthermore, the study shows that personality is an important resilience factor, which is also crucial for firms. They need to have individuals in place that can cope well with the special circumstances of supply chain disruptions and show appropriate personality skills in order increase resilience.

To summarize, study 3 is one of the first studies to include personality as a factor for supply chain resilience, thus contributing to a better understanding of how firms can handle disruptions and build resilient supply chains.

5.2 Limitations

This dissertation project and the presented findings are – as any empirical research – subject to some limitations with regard to data and to methodological approaches that need to be considered.

First, the studies are prone to potential biases inherent to survey-based research. Due to the methodology chosen in our research design, there might be problems with regard to common method variance (Podsakoff et al., 2003). Although the studies were designed in a way to address this issue, potential problems cannot be precluded completely. Furthermore, there might be problems with respect to social desirability (Nederhof, 1985). Especially, this can be problematic when assessing highly sensitive personal information like personality traits or salary, as was the case in studies 1 and 3. To resolve these issues, a longitudinal study design that does not only resort on self-ratings would be a promising approach for future research.

Second, the studies were designed in a way that individual respondents were the unit of analysis. This automatically leads to the fact that subjective assessments and evaluations of those people answering the survey, depending on their individual opinions, enter the results. On the one hand, this is desired in order to answer the research questions, but on the other hand, this fact introduces further limitations to this dissertation project. Based on the studies, no absolute statements can be made whether something that was found for the researched individuals and their work environment holds true for others in maybe different settings as well. Furthermore, the studies did not consider any hierarchical issues that might appear within a firm or other potential firm-specific dependencies.

In a similar vein, the study samples include mainly individuals from the same cultural background. However, it might well be that different personality traits or behaviors can have different outcomes and effects in different cultural or industrial settings. Consequently, there are limitations with regard to the generalization of the results. Hence, future research might replicate these studies in different cultural settings and might incorporate the aforementioned dependencies in different work environments as well.

Finally, the studies only find relationships between the variables of interest from the data. Although the studies show empirical evidence for these relationships, they neither show any direction of effects, nor any causation. Consequently, future research

approaches investigating the research questions with further methodological approaches might help making statements that are still more confident with regard to the detected relationships.

5.3 Outlook

This dissertation project indicates that personality traits and other personal factors of individuals indeed seem to make a difference. Therefore, it can pave the way for other promising avenues of future research, beyond addressing the limitations mentioned above.

First, personality traits and personal factors could be scrutinized in other topic areas in procurement research, but also in other areas like risk and supply chain management. Every decision in a business-related context has to be made by individuals and thus, personal capabilities and traits should not be neglected. In addition to that, this dissertation project reveals that these factors can also be relevant for decisions that individuals have to make with regard to their own career. Consequently, managers and employees could be interested in even more detail how such personal factors promote or impede themselves and what they could do in order to benefit from these insights. Thus, future research could have a more dedicated look into practice and derive respective conclusions for individual professionals in procurement and other professions.

Second, studies 2 and 3 indicate that firm size might be negatively related to resilience. This relationship is certainly worth to be scrutinized in more detail. Future research might theorize and empirically test why this seems to be case and what impediments exist that hinder larger firms in building resilient supply chains. In doing so, research can aid firms in order to improve and create more efficient ways of dealing with supply chain disruptions.

Third, it is easily conceivable that other personality traits can play a decisive role in personal decision-making. Furthermore, this might also depend on the respective cultural or industrial setting within which decisions are made, potential dependencies that decision-makers have to consider or manifold other factors. Therefore, future studies could have an even closer look at underlying factors and mechanisms in decision-making. It will be interesting to find out in more detail how these factors affect individual managers and employees. The conceptual part at the end of study 3 provides a path to scrutinize these underlying factors and mechanisms in more detail. It theorizes about these factors and mechanisms and points out possible coherences. It highlights potential

methodological approaches and provides a clear path for future research and theoretical evolution of this fruitful research area.

Finally, future studies might look at the interplay of organizational and personal factors in supply chain resilience. Pertinent research already had a strong focus on organizational factors, showing that some of them are important in building resilient supply chains. In addition to that, this dissertation project demonstrated that personal factors and personality traits could be a further important component with regard to supply chain resilience. Consequently, future research might pursue an approach towards building resilient supply chains that includes organizational and personal factors, scrutinizes their interplay and finally comes up with a holistic model of supply chain resilience.

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Appendix A: Measurement items and scales of study 1

Total annual salary (five components)

Please state your following annual salary components (Please round off the values to integral numbers):

- Annual base salary (gross value) [in €]
- Employer's pension scheme or capital-forming benefits on an annual basis [in €]
- Grants on public transport tickets or food or other benefits on an annual basis [in €]
- End-of-year bonus [in €]
- Average performance-related bonus [in €]

Openness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who has few artistic interests. (R)
- I see myself as someone who has an active imagination.

Conscientiousness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who tends to be lazy. (R)
- I see myself as someone who does a thorough job.

Extraversion (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is reserved. (R)
- I see myself as someone who is outgoing, sociable.

Agreeableness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is generally trusting.
- I see myself as someone who tends to find fault with others. (R)

Neuroticism (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is relaxed, handles stress well. (R)
- I see myself as someone who gets nervous easily.

Additional qualifications (single item)

Which additional qualifications have you attained?

BME ¹ Purchasing manager	BME Purchasing expert
IHK ² Purchasing specialist	Supplementary or postgraduate courses (e.g., VWA ³)
Additional technical qualifications	Other additional commercial qualifications (<i>please specify</i>)

English skills (single item)

What languages do you speak at a level that is at least business fluent?

English	French	Spanish
Italian	Chinese	Turkish
Russian	Polish	Other (<i>please specify</i>)

Purchasing-specific IT skills (single item)

Please assess your skills in purchasing-specific software applications (1 – “no skills” to 7 – “specialist skills”)

Actual weekly working hours (single item)

What is your average weekly working time (in hours)?

Time in actual position (single item)

How long have you been working in your current position?

Experience in procurement (single item)

How long have you been working in the field of procurement?

Firm size (single item)

Please state your firm's number of employees in the last business year.

¹ “BME” refers to the “Association Supply Chain Management, Procurement and Logistics”, or “Bundesverband Materialwirtschaft, Einkauf und Logistik” in German, which offers certified trainings for PSM professionals

² „IHK“ refers to „Chamber of Commerce and Industry“, or “Industrie- und Handelskammer” in German, which offers certified trainings as well

³ „VWA“ refers to “administration and economic academy”, or “Verwaltungs- und Wirtschaftsakademie” in German, a private-law educational institution

Industry (single item)*In what industry does your business unit participate?*

Automotive	Chemicals, plastics, rubber	Electronics, optics, data processing
Consumer goods	Aerospace, defense	Machinery and plant engineering
Metals, metal working	Pharmaceuticals	Other (<i>please specify</i>)

Education (single item)*What is your highest educational achievement?*

Job training	Foreman/technician/Business administrator
Bachelor (University of Applied Sciences)	Bachelor (University)
Master (University of Applied Sciences)	Master (University)
PhD	Other (<i>please specify</i>)

Appendix B: Measurement items and scales of study 2

Number of disruptions (single item)

How many supply chain disruptions affected your firm in the last year?

Recovery time (single item)

How long does it take on average, until you restore normal operations?

Executive experience (single item)

How long have you been working in your current position?

Employee experience (three items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 5 – “agree strongly”):

- We have long-standing employees that are experienced in crisis management.
- We have mainly young employees with little work experience. (R)
- Our employees stick by the firm in periods of crisis.

Firm size (single item)

Please state your firm's number of employees in the last business year.

Firm experience (single item)

How long has your firm been active in this business area?

Upstream horizontal complexity (single item)

How many direct suppliers does your business unit have?

Appendix C: Measurement items and scales of study 3

Supply chain resilience of immediate business environment (four items)

Within the scope of this study, we want to examine supply chain disruptions and their consequences for your working area. For the following questions, please solely refer to the working area within your business unit where you personally bear responsibility. Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- We are able to cope with changes brought by the supply chain disruption.
- We are able to adapt to the supply chain disruption easily.
- We are able to provide a quick response to the supply chain disruption.
- We are able to maintain high situational awareness at all times.

Openness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who has few artistic interests. (R)
- I see myself as someone who has an active imagination.

Conscientiousness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who tends to be lazy. (R)
- I see myself as someone who does a thorough job.

Extraversion (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is reserved. (R)
- I see myself as someone who is outgoing, sociable.

Agreeableness (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is generally trusting.

- I see myself as someone who tends to find fault with others. (R)

Neuroticism (two items)

Please indicate to what extent you agree to the following statements (1 – “disagree strongly” to 7 – “agree strongly”):

- I see myself as someone who is relaxed, handles stress well. (R)
- I see myself as someone who gets nervous easily.

Firm size (single item)

Please state your firm’s number of employees in the last business year.

Firm experience (single item)

How long has your business unit been active in this industry? Since the year:

Experience in procurement (single item)

How many years of work experience do you have in the field of procurement?

Time in actual position (single item)

How long have you been in your current position?

Individual’s upstream horizontal complexity (single item)

How many suppliers are in your direct area of responsibility?

Curriculum vitae

Academic employment

10/2016 – 02/2021 **Doctoral Candidate / Research Assistant**
University of Mannheim, Business School, Mannheim, Germany
Endowed Chair of Procurement

Education

Since 10/2016 **Doctoral Studies in Business Administration (Dr. rer. pol.)**
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Advisor: Prof. Dr. Christoph Bode

04/2013 – 09/2016 **M.Sc. in Industrial Engineering and Management**
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01/2014 – 06/2014 **ERASMUS Semester abroad**
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