

**What Drives People and Organisations that**

**Drive Innovation?**

**The Fundamental Motives, Organisational Climate, and  
Innovative Work Behaviour in the German Private Sector.**

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## Abstract

This PhD thesis investigates the drivers of innovation within the German private sector, focusing on the context of individual and organisational factors.

At the individual level, the research explores the influence of intrinsic motivation on innovative work behaviour (IWB). While previous studies have examined personality traits, such as the Big Five, and their relationship with innovation, this thesis takes a multi-faceted approach. By exploring fundamental intrinsic motives, a deeper understanding of the complex nature of motivation and its role in fostering innovation is achieved and an original contribution to the field of motivational studies and innovation management is made.

On the organisational level, the study recognises that innovation is a collaborative and multi-stage process. Therefore, examining innovation solely at the individual level is insufficient. The research investigates the mediation effect of organisational climate variables, such as autonomy, formalisation, and reflexivity, on the relationship between fundamental motives and innovative work behaviour.

This study examines two data sets collected from eight German enterprises, encompassing 584 employee surveys and 421 supervisor surveys. After cleaning and matching the data, a total of 372 data sets were analysed to test the proposed hypotheses, employing Structural Equation Modelling (SEM).

The findings of this research have both theoretical and practical implications. The theoretical framework developed in this study contributes to the understanding of innovation drivers, while the practical recommendations offer guidance for increasing innovation within the German private sector. By establishing a comprehensive understanding of innovation and its underlying drivers, organisations can foster a climate of innovation and gain a competitive edge in the marketplace.

## Author's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas. Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed:



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## List of Abbreviations and Acronyms

16mrs	16 motives research scales
16PFQ	Sixteen Personality Factor Questionnaire
ACO	Ant Colony Optimisation
AMOS	Analysis of a Moment Structures
ANOVA	Analysis of Variance
APA	American Psychological Association
AVE	average of variance extracted
BFI	Big Five Inventory
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
COVID-19	Corona Virus Disease 2019
CR	Composite Reliability
CVF	Competing Values Framework
DV	Dependent Variable
DVD	Digital versatile disc
EFA	Exploratory Factor Analysis
e.g.	exempli gratia (for example)
FACIT	Functional Assessment of Chronic Illness Therapy
FFM	Five-Factor-Model

GDPR	General Data Protection Regulation
HSD	Honestly Significant Difference
HR	Human Resource
HRM	Human Resource Management
HTMT	heterotrait-monotrait
i.e.	id est (that is)
IT	Information Technology
IV	Independent Variable
IP	Internet Protocol
IWB	Innovative Work Behaviour
LCRC	Latent Class Reliability Coefficient
LFS	Labour Force Survey
LMX	Leader-Member-Exchange
LSOCQ	Litwin and Stringer's Organisational Climate Questionnaire
M	Mean
MAR	missing at random
MCAR	missing completely at random
MI	modification indices
MNAR	missing not at random
MV	Mediating Variable
NATO	North Atlantic Treaty Organisation

NEO-I	Neuroticism-Extraversion-Openness Inventory
OC	Organisational Climate
OCI	Organisational Climate for Innovation
OCM	Organisational Climate Measure
OMT	Organisational Management Theory
PClose	probability of close fit
Q&A	Questions and Answers
R&D	Research and Development
RMSEA	Root Mean Square Error of Approximation
RTC	Resistance to Change
SD	Standard Deviation
SDT	Self-Determination Theory
SEM	Structural Equation Modelling
SLQ	Source Language Questionnaire
SPSS	Statistical Package for Social Sciences
SRMR	Standardised Root Mean Square Residual
STEM	Science, Technology, Engineering, and Mathematics
UK	United Kingdom
US	United States
USA	United States of America
VIF	Value Inflation Factor

VUCA      Volatility, Uncertainty, Complexity and Ambiguity

# Chapter One: Introduction

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*We'll innovate our way out of the energy crisis or die trying. (New York Magazine, 2021)*

*NATO Deputy Secretary General underlines the importance of innovation to our security. (NATO, 2022)*

*China and the West are in a race to foster innovation. (The Economist, 2022)*

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These recent headlines from various global newspapers, magazines, and even the NATO blog reflect the current global call for innovation as a solution to a plethora of problems the world is facing, from the energy crisis, and security threats to climate change. To measure innovation performance globally, one of the most prestigious indexes is the Fraunhofer Innovation Index.

The Fraunhofer Innovation Index is a measure of a country's innovation capability and shows a ranking of 35 nations based on indicators related to the creation, diffusion, implementation, and utilisation of knowledge and technology. These indicators include the proportion of the population with doctoral degrees, research and development expenditures by the private and public sectors, scientific publications and citations, patents, the availability of skilled workers, and the use of high technology in the economy among others.

In 2023, Germany was ranked 10th of the 35 countries assessed, with a score of 45 out of 100 points in the Fraunhofer Innovation Index. However, in previous years, Germany consistently held the 4th position but experienced a continuous decline in points. It was observed that larger economies<sup>1</sup> in general tend to have a more stable development of their innovation capability and thus score lower overall when it comes to innovativeness. This is due to their occupation of a greater number of technologies and innovation topics, which mitigates the impact of abrupt changes in a specific technological field on the overall ranking. Additionally, larger economies require significantly more financial and human resources to make noticeable changes in their innovation performance.

When compared to South Korea, however, the highest-rated large economy for innovation capability, the researchers of the Fraunhofer Institute note in their report that Germany lacks dynamism and needs to make certain adjustments to face future challenges and disruptive technologies.

This urgency to enhance innovation efficiency in Germany is widely recognised, not only by the Fraunhofer Institute but also by the German government. According to a government report released at the beginning of 2023, Germany is lagging in the areas of cutting-edge technologies and digitalisation. To ensure Germany's position as a future-proof innovation hub, the government believes there is an urgent need for a future-oriented strategy that focuses on strengthening Germany's overall innovation capacity. To

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<sup>1</sup> Being the fourth-largest economy in the world with a GDP of \$4.0 trillion and a per capita GDP of \$46,560, Germany is considered a large economy.

tackle this issue, they have introduced the "Zukunftsstrategie Forschung und Innovation" (Future Strategy for Research and Innovation) which aims to strengthen the research and innovation landscape in Germany through collaboration among stakeholders, support for excellence in research, promotion of innovation in companies, and facilitation of technology transfer. While this policy framework has already provided some momentum in these areas according to the innovation report of the Fraunhofer Institute 2023, additional efforts are necessary, particularly in terms of skilled workforce availability and fostering innovation in the private sector.

In 2021, the private sector in Germany invested more than 170 billion Euros in innovation and research and development, a number that has been consistent over the years and exceeds the innovation spendings of most other EU countries, according to the German Federal Ministry for Economy and Climate Protection. However, a study by the Bertelsmann Foundation, which explored the innovation output of 1,000 German companies, classified only 25 per cent of them as truly innovative, while 46 per cent were considered to be in less innovative categories, such as "passive implementers" or "companies without an innovation focus". These findings are consistent with a study by Rammer et al. (2022), which shows that although innovative German companies perform exceptionally well and contribute significantly to the country's innovation rankings, they represent only a small fraction of the private sector.

One of the key drivers of innovation identified by Rammer et al. (2022) is human capital, while internal resistance within organisations is seen as a negative influencing factor on innovation. However, the specific drivers of this

positive "human capital" and the organisational factors that can either support or hinder innovation in the private sector require further investigation, as this is an area that remains highly under-researched.

The concept of innovation, both in practical application and theoretical understanding, is multifaceted. While innovation is widely recognised as a crucial factor in addressing various organisational and global challenges, there is a lack of a unified innovation management theory or a comprehensive model that defines the characteristics of an innovative employee or organisation.

Innovation encompasses a range of dimensions, including technological advancements, novel ideas, creative problem-solving, and disruptive changes. However, the complexity of innovation lies in its dynamic nature, as it varies across industries, sectors, and organisational contexts. Consequently, the pursuit of innovation requires a nuanced understanding of the factors that foster and inhibit innovative behaviours and practices within individuals and organisations. Addressing this research gap is essential for organisations seeking to enhance their innovative capacity and for policymakers aiming to promote innovation-led growth. By establishing a more comprehensive understanding of innovation and its underlying drivers, scholars and practitioners can develop effective strategies, policies, and management approaches to foster a climate of innovation and unlock the full potential of individuals and organisations in driving meaningful and impactful change.

Over the last 15 years, innovation studies, and more specifically, innovation management as an area of research, has emerged and produced

"extensive prescriptions for managers to increase the likelihood of innovation success" (Dodgson et al., 2014: p. 482). However, the question of what drives individuals and organisations that produce innovations remains a central unanswered research question that has high relevance to help companies understand how to translate their high investments into innovation and R&D into actual innovation output. By addressing this research gap, the crucial factors that drive innovation within individuals and organisations can be unravelled. Understanding these drivers is vital for organisations seeking to optimise their innovation processes and outcomes. It enables them to bridge the gap between investment in innovation and actualising innovative ideas, ultimately fostering a climate of innovation, and achieving a competitive edge in the marketplace.

## **1.1. Drivers for Innovation**

To address the question of what drives individuals and organisations that produce innovative ideas, this thesis aims to explore the personality drivers for innovative work behaviour and examine how organisational climate variables may mediate this relationship, focusing on the context of the German private sector. By answering the question on the individual and organisational drivers of innovation in the German private sector, the study aims to provide valuable insights into innovation management and contribute to the global call for innovation to solve pressing problems such as the energy crisis and climate change. The following introduction chapter will show the objectives this research aims to reach to answer this question, what gaps in

literature it intends to bridge by creating an original contribution to both theory and practice and which procedure and methods are intended to be employed in order to reach these goals.

Innovation Management is a diverse field, but its complexity arises from the broad definition of innovation, which encompasses a wide range of activities from small improvements to revolutionary breakthroughs. Dodgson et al. (2014) define innovation as the successful application of new ideas resulting from organisational processes that combine various resources. This definition highlights the multifaceted nature of innovation and the different levels at which it is managed, including individuals and organisations. This study adopts a multi-dimensional approach to comprehensively examine the issue and explore strategies that German businesses can employ to foster innovation. It aims to explore innovation dynamics at both the individual and organisational levels, providing a comprehensive analysis of the factors that drive and facilitate innovation within the German context.

### **1.1.1. Individual Drivers**

Denti and Hemlin's (2012) review of 30 empirical studies on the relationship between leadership and innovation, concludes, that innovation may be stimulated "on the individual level by influencing creative self-efficacy" (p. 11) while Ramamoorthy et al. (2005) state that innovation demands personal involvement of employees. Despite the seemingly common understanding in management theory that the stimulation of an individual's self-efficacy is

crucial to innovation, achieving a consensus on effective approaches to foster or increase self-efficacy for innovative behaviour remains elusive.

Although it has been long established that many extrinsic motivators practised in HRM such as monetary incentives, tend to be counter-productive to innovation (Deci and Ryan, 2014), the field of intrinsic motivation and its connection to innovation is still under-researched, while research in the field of personality in general and innovative behaviour has led to inconclusive results (Postigo et al., 2021).

A common pathway taken in research towards examining the relationship between personality and innovative work behaviour is using personality traits and more specifically the Five Factor Model, also known as the Big Five. However, despite a vast number of studies conducted in this field, the findings are contradictory or inconclusive (e.g. Antoncic et al., 2015; Gal, 2019; Hsieh et al., 2011; Imran, 2019; Obschonika et al., 2012; Stock et al., 2016; Woods et al., 2018; Zuraik, Kelly and Dyck, 2020). Intrinsic motivation, on the other hand, is shown to have much stronger effects on individual innovation than personality traits (e.g. Amabile and Pratt, 2016; Fischer, Malycha and Schafmann, 2019; Hammond et al., 2011; Klaijnsen, Vermeulen, and Martens, 2018). However, these studies on intrinsic motivation and innovative behaviour or creativity have predominantly focused on two main approaches. One approach involves measuring employees' motivation levels without specifically examining the underlying motives that drive innovative behaviours. The emphasis is placed on assessing whether employees feel motivated, but the specific motives that contribute to their innovative behaviours remain unexplored. This approach provides valuable insights into

overall motivation levels but offers a limited understanding of the intrinsic motives that fuel innovation.

The second approach involves assessing explicit motives such as power, achievement, and fear. While these motives provide some understanding of employees' motivation and its influence on innovation, they offer a constrained view of intrinsic motivation. Examining the question of what drives employees who drive innovation using a multi-faceted approach to motivation is likely to answer the call for a more fine-grained view of personality drivers on IWB compared to the Big Five (Postigo et al., 2021). It will further shed light on a different level of personality which has been shown to have a higher effect on individual innovativeness. Connecting these elements will offer brand-new insights and thus contribute never before researched perspectives to personality studies and innovation management theory, but also offer helpful perspectives that can be used in practice by corporations.

To bridge this gap in the literature and gain deeper insights into the influence of intrinsic motivation on Innovative Work Behaviour than existing studies offer, this thesis will take a multi-faceted approach to motivation in form of basic desires, also referred to as fundamental motives, as proposed by Reiss and Havercamp (1998) and further developed by other researchers such as Kemper et al. (2017) and Döhrendahl et al. (2021). Understanding which fundamental motives drive innovative work behaviour will allow a better understanding of the complex nature of intrinsic motivation and its role in fostering innovation within organisations.

### 1.1.2. Organisational Drivers

“No man is an island”: the famous quote by John Donne (1624) has never rung truer than when talking about the innovation process in companies. While creativity can rely solely on the level of the individual, innovation is a complex process which entails collaboration and networking across teams, departments and often even organisations. Innovative Work Behaviour is defined as a multi-stage process including various stages such as spotting problems, generating ideas, finding support for, and finally also implementing an idea. While the first stages may be conducted by individuals alone, the stages of championing and implementing ideas require collaboration. For this reason, examining innovation solely at the individual level is insufficient to capture the intricate complexity that underlies the innovation process.

Various studies have been conducted on the direct effect of organisational climate on innovative work behaviour (e.g. Afsar and Umrani, 2019; Alpan et al. 2010; Bysted and Jespersen, 2014; De Spiegelare, 2014; Gundry et al., 2016; Ramamoorthy et al., 2005). These studies have shown that a positive organisational climate can have a significant impact on the creativity and innovation levels of employees. In fact, some researchers have gone so far as to define a concept called Organisational Climate for Innovation (OCI). However, some scholars argue that examining only the direct relationship between OCI and IWB is too narrow in scope. Shanker et al. (2017) suggest that a more multi-faceted approach is needed, which includes variables such as employee engagement and intrinsic motivation, to fully understand the

complexities of innovation in organisations. To answer this call and bridge this gap in literature, organisational climate variables known to have either a positive or negative influence on innovativeness will be tested as mediating factors in the relationship between fundamental motives and innovative work behaviour (IWB). The summary of the research objectives based on these gaps identified in the literature and the approach to reaching the research aim will be outlined in the following subsections.

## **1.2. Research Objectives**

The aim of this thesis is to investigate what leads employees and organisations in the German private sector to be more innovative. It does this with a focus on intrinsic motivation, Innovative Work Behaviour (IWB) and organisational climate. In meeting the aim, the research achieves the following objectives, to:

1. Create a model of the relationship between fundamental motives, IWB and organisational climate through an extensive literature review. This model will provide a theoretical framework for the research and guide the data collection and analysis.
2. Conduct surveys with supervisors and employees in the German private sector to identify the intrinsic motives that drive IWB and explore how this relationship is mediated by the organisational climate factors of autonomy, tradition, formalisation, reflexivity and innovation and flexibility.

3. To establish theoretical and practical implications presented by the analysis and make recommendations for increasing innovation in the German private sector.

### **1.3. Structure of the Thesis**

Having justified the conduct of the study and articulated the aim and objectives in the preceding sections, the thesis will continue to provide a comprehensive review of the literature on the drivers of innovation. The review encompasses existing studies focused on both the individual and organisational levels, offering a critical analysis of the current literature while identifying the key variables that influence innovation. Building upon the review, a robust theoretical framework is developed to guide the subsequent investigation.

Following the literature review, this thesis provides more detailed insights into the conceptual framework and the development of hypotheses. It explains the process through which these hypotheses are derived, while also exploring other potential influencing factors that may contribute to the understanding of innovation drivers. To further enhance comprehension, the key variables are systematically incorporated into a model that reflects the hypotheses developed, providing a visual representation of their interrelationships.

Moving forward, the methodology chapter sheds light on the philosophical underpinnings of this research, elaborating on the chosen paradigm that serves as the foundation for the study. It thoroughly discusses the survey design, including the careful selection of scales that effectively

capture and represent the identified key variables. Additionally, the methodology highlights the rigorous translation process employed to ensure the accuracy and appropriateness of the chosen scales. Furthermore, it explores the sampling strategy and data collection procedures, offering insights into the systematic process of sourcing participating companies and the distribution of surveys. Finally, this chapter concludes with the ethical considerations that govern this research, emphasising the protection of participant rights, privacy, and confidentiality.

Subsequently, the data analysis chapter demonstrates the thorough process undertaken to prepare and screen the collected data for analysis. It showcases the measures implemented to ensure data quality, underscoring the reliability and validity of the scales employed. Moreover, this chapter culminates in a comprehensive presentation of descriptive statistics, providing a clear overview of the collected data. To test the formulated hypotheses, structural equation modelling is used, employing a robust statistical technique to examine the relationships between variables and validate the proposed model.

The discussion chapter investigates the problems identified in the existing literature, providing a comprehensive exploration of the new insights gained through this study. Furthermore, it contextualises the obtained results within the German private sector, offering valuable perspectives on how these findings can be practically applied to enhance innovation practices within businesses. By highlighting the practical implications, this research aims to facilitate knowledge transfer and guide organisations in leveraging the drivers of innovation to achieve sustainable competitive advantage.

In the final chapter, a conclusive synthesis is presented that ties together the threads of this thesis. It assesses the extent to which the research aim has been achieved and evaluates the fulfilment of the research objectives. Moreover, this chapter clarifies the contributions made to both theory and practice. It highlights how the findings of this study bridge existing knowledge gaps in the realms of personality and innovation management theory, enriching the understanding of the intricate relationship between individuals and organisational innovation.

While this study is extensive and comprehensive, it is essential to acknowledge and address its limitations. The final chapter provides an honest examination of the constraints encountered during the research process, underscoring the potential implications for the generalisability and interpretation of the findings. Furthermore, this chapter identifies promising avenues for future research, shedding light on the unexplored areas and untapped potential for further investigation in the realm of innovation drivers.

By adhering to a meticulous research methodology, presenting robust empirical findings, and offering practical insights, this thesis seeks to contribute significantly to the fields of innovation management and organisational behaviour. This research further aims to empower German organisations to harness the power of innovation and foster a climate of continuous improvement and adaptation, ensuring their long-term success in an ever-evolving business landscape.

No research to date has explored the impact of fundamental motives on Innovative Work Behaviour or examined the mediation of this relationship

through organisational climate, either theoretically or within the context of the German private sector. Therefore, this study is anticipated to make a significant contribution to both research literature and practical implications for German businesses.

## Chapter Two: Literature Review and Theoretical Framework

This chapter presents a comprehensive overview of the current state of the literature on innovation management, specifically focusing on innovative work behaviour and how it is managed in companies.

To understand what drives innovative behaviour in humans, it is necessary to explore the role of personality in psychology and behavioural economics. This analysis includes an examination of how personality can be measured, the different levels of personality, such as traits and motivation, and how personality is connected to creativity and innovative work behaviour. The chapter also provides an up-to-date overview of the current stance of research in this field and highlights areas where further research is needed to fill the gaps.

Furthermore, the chapter examines the role of organisational culture and climate in shaping innovative work behaviour, as employees do not operate in a vacuum, but rather organisations are shaped by the people who work in them, and vice versa. This section provides a closer look at the associations found in the literature between organisational culture/climate and innovative work behaviour, while also identifying areas where further research is needed to gain a more comprehensive understanding.

Overall, this literature review chapter provides a foundational understanding of the complex fields of personality, organisational climate, and innovation

management and its specific focus on innovative work behaviour. It lays the groundwork for the subsequent hypotheses and model development which serve as the basis for the empirical investigation by identifying gaps in the existing literature and highlighting the key areas where further research is needed to address the research aim.

## **2.1. Innovation Management**

Innovation management studies are wide and varied, however, one of the aspects that makes innovation management research so challenging is that the term innovation is broadly defined. It includes an extensive scope of activities ranging from revolutionary new breakthroughs to the improvement of as little as one aspect of a product or process. The distinctions are usually made in the degrees and the types of innovation (Albury, 2005).

Types of innovation are usually separated into product, process, and service innovations (Albury, 2005). Product and service innovations include the research, development, and launch of new products and services while process innovations entail changes in work procedures, organisational activities, machines and/or software used to improve manufacturing, and project flow, amongst other changes.

While product innovations are visible to the public, process innovations usually stay hidden from the public eye and, though less recognised, are important for the overall innovation performance of a company. In an empirical study with top executives from 101 US banks, Damanpour and Gopalakrishnan (2001) found that there are strong interrelations between

product and process innovations, and that “the synchronous adoption of product and process innovations has a positive implication for organisational performance” (p. 61).

The degree of change an innovation creates determines whether it is considered radical or incremental. Incremental innovations mark the beginning of the innovation spectrum and entail improvements or reconfigurations of existing processes and products which in turn are sometimes repurposed to create something new based on older technology. A good example would be the use of existing GPS technology for navigation systems in automobiles. Radical innovations are at the very end of the innovation continuum and mark breakthrough innovations such as the world wide web, digital cameras, and smartphones (Christensen, 2016).

In industries, incremental and radical innovations are not mutually exclusive or unrelated processes; instead, they are correlated and interconnected phenomena (Hesse and Fornahl, 2020). Therefore, when looking at how innovation is created and through which organisational variables, this thesis will focus on the innovative behaviour of employees. This includes employees who are directly involved in research and development (R&D), leading to more radical product innovation endeavours, as well as those working in other areas of the organisation such as IT, Marketing, or Consumer Relations. These areas are typically more involved in process or service innovation and often contribute to the organisation's development through incremental and/or internal innovations. Regardless of the type or degree of innovation—whether it is incremental or radical, or falls into the categories of product, service, or process—the fundamental principle of innovation management

remains understanding how innovation is created within the organisation and which variables influence this process.

According to Dodgson et. al. (2014) “an innovative outcome involves the successful application of new ideas, which results from organisational processes that combine various resources to that end” (p. 5). This definition shows the complexity of managing innovation on an organisational level. It entails the notion that innovation itself is both the outcome as well as the process and displays the different levels on which innovation is created and managed. These include individuals and their contributions in the field of idea generation and implementation as well as support, implementation, and management on both a managerial and organisational level. When managing innovation, it is important for a company to be internally connected, market-focused, open to external collaboration and prepared for the future (de Jong and Den Hartog, 2010; deSai, 2013; Patterson et al., 2005). To achieve the highest possible level of innovation, it is essential to encourage, manage, and organise innovation. However, due to its complexity, there is no universal innovation management theory but rather varied approaches from diverse fields that shine a light on the different aspects of innovation and its management.

The following section will involve an in-depth examination of the various theoretical approaches presented in innovation management literature within the domain of organisational management theory. This will be followed by a comprehensive analysis of the concept of innovative work behaviour, aiming to provide a thorough understanding of its theoretical underpinning and its complexities. Subsequently, a careful exploration of the existing literature will

be undertaken to shed light on the approaches that have been investigated within organisational management theory, with the objective of gaining insights into the management of innovative work behaviour at the organisational level.

### **2.1.1. Organising Innovation**

When companies “are not organised to facilitate innovation: occasionally innovation did occur, but it occurred in spite of the system, not because of it” (Dougherty and Hardy, 1996, p. 1121).

The organisation of innovation can be explored using various theoretical lenses. These lenses analyse the different aspects innovation entails. For example, evolutionary economics (e.g. Foster and Metcalfe, 2012; Hodgson, 2019) examines innovation as a dynamic process and its influence on changes in the economy. Another lens is the dynamic capabilities theory, which focuses on an organisation's ability to adapt to changing environments. While both evolutionary economics and dynamic capabilities theory are important perspectives when considering innovation, particularly in the field of economics and national innovation, there is another lens that is commonly used to examine innovation within organisations: innovation management theory.

Under the approach of innovation management theory, the innovation process for an organisation typically involves four stages. Dodgson et al. (2014) present an approach to innovation management as depicted in Table

1, which highlights the following four stages: creating options, selecting, and deploying innovations, capturing value, and learning.

Unlike evolutionary economics and dynamic capabilities, which primarily focus on outcomes and performance, innovation management theory offers a more comprehensive perspective by examining the internal processes of configuring and deploying resources and capabilities within the organisation (Dodgson et al., 2014). This lens encompasses an analysis of integration within the organisation to effectively control and enhance innovation readiness.

In order to foster innovation within a company, it is crucial to establish integration and coordination, given that innovation ideas emerge from diverse sources and involve multiple contributors. Jatin DeSai (2013), through applied research, identified 15 organisational factors of innovation readiness, which can be categorised into three groups: Alignment, Insights, and Mobilization. According to DeSai (2013), Alignment, Insights, and Mobilization are simultaneous and interconnected factors that significantly influence the success of innovation within organisations.

<b>Evolutionary Economics</b>	<b>Dynamic Capabilities</b>	<b>Innovation Management</b>
<p><b>Create variety</b></p> <p>New firms, technologies, and business models</p>	<p><b>Search</b> for new market opportunities</p> <p>Create, access, and mobilize resources needed to engage in new activity to exploit selected opportunities</p>	<p><b>Create options</b></p> <p>Search for innovation opportunities: internally and externally</p>
	Absorptive capacity	
<p><b>Select and eliminate</b></p> <p>Decisions by investors customers, regulators, partners</p>	<p><b>Create and capture value</b></p> <p>Devise business models to produce outcomes that deliver value</p>	<p><b>Select innovations to pursue</b></p> <p>Strategic/risk assessment and choice</p>
	<p>Develop specific capabilities and generate revenue to sustain returns</p>	<p><b>Configure and deploy</b></p>
	<p>Complement activity of co-evolving organizations</p>	<p>Resources and capabilities</p>
	Complementary assets	
	<p>Protect patents, institute customer switching costs</p>	<p><b>Capture value</b></p> <p>Produce distinct advantages</p> <p>Create IPRs and standards</p>
<p><b>Propagate</b></p> <p>Selected innovations</p> <p>Reinvest to create more variety</p>	<p><b>Adapt</b></p> <p>Capabilities to changing business environment</p>	<p><b>Build capabilities</b></p> <p>Across innovation portfolio</p>
<p><b>Learn</b></p> <p>Dynamic improvements in economy through creative destruction</p>	<p><b>Learn</b></p> <p>Organizational learning in routines</p>	<p><b>Learn</b></p> <p>Evaluate returns and review performance</p>

Table 1: Analytical Lenses to Innovation, Dodgson et al. (2014, p. 11)

### 2.1.1.1. Alignment

Alignment is connected to a business's capability to identify and commit to the purpose of innovation by linking it to the business strategy. It essentially revolves around supporting innovation on all levels of the business. According to DeSai (2013) "if alignment is properly executed and adjusted as the organisation matures, the result will be a climate and culture of innovation for long-term sustainable business growth" (p. 44).

	Definition
<b>Innovation mandate</b>	At the top, innovation is seen as critical to the future of our organization.
<b>Leader readiness</b>	Leaders are prepared to guide the organizations innovation efforts.
<b>Employee engagement</b>	Individuals throughout the organization are motivated to contribute to innovation.
<b>Innovation support</b>	Organization has effective systems and processes to support innovation.
<b>Systematic approach</b>	There is a clear framework, common language, along with a systematic and well-understood approach to innovation.

*Table 2: Alignment Factors, DeSai (2013, p. 44)*

Alignment encompasses the recognition of innovation as critical to the organisation's future, the preparedness of leaders to guide and support innovation efforts, the engagement and motivation of employees at all levels, the establishment of effective systems and processes to facilitate innovation, and the adoption of a systematic and well-understood approach. Alignment reflects the organisation's strategic commitment and systematic approach to creating a culture and climate that promotes innovation, ensuring long-term success and sustainability.

### 2.1.1.2. Insights

The five factors of insights, as can be seen from Table 3, reflect the significance of nurturing creativity within a company, organising ideas that arise and selecting the ones that will be pushed forward to create innovations.

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	Definition
<b>Diverse perspectives</b>	We incorporate a wide range of perspectives in the idea-generation process.
<b>External orientation</b>	We actively engage with the external environment.
<b>Climate/Culture</b>	Our organizational climate and culture support the generation of ideas/insights.
<b>Idea flow</b>	We have a strong flow of creative ideas.
<b>Idea Selection</b>	We select the best ideas from those that are generated on a timely basis.

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*Table 3: Insights Factors, DeSai (2013, p. 45)*

This level of idea development shows the various layers the innovation process works on. It starts with the identification of both the needs and the opportunities of the organisation by using insights gathered through the involvement of both internal and external stakeholders from all levels of the organisation. According to DeSai (2013), “the larger the field of information and ideas, the more dramatic, sustainable, and unique will be your pool of insights” (p. 45). The notion of networks being a crucial factor for idea exploration and idea generation is supported by various studies (e.g. Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014). Two more factors of the insights level are idea flow and idea generation, and it is further noted that companies need tools for individuals and teams to find ideas.

Another factor of insights, which DeSai (2013) deems the most important one, is creating a culture and climate that supports the generation of ideas. The role of culture or climate in encouraging innovation is supported by extensive research and many authors have tried to define variables of organisational climate which foster innovation, commonly referred to as Organisational Climate for Innovation (OCI) (e.g. Kheng and Mahmood, 2013; Kim and Yoon, 2015; Kiss et al., 2012; Liu et al., 2017, Shanker et al. 2017). The details of which factors of organisational climates have been found to support innovation and which are still under-researched will be discussed in more detail in sections 2.3.4. and 3.2.

#### **2.1.1.3. Mobilization**

The third level of innovation readiness of organisations as defined by DeSai (2013) is mobilization. This captures the level that is often disregarded in theory when talking about innovation readiness: execution. It is not always the organisation with the best ideas that brings forth the best innovations and captures market share but rather the organisation “with the ability to execute the best idea is the winner”. (DeSai, 2013, p. 46)

Mobilization is the level which, according to DeSai, plays purely on the level of the organisation and according to their data is the weakest point for most organisations.

	Definition
<b>Resources</b>	The organization allocates sufficient resources to innovation.
<b>Governance</b>	There are effective governance structures and processes for innovation.
<b>Portfolio</b>	Through a structured process, the company effectively manages a portfolio of innovations selected for implementation.
<b>Change Management</b>	Leaders create the adjustments required to ensure all innovations achieve full realization.
<b>Execution</b>	The company has a clear process for successfully bringing projects through the pipeline to achieve positive results.

*Table 4: Mobilization Factors, DeSai (2013, p. 46)*

Interestingly, all factors that include the contribution of individuals presented in the first two levels refer to idea generation, but the overall innovation process is defined as a multi-stage process. To have innovation success, all stages of innovation readiness and the innovation process need to be managed and executed. The notion that innovation on the level of the individual is limited to idea generation can be seen in a great number of innovation research conducted. Many studies have been researching creativity for idea generation as the main contributing factor of the individual (e.g. Amabile, 1988, 1996, 2002, 2012; Chen and Chen, 2012; Chen and Kaufmann, 2008; Fischer et al., 2019; West and Farr, 1990). For a long time, research in innovation management theory had neglected to look at the contribution of the individual to the other stages of the innovation process. This has been changing, with a shift from creativity as a focal point to the development of the construct of innovative work behaviour which looks at the contribution of the individual to the innovation process as a whole. For

organisations to be innovative and future-ready as well as sustainable according to DeSai (2013), all three stages - alignment, insights, and mobilization - must be managed. To fully utilise the potential of employees and foster a climate of innovation, it is imperative to engage them at every stage of the innovation process, beyond just idea generation, by actively promoting and nurturing their innovative work behaviour within an organisational climate that fosters innovation. The concept of Innovative Work Behaviour will be examined in the following section, which encompasses the level of the individual and is considered the most useful approach in this research due to its focus on employees' discretionary behaviours and their proactive involvement in the innovation process. The following section will discuss the development of the concept, its theoretical underpinnings, and why it is essential to understand it in the context of organisational innovation.

### **2.1.2. Innovative Work Behaviour**

For a long time, innovation and entrepreneurship studies have been investigating the sources of creativity and trying to understand the psychology of inventors and entrepreneurs as well as the environmental factors that support idea generation (Amabile, 1985; Dodgson et al., 2014; McLean et al., 2014; Park and Sung, 2018; Scott and Bruce, 1994; Theurer et al., 2018). However, as Dodgson et al. (2014) point out, most ideas generated do not translate to innovations in the long run as it requires “additional effort to turn a practical idea into a commercially useful product, process, or service” (p. 35). It is therefore important to start looking at individual innovation beyond

creativity for idea generation and rather look at the contribution of the individual to the overall multi-stage process of innovation.

Drawing on the theories of Kanter (1988) and West and Farr (1990), Scott and Bruce (1994) created the concept of Innovative Work Behaviour, recognising the need to distinguish between creativity and innovation, which began to emerge in the late 1980s. In their seminal work, creativity was defined as the "production of novel and useful ideas," while innovation was defined as the "production or adoption of useful ideas and their implementation" (p. 581). To further understand the multi-stage process of innovation, Scott and Bruce examined the involvement of individuals in the innovation process and identified three sub-dimensions, which they termed "Innovative Work Behaviour" (IWB). These dimensions include Problem Recognition/Idea Generation, Idea Coalition, and Idea Production. By conceptualising the multi-stage process of innovation and defining Innovative Work Behaviour, Scott and Bruce provided a framework for organisations to understand and measure the innovative work behaviour of their employees. When testing the scale, they developed for IWB, which was given to the supervisor of each individual in the study, Scott and Bruce also gathered the respondents' personal work history in relation to their respective innovation output from the company's archives. The innovation output measure they created, by taking the total number of inventions an individual filed divided by their respective company tenure in years, correlated .33 ( $p < .001$ ) with the supervisors' ratings of the employee's IWB.

Since the conceptualisation of Innovative Work Behaviour (IWB) in 1994, the literature on IWB has steadily grown. According to DeSpiegelaere (2014), the

dimensions of IWB are largely derived from Kanter's (1988) findings, which distinguish four phases of innovation: idea generation, seeking support for the idea, idea realisation, and dissemination of the innovation. However, after excluding the final phase of dissemination, most researchers refer to three sub-dimensions, similar to the original work by Scott and Bruce (1994). Nevertheless, there are some researchers who define IWB using two sub-dimensions (e.g., Krause, 2004; Yuan and Woodman, 2010), four sub-dimensions (de Jong and Den Hartog, 2010; Dorenbosch et al., 2005; Knol and van Linge, 2009; Messmann and Mulder, 2012), or even five sub-dimensions (Kleysen and Street, 2001; Tuominen and Toivonen, 2011), as illustrated in Figure 1.



Figure 1 - Visualisation of IWB Dimensions in Literature – based on Systemic Reviews by Despiegelaere (2014) and AlEssa and Durugbo (2021).

IWB has been used in various studies, researched both as a dependent and an independent variable (AlEssa and Durugbo, 2021) and has been subject to the development of new measurements (Janssen, 2001; de Jong and Den Hartog, 2010; Messmann and Mulder, 2012). Analysing the various approaches to IWB including all the different aspects researched, DeSpiegelaere (2014) has formulated a common definition of IWB:

“Innovative work behaviour is all employee behaviour aimed at the generation, introduction and/or application (within a role, group, or organisation) of ideas, processes, products or procedures, new and intended to benefit the relevant unit of adoption. ” (p. 11).

### **2.1.2.1. Idea Exploration**

In theory, IWB is a multi-dimensional construct, consisting of two to five stages, as can be seen in Figure 1. The first stage of Innovative Work Behaviour, known as idea exploration or problem recognition, is recognised as a separate sub-dimension by some scholars (e.g., de Jong and Den Hartog, 2010; Dorenbosch et al., 2005). However, others consider it to be a part of idea generation, as proposed by Scott and Bruce (1994). This stage of idea exploration involves the identification of problems or opportunities for improvement within the organisation or industry, and the generation of initial ideas on how to address them. A supportive argument for the distinction between idea exploration and idea generation can be found in creative research which suggests that these two behaviours have different underlying cognitive abilities (Basadur, 2004). In addition, Basadur's (2004) extensive field research (1974, 1979, 1981, 1983) highlights the importance of recognising problems that need solving and proactively seeking out potential opportunities for improvement or innovation. Failure to do so can result in issues across departments and functions within an organisation. Therefore, it is crucial to recognise the significance of the stage of idea exploration or problem recognition in fostering innovative work behaviour within

organisations. Thus, including this stage when measuring the IWB of employees could give important insights into the innovation process and possible shortcomings of an organisation.

#### **2.1.2.2. Idea Generation**

The second stage of the innovation process and an important sub-dimension of IWB is idea generation (also referred to as idea development). It refers to the development of practical and creative ideas that can be used to solve a problem recognised and to create changes to an existing or even a whole new process, product, or service. This stage is the most researched stage of individual innovativeness as it most commonly refers to creativity in a broader sense and is therefore typically the subject of many creativity studies in various forms (e.g., Amabile, 1988; Burt, 2004; Georgsdottir and Getz, 2004; Kanter, 1988; McLean et al., 2014). The key to idea generation, according to creativity research, aligns with Schumpeter's (1934) classic definition of innovation as new combinations of new or existing knowledge, resources, and other factors. Kanter (1986) refers to idea generation as "kaleidoscopic thinking" (p. 11) as the already existing fragments of a kaleidoscope appear in a brand-new pattern when perspective is changed.

#### **2.1.2.3. Idea Championing**

Many creativity studies stop after the generation of ideas, but innovative work behaviour continues with the third stage of idea championing which is in line

with DeSai's (2013) suggestion that for organisations to be truly innovative all stages of the innovation process need to be observed and managed.

Numerous studies (e.g., Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014) provide evidence to support the idea that networks play a vital role in the innovation process. These networks, however, are not only formed by organisations as entities but by the employees themselves. To champion a new idea, employees need to create alliances and find support to successfully push the idea forward (de Jong and den Hartog, 2010; Howell, Shea, and Higgins, 2005) in order to get to the stage of idea implementation.

#### **2.1.2.4. Idea Implementation**

To implement an idea, employees need to show considerable effort and a result-oriented attitude (de Jong and den Hartog, 2010) to get and be involved in the implementation process. As innovation is recognised as a circular process (Basadur, 2004; Gordon, 1956, 1971), part of the implementation stage includes the incorporation of innovations into the regular work process (Kleysen and Street, 2001) to ensure a circular flow of the innovation process and IWB.

Although IWB is clearly multi-dimensional in theory, most researchers have found no evidence for the distinctiveness of the different stages. De Jong and den Hartog (2010) found that a four-factor model of IWB provided the best fit for the overall measure of IWB and that all four factors contribute greatly to the overall measure of IWB, however, failed to find strong evidence for the distinctiveness between the four dimensions. This is in line with previous

research (Janssen, 2000; Scott and Bruce, 1994) which suggests that while multi-dimensional in theory, the dimensions are “best viewed to combine additively to create an overall scale of innovative work behaviour” (de Jong and Den Hartog, 2010, p. 31). The underlying reason for this is that individuals are most likely to “be involved in any combination of these activities at any one time” (Scott and Bruce, 1994, p. 582) and as the innovation process is circular and highly connected due to its network structure, it is difficult to pinpoint the exact stage an individual displays the highest IWB in. Supervisors rather see an employee’s overall display of innovative work behaviour in the whole process.

Although the role of the individual and the importance of IWB is clear, research about it and what factors cause it and what factors may influence it, is still limited and inconsistent (Bos-Nehles et al. et al., 2017). Their meta-study showed that knowledge about IWB and its triggers is still fragmented and that “organisations may be restricted in their ability to innovate because they do not know how to trigger employees in a way that will encourage them to engage in IWB” (p. 1229). Similarly, a systemic literature review on IWB by AlEssa and Durugbo (2021) highlights that the ongoing demand for innovation creates continuous pressures on organisations to foster Innovative Work Behaviour (IWB). As companies strive for reinvention, the field of IWB scholarship is expected to expand and play a vital role in driving initiatives and incentives for organisational survival and success. Therefore, further research on IWB is crucial to comprehensively understand its impact and unlock its full potential in cultivating innovation within organisations. A deeper insight into both the psychology of the individual and the organisational

triggers of IWB is necessary to provide a more consistent and unified picture of innovation management of employees in organisations.

The forthcoming section and subsequent sub-sections will closely examine how IWB and creativity are managed in organisational settings. By exploring the strategies, practices, and approaches employed in IWB management, valuable insights can be gained into optimising organisational processes to foster innovation. This exploration aims to enhance understanding of the drivers that facilitate and enhance IWB, contributing to a more in-depth comprehension of managing employee innovation.

### **2.1.3. Managing Creativity and Innovative Work Behaviour**

Research on innovation management has been growing steadily<sup>2</sup> (Anderson et al., 2014). However, there remains a limited amount of research that explores organisational measures and climate factors that influence innovation at the individual level, as well as the reciprocal influence of individual-level factors on innovation (AlEssa and Durungbo, 2021; Bos-Nehles et al., 2017). Thus, there is a gap in understanding the interplay between organisational and individual dynamics in driving innovation. Addressing this gap is essential to gain a comprehensive understanding of

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<sup>2</sup> Anderson et al. (2014) have identified over 20,000 papers with creativity and/or innovation in either their titles or abstracts over the past decade.

how organisational measures and individual factors shape and foster innovation within the organisational context.

Although the organisational structures as discussed in section 2.1.1. are important for the support and implementation of new products and processes, it is imperative to have employees within organisations who can recognise the need for change and initiate innovations (Diborv, 2015; Salisu and Abu Bakar, 2019). To achieve a higher involvement of employees in innovation processes, an understanding is needed of what stimulates IWB within individuals.

The following subsections will discuss the prevailing methodologies identified in literature regarding the stimulants of Innovative Work Behaviour (IWB), providing insights into how the management of IWB is effectively addressed including rewards, job autonomy and psychological empowerment of employees.

#### **2.1.3.1. Rewards**

One of the practices used within organisations to foster a climate of innovativeness, which has been researched in connection with both creativity and innovative behaviour, is rewards. The findings on the relationship between rewards and individual innovation are, however, ambiguous. This may be due to the fact that the term “rewards” is rather equivocal itself. When rewards were interpreted as direct and indirect financial rewards, a significantly negative relationship with innovative behaviour was found (Sanders et al., 2010). This is in line with findings (Amabile, 1983; 1988; 1996;

Deci, 1971; Fernandez and Moldogaziev, 2013) that external motivation is detrimental to creativity. External motivation is defined as an action or work done in order to obtain external rewards, meet goals other than the work itself or avoid negative consequences.

However, when looking at rewards as a fulfilment of inner desires or intrinsic motivation, a positive correlation between creativity and innovation can be seen across a number of empirical studies according to Amabile and Pillemer (2012). The findings of Amabile (1983) and her formulation of the “Intrinsic Motivation Hypothesis of Creativity”, which states that “the intrinsically motivated state is conducive to creativity, whereas the extrinsically motivated state is detrimental” (Amabile, 1996, p.107) has been replicated and expanded (e.g. Amabile, Goldfarb, and Brackfield, 1990; Shalley and Perry-Smith, 2001; Zhou, 2003) and for this reason has since been renamed the “Intrinsic Motivation Principle of Creativity”.

According to self-determination theory, people are either more or less motivated, and a higher level of motivation leads to higher creativity. However, self-determination theory does not look at intrinsic motivation as multifaceted in nature. It does not distinguish between an array of motivators that form a layer of a human’s personality, as will be discussed in section 2.2.3. but rather define individuals as “intrinsically motivated when they seek enjoyment, interest, the satisfaction of curiosity, self-expression, or personal challenge in the work” (Amabile, 1993, p. 188).

The many correlations found between intrinsic motivation and innovative behaviour show that this is a topic worth looking into further. An exploration

of these correlations from a multi-faceted motivational perspective may provide additional insight into both motivational as well as innovation management literature.

### **2.1.3.2. Job Autonomy**

Another way of managing innovation on the level of the individual that has been researched in empirical studies is job autonomy. Through their extensive meta-study, Bos-Nehles et al. (2017) uncovered compelling evidence from numerous empirical studies, establishing job autonomy as a robust predictor of Innovative Work Behaviour.

In a study with 8,310 employees from Denmark, Norway and Sweden, Bysted and Jespersen (2014) found that autonomy, which they measured using four items 'necessary decision latitude for job decisions', 'sufficient influence on job tasks', 'impact on job tasks to perform', and 'clear expectations of job tasks', has a significantly positive effect on all stages of Innovative Work Behaviour.

Ramamoorthy et al. (2005) found job autonomy to have a significant direct effect on IWB as well as an indirect effect on IWB through the intervening variable of obligation to innovate in their study with 240 blue-collar employees from manufacturing organisations in Ireland.

Similarly, de Spiegelare et al. (2014) found autonomy to have both a direct and indirect effect on IWB in their study with 927 Belgian workers, of which 30 per cent were blue-collar, 59 per cent were white-collar and 11 per cent were managers. This indicates that autonomy has an effect on IWB

independent of the job position and the type of work done. It has further been found that the effect of autonomy on IWB does not differ between the public and private sectors (Bysted and Jespersen, 2014).

This, further, underlines the significant importance of including the aspect of autonomy when studying innovation management, however, most studies look at the effect autonomy has on the overall IWB but not if its effect differs depending on the personality or type of intrinsic motivation on the level of the individual. The significance of including the aspect of autonomy when studying innovation management cannot be overstated. Prior research has consistently highlighted the positive impact of autonomy on overall IWB. However, an important gap in the literature exists regarding whether the effect of autonomy varies depending on individual differences, such as personality traits and intrinsic motives. Understanding how autonomy interacts with these individual characteristics is crucial for gaining a comprehensive understanding of the underlying mechanisms that drive IWB. By investigating this relationship in depth, this thesis aims to bridge this gap and shed light on whether the effect of autonomy on IWB differs based on the dominant intrinsic motives of individuals. Such insights will provide a more nuanced understanding of the complex interplay between autonomy, individual differences, and innovative work behaviour, ultimately contributing to the advancement of innovation management theory and practice.

### 2.1.3.3. Managerial and Psychological Empowerment

Another element that is shown to have an influence on innovation on the level of the individual is empowerment. Employee empowerment, however, does not have one unified definition but is generally grounded in two distinct theoretical perspectives: managerial and psychological empowerment. Managerial empowerment, according to Bowen and Lawer (1992, 1995), is not just the power shared by authorities of an enterprise with their employees as it had commonly been equated to by researchers before the 1990s (e.g. Kanter, 1977, 1983; Pettigrew, 1972). Bowen and Lawer defined four factors of employee empowerment in organisations: “(1) information about the organisation’s performance, (2) rewards based on the organisation’s performance, (3) knowledge that enables employees to understand and contribute to organisational performance, and (4) power to make decisions that influence organisational direction and performance” (1992, p. 32). The fourth factor most closely relates to autonomy as it includes practices such as “creative rule breaking, employee participation, self-managed teams, job enrichment” (Fernandez and Moldogaziev, 2013, p. 159). In a study with 222,479 employees from the USA, Fernandez and Moldogaziev (2013) found that the factor of empowerment which they called “granting employees discretion” was positively related to “encouragement to innovate”. Similarly, in a study with 847 nurses from the Netherlands, Knol, and van Linge (2009)

found a statistically significant relationship between structural empowerment<sup>3</sup> (which is a similar concept as managerial empowerment) and innovative behaviour (based on Janssen, 1997), with informal power as the most important sub-variable. Informal power as a sub-variable of structural empowerment according to Kanter (1977, 1983) occurs when positive relationships between managers and employees are supported and employees are able to avoid formal lines when working on new tasks enabling them to act with more autonomy. This further supports the notion put forth in the previous section that autonomy has a direct and indirect effect on IWB.

Another interesting aspect Knol and van Linge explored in their study (2009) was the effect of psychological empowerment on innovative behaviour. Psychological empowerment essentially is based on the perception people have on their role in the organisation and consists of four dimensions (Seibert et al., 2011; Spreitzer, 1995): 1. *Meaning* describes how well a person's own ideas and values align with their role within the organisation. 2. *Competence* describes a person's confidence in their own abilities to successfully complete a work task. 3. *Self-Determination* refers to how much a person perceives to have autonomy over their own job and how much autonomy they have in initiating work. 4. *Impact* describes the belief that the person can make a difference in the work processes and outcomes.

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<sup>3</sup> Structural empowerment based on Kanter (1993) is formed on basis of six factors. It entails opportunity for advancement, access to information, access to support, access to resources, formal power, and informal power.

Knol and van Linge (2009) found that psychological empowerment not only shows a significant direct correlation with innovative behaviour, but they further found that psychological empowerment also acts as a mediator between structural empowerment and innovative behaviour. A study with 378 service employees from the tourism industry in Taiwan by Luoh, Tsaur and Tang (2014) found psychological empowerment to not only directly positively affect IWB but also found that it both mediates and moderates the relationship between job standardisation and IWB.

Further support for both the direct and indirect relationship between psychological empowerment and innovative behaviour can be found in an array of recent empirical studies (e.g. Alisher et al., 2019; Bin Saeed et al., 2019; Javed et al., 2019).

As the four cognitions that form psychological empowerment refer to a person's motivational state which is shaped by their work environment (Seibert et al., 2011; Spreitzer, 1995; Thomas and Velthouse, 1990), the notion of psychological empowerment is essentially the combination of intrinsic motivation and organisational climate, which will both be discussed in more detail in the upcoming sections. The findings demonstrate the significant importance of exploring these two variables, namely intrinsic motivation, and organisational climate, for further understanding the drivers of Innovative Work Behaviour. However, to comprehensively investigate the underlying mechanisms and potential of these variables, it is essential to employ diverse, multi-faceted approaches. Through such an approach, the specific pathways through which intrinsic motivation and organisational climate influence Innovative Work Behaviour can be uncovered, leading to an

enhanced understanding of effective strategies for promoting and nurturing innovation within organisations. Although Innovative Work Behaviour has been more in focus in recent years and various theories have emerged on how IWB can be fostered in businesses, current literature is still limited (Ližbetinová et al., 2022; Saura et al., 2023).

## **2.2. Personality**

To gain a comprehensive understanding of the individual drivers of Innovative Work Behaviour (IWB) in employees, it is crucial to explore the diverse aspects of human personality and their measurement. This section aims to provide a thorough overview of these elements, with a particular emphasis on the need for a multifaceted approach to understanding motivation.

Firstly, an exploration will be conducted into the examination of various psychological approaches that shed light on the study of personality, which offer valuable frameworks for understanding the range of individual approaches to personality.

Moving forward, the discussion will shift towards the measurement of personality, including an exploration of commonly used theories such as the Big Five model and the 16 personality factors. It is important to acknowledge that these broad conceptual frameworks may not fully capture the intricacies of personality in relation to IWB. Thus, the need arises for a more nuanced and multifaceted understanding of personality. In the framework of this discussion, the distinction between personality traits and motivation as separate levels of personality will be recognised. While existing research has

primarily focused on traits and their association with IWB, limited attention has been given to investigating motivation as a key driver of innovative behaviour. Therefore, this section emphasises the necessity of conducting further research to explore motivation in a comprehensive and nuanced manner, delving into specific fundamental motives that may contribute to higher levels of IWB.

By adopting a multifaceted approach to personality, with a focus on motivation, a deeper understanding of the complex interplay between individual characteristics and IWB can be achieved. This exploration of motivation as a more granular and specific construct holds the potential to uncover novel insights and provide a clearer understanding of the underlying drivers of innovative behaviour.

### **2.2.1. Psychological Approaches to Personality**

Explaining human nature has been the focus of psychology and behaviour studies for over a century and has been explored from many different angles. The main streams of personality psychology attempt to explore human nature using cognitive, biological, psychodynamic, learning, humanitarian, and trait-based approaches (see Table 5). All perspectives of personality psychology have derived from distinct approaches used by leading theorists and researchers such as Jung, Freud, Maslow and Allport and each perspective highlights personality from a different angle (Cloninger, 2009). What the different approaches in these distinct theories underline, is that the answer to the question of what defines personality is a complex one.

Perspective	Major concepts	Contributors
<b>Biological</b>	temperament, evolution, adaptation, sexual jealousy, heredity, neurotransmitter pathways, cerebral hemisphere function	D. Buss, Eysenck, J.A. Gray, C.R. Cloninger, Kagan
<b>Cognitive</b>	Expectancy, self-efficacy, outcome expectation, schema, cognitive person variable, personal construct, reciprocal determinism, modelling, constructive alternativism, life narrative	Mischel, Bandura, Kelly Beck
<b>Humanistic</b>	Self-actualization, creativity, flow, spirituality, personal responsibility, freedom, choice, openness to experience, unconditional positive regard, acceptance, empathy, real self, hierarchy of needs, peak experience, positive psychology	Maslow, Rogers, Seligman, Csikszentmihalyi
<b>Learning</b>	reinforcement, punishment, stimulus, response, conditioning, extinction, shaping, discrimination learning, generalization, situation, act frequency, basic behavioural repertoire, labelling, gradients of approach and avoidance	Skinner, Staats, Dollard and Miller
<b>Psychodynamic</b>	Libido, conflict, id, ego, superego, defence mechanisms, Oedipal conflict, fixation, repression, attachment, object-relations	Freud, Jung, Adler, Erikson, Horney, Klein, Sullivan, Chodorow, Westen, Kohut, Kernberg
<b>Trait</b>	Trait, type, facet, factors, Neuroticism/Emotional Stability, Extraversion	Allport, Cattell, McCrae and Costa

*Table 5: Personality Perspectives (Cloninger, 2009, p. 4)*

There are two fundamentally different ontological and epistemological positions revolving around personality: the idiographic and the nomothetic

approach. The terms idiographic and nomothetic were introduced as early as 1892 by philosopher Wilhelm Windelband, but it was American psychologist Gordon Allport who widely popularised the terms and promoted them in psychological discourse (1937).<sup>4</sup>

The idiographic approach attempts to understand and offer insights into individuals and is based on the premise that each human being is so uniquely different that generalisations cannot be made. Research following the idiographic approach is usually qualitative in nature, using case studies, unstructured interviews, and autobiographical texts in the theoretical approach and psychotherapy or behaviour modification in applied fields. This is particularly useful when studying personality dynamics in individuals and the development of behaviour over time (Cloninger, 2009), such as therapeutic settings.

The nomothetic approach on the other hand attempts to find evidence for general concepts that can be found across populations and can be applied when studying how individuals compare to others (Cloninger, 2009). Nomothetic research is typically quantitative in nature using experiments, correlations, and psychometric testing. The nomothetic approach offers

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<sup>4</sup> According to Hurlburt and Knapp (2006), the terms idiographic and nomothetic have been part of American psychology discourse since 1898 through the introduction of the terms to psychology by Hugo Münsterberg and further popularisation by William Stern, both who have immensely influenced Allport's work. However, it is undisputable that Allport was detrimental for the wide popularisation of these terms in psychology and is widely accepted as the leading psychologist on the distinction between the nomothetic and idiographic approaches in American psychology.

advantages in employing rigorous measurement techniques and conducting studies with large sample sizes, allowing for systematic analysis and the establishment of generalisable patterns. While it is important to acknowledge the limitations of precise measurement in research, the nomothetic approach provides opportunities to develop theories that can be empirically tested and applied to broader contexts. It is worth noting that qualitative data also contributes to evidence-based insights, providing rich and in-depth understanding of individual experiences. However, the strength of large-scale measurement lies in its ability to detect statistical trends and identify associations that can inform our understanding of human behaviour at a deeper level. By examining a larger sample size, the nomothetic approach enables researchers to identify patterns and trends that may not be readily apparent in smaller qualitative studies, allowing for the exploration of generalisable findings and statistical relationships. It is, however, important to note that this approach also bears limitations. While predictions can be made in general, they do not always apply to all people and as human beings are complex, the nomothetic approach only remains on a categorical surface of identity and can never fully grasp the complexity of a human being as an individual.

While both ontologically and epistemologically different in nature, these two approaches should not be seen as competing but rather as complementing as both are needed when studying personalities, depending on the nature of the study.

### 2.2.2. Measuring Personality

One of the major theories within personality psychology, which generally follows the nomothetic research tradition, is dispositional theory, also known as trait theory. Traits are defined as habitual patterns of behaviour, emotions, and thoughts (Kassin, 2003), which show coherence and stability over time<sup>5</sup> (Ajzen and Fishbein, 2005; Allport, 1961; Cloninger, 2009; Fajkowska and Kreitler, 2018; McCrae and John, 1992). This theory is based on the notion that each human being can be categorised by a set of traits and that the variation in the degree of the traits they display can be used to show the individual differences between human beings, create generalisations, and derive possible conclusions about behaviour (Allport, 1961; McCrae and John, 1992; ) and/or well-being and satisfaction (Gallagher, 2007; Janssen, 2004; Matthews et al., 2009).

One of the central questions of trait theory - which traits postulate personality traits- has been the focus of research and debate ever since Allport, the father of trait theory, posed it in 1957. The difficulty of answering this question lies in the intricacy of measuring personality concepts. Personality psychology has many hypothetical constructs which can be inferred indirectly but are not directly observable (Cloninger, 2009). For this reason, the development of

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<sup>5</sup> There is a growing stream of research that argues for personality changes across a human being's life span. (e.g. Wrzus & Roberts, 2016; Hampson & Edmonds, 2018) However, there is also a substantial number of recent empirical research that argues for the stability of traits (e.g. Bleidorn et al., 2018). The contradicting stances and findings show that "the study of trait stability might benefit from new theorising" (Fajkowska and Kreitler, p. 7)

assessment scales that can provide construct validity using factor analysis and structural equation modelling is particularly important.

### **2.2.2.1. The Five Factor Model**

The most common form of assessment in personality psychology is self-report scales in which participants provide information about themselves, usually on 4 to 7-point Likert scales to express agreement and disagreement on statements about their own personality and behaviour. Self-report scales have been used to create, test, and confirm various models of personality traits, the most prominent being the Five-Factor-Model (FFM).

The five factors of personality can be summarised as follows (Rossberger, 2014):

- Agreeableness is the extent to which individuals pursue social harmony, trust others human beings and have an optimistic outlook on life.
- Conscientiousness is the extent to which individuals strive for order, value planning, but also display self-discipline and strive for achievement.
- Extraversion describes the extent to which individuals engage with the external world, seek excitement and positive emotions, are enthusiastic and full of energy.

- Neuroticism (or *Negative Emotionality* in the BFI-2 (Soto and John, 2017)) is connected to facets of anxiety, self-consciousness, impulsiveness, and vulnerability.
- Openness to Experience (or *Open-Mindedness* in the BFI-2 (Soto and John, 2017)) is connected to individuals' curiosity, and affinity for art and beauty and describes the extent to which individuals seek new experiences and change.

There is a plethora of measurement tools used to assess the five factors of personality, from very short five and ten-item tests to the 60-item BFI-2 (Soto and John, 2017) and the extensive 240-item NEO-PI-3 (Costa and McCrae, 2005). The development and use of these instruments have shown a need to explore these traits deeper. After various revisions of their original NEO-I (Neuroticism-Extraversion-Openness Inventory) which covered only 3 factors in 1978, Costa and McCrae further revised their scales and both their 1992 NEO-PI-R and the latest version of their tool, the NEO PI-3 cover 6 facets of each factor, measured with a separate scale. These thirty facets have been generally accepted and included in other Big Five measures such as the BFI-2 and the notion of facets of traits has since expanded beyond the Five Factor model to other models such as HEXACO (Lee and Ashton, 2005).

The addition of factor facets forms an important development in trait measures as it responds to criticism that five (FFM) or even six (HEXACO) factors are too few and too simplistic to truly assess personality (Matthews, 2017). Nevertheless, the FFM in particular forms a solid basis for many

empirical studies connecting HRM practices and employee behaviour to personalities, such as the connection between Big Five and job satisfaction (e.g. Furnham et al., 2009; Kampkötter, 2017; Zhai et al., 2013), or to innovativeness (e.g. Antoncic et al., 2015; Imran, 2019; Rossberger, 2014) which will be discussed in more detail in section 2.2.4.

### **2.2.2.2. Sixteen Personality Factors**

A slightly different approach was taken by Cattell whose Sixteen Personality Factor Questionnaire (16PFQ) measures 16 trait constructs on the primary level, five constructs<sup>6</sup> on the secondary level called global scales, and three response bias scales (Cattell, 1995). Instead of using self-assessment responses about personality traits, the items refer to daily situations and people's reactions to it, e.g.: "I hold back from criticising people and their ideas. Yes/No/Uncertain".

Cattell's 16PF construct provides a more granular model of personality through its hierarchical structure of personality traits on the one hand and the higher number of factors found on the other. It has been used in the clinical field (e.g. Lind, 1972) as well as in Human Resource Management (HRM) (e.g. Roy, 1995). Compared to the Big Five, however, its use in (particularly more recent) research is rather limited. The reason for this may be that many

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<sup>6</sup> These five secondary factors gave way to the formation of the theory behind the Five Factor Model when Tupes and Christa tried to validate Cattell's construct and confirmed only five factors in 1961 (Tupes & Christa, 1992).

researchers have failed to replicate Cattell's findings (Philipp, 1972; Eysenck and Eysenck, 1985) and it has further been found "unsuitable for discriminating among psychiatric diagnostic groups" (Howe and Helmes, 1980).

### **2.2.2.3. Limitations to Trait Theory**

While the approaches to trait theory differ, it is generally accepted that studying the traits of individuals offers a certain level of predictability to their behaviour (Allport, 1961; McCrae and John, 1992) and presents a reliable way of measuring personality.

Trait theory has been one of the major, if not the most dominant theory throughout the history of personality psychology and despite or maybe even because of many challenges and criticism it had to face, it has evolved into a continuously developing paradigm (Fajkowska and Kreitler, 2018), which still faces compelling challenges.

Apart from the limitations of specific models presented here, one of the limitations that trait theory as a whole exhibits, is demonstrated in the questions of why people have differing degrees of certain traits, if these are stable throughout life, and where these traits come from. Substantial empirical research has been done in animal personality research (Adams et al., 2015; Iwanicki and Lehmann, 2015; Manson and Perry, 2013) to shed light on the question of the biological background, the source of traits and their stability over time.

Adams et al. (2015) collected adjectival ratings of personality traits from six different species of macaques and compared them to rhesus macaques, whose personality had been previously characterised. Using a nonparametric method called fuzzy set analysis to identify commonalities in personality dimensions across species, they found that all but one species of macaque exhibited consistent levels of friendliness and openness in their personality. However, similarities in personality dimensions related to aggression and social competence were found to be more closely related to social styles suggesting that social and evolutionary factors both contribute to the development and diversification of personality traits and may not all be stable. Similarly, a study conducted by Manson and Perry (2013) with 240 wild White-Faced Capuchins (*Cebus capucinus*) in Costa Rica using observer ratings over a nine-year period revealed significant rank-order stability for 15 out of 26 personality items from adolescence through early adulthood. All dimensions but one showed significant rank-order stability from adolescence through early adulthood. Sex differences were also found, with males being more extroverted, open, neurotic, and eccentric than females, while females were more agreeable. Cross-sectional analysis revealed that openness and agreeableness declined during adulthood, while eccentricity increased. The personality dimensions identified were consistent with the capuchin's social and ecological adaptations.

A human biological perspective was taken by Jang, Livesley and Vernon in 1996 in an empirical study using 123 pairs of identical twins and 127 fraternal twins to examine the genetic and environmental factors contributing to the five-factor model of personality. The study found that genetic factors played

a significant role in the development of each of the five dimensions of personality, with estimates ranging from 41% to 61%. The facet scales also showed substantial heritability, with nonadditive genetic influence found for several facets. The impact of the environment was consistent across all dimensions and facets, with shared environmental influences accounting for a negligible proportion of the variance in most scales, while nonshared environmental influences were found to be the major contributor to the environmental variance in all scales.

Due to the contradicting stances but also rather mixed results when it comes to the correlation between traits and certain behaviours, as will be discussed in more detail in section 2.2.4., a growing body of researchers has been calling for a new theorisation in psychology and a more multi-faceted and wider look at personality research from the different perspectives that exist in psychology.

One of these perspectives on personality that can be taken is the psychodynamic one using Freud's id, ego, and superego as functional structures of personality. Along with Hilgard's (1980) "trilogy of the mind", which has been instrumental in guiding research and theory development in the field these approaches can be used to study personality regarding motivation, emotion, and cognition (Mayer, 2003). Freud's id, the unconscious, shows similarity to the level of motivation within personality and when taking on a more comprehensive stand towards personality including the psychometric approach, it seems crucial to take a deeper look into the relation of traits and motivation and explore intrinsic motives as possible indicators for behaviour. This approach would fall in line not only with

Hilgard's trilogy of the mind but also with McAdams' theory that personality operates on three conceptual levels: traits, motivations, and life narratives (Dunlop, 2015; McAdams, 1995, 2013). After having established how personality is measured on the level of traits, the following section will show insights into motivational psychology theories and motivation as a level of personality.

### **2.2.3. Motivation**

Based on the three-level approach to personality as discussed in the previous section, a model by Fajkowska (2018), conceptualises the levels as follows: Level L-1 is formed by the biological, psychological, and situational mechanisms and processes, Level L represents structures and Level L1 represents behaviours and actions. While Fajkowska's approach and the resulting model are within the tradition of trait psychology rather than the Freudian psychodynamic perspective or motivational psychology, her theory supports the idea that there is an underlying level of human personality which influences traits.

Reisenzein and Weber (2009) argue that most "systems of personality descriptors include a sub-set that refer directly or indirectly to emotions" (p. 54) and that an affective-motivational system is the core of the mind. The leading theory of emotion generation nowadays is the appraisal theory of emotion (Scherer, 2001) which proposes that emotions arise when a motive is or is not fulfilled (Reisenzein and Weber, 2009).

There are various approaches to identifying what underlies motivation, of which content theory and goal theory are among the most widely used in Human Resource Management (HRM).

Content theory includes Maslow's (1954) famous hierarchy of needs (including physiology, safety, social/love, self-esteem, and self-actualisation), Deci (1971) and Ryan's Self-Determination Theory (SDT) stating that humans are motivated by three intrinsic motives namely competence, relatedness and autonomy, McClelland's (1978) need theory postulating that all human beings share a need for affiliation, power, and achievement in differing degrees, and Reiss and Havercamp's (1998) 16-basic-desires theory, among others.

Goal theory proposes "that all actions are given meaning, direction, and purpose by the goals that individuals seek out, and that the quality and intensity of behaviour will change as these goals change "(Covington, 2000, p. 174). However, one commonality content and goal theorists share, is the assumption that the goals a person sets are derived from more fundamental basic desires which embody the source of human motivation (Brunstein et al., 1998, Reiss, 2000).

#### **2.2.3.1. Fundamental Motives**

The study of human desires, end goals or fundamental motives reaches as far back as Aristotle in 330 BC (Aristotle, 330/1953) who defined motivation as the search for one end. While there may be seemingly many positive effects that derive from an action, Aristotle proposed that "if there is more than one (end), the most final one is what we will be seeking" (Aristotle, 300/1953,

p. 9). This means that while there are seemingly hundreds of motivators for people's actions and behaviour in general, they can all be broken down to a limited number of final goals or human desires that drive actions and thus act as intrinsic motives. If analysed, a person's behaviour may show an array of "instrumental motives" (Reiss 2004) which can be broken down to reveal the person's end goal. For example, a student may study diligently to achieve high grades (instrumental motive), aim for high grades to secure a scholarship (instrumental motive), and desire the scholarship to help take care of his family (end goal: family motive). In this scenario, the behaviour chain demonstrates three actions, with two motivated by instrumental goals and the third driven by an end goal. It is important to note that only goals that are desired for their inherent value can serve as the ultimate purposeful explanation for a series of human actions. "A motivational analysis of many actions may reveal chains of instrumental behaviour, but eventually there must be an intrinsically reinforcing stimulus (a non-instrumental goal) at the end of each chain" (Reiss and Havercamp, 1998, p. 97).

According to Reiss and Havercamp (1998) and Reiss (2004), the number of instrumental motives is unlimited while the number of end goals is limited by human nature. Since an essential concern for psychology is the identification of reasons for human behaviour, the identification and classification of end purposes should be at the centre of behavioural psychology, according to Reiss (2004).

While Aristotle identified 12 end motives, McDougall (1926) recognised 20 primary instincts and emotions. With the further development of psychodynamic psychology, Murray (1938) formulated a list of 20

psychological needs based on McDougall's findings, while Maslow (1943) in turn put forward a theory of human motivation, which entails 5 sets of human motives as discussed earlier. One of the 13 conclusions from his studies Maslow proposes to be definite, is the claim that "there are usually available various cultural paths to the same goal. Therefore conscious, specific, local-cultural desires are not as fundamental in motivation theory as the more basic, unconscious goals" (Maslow, 1943, p. 370).

Similarly, McClelland differentiates between implicit and explicit motives in his need theory (1963, 1978, 1989) proposes that all human beings are motivated by the so-called "Big Three" motives of achievement, power, and affiliation to differing degrees.

Reiss' 16-basic-desires theory, however, does not differentiate between implicit and explicit motives. Instead, it posits that true end goals or basic desires are at least partially genetically determined and therefore unconscious, while the ways in which individuals choose to satisfy these motives are shaped through cultural influences and personal experiences.

Reiss and Havercamp (1998) highlight the connection of fundamental motives to various survival implications. Their research draws comparisons between these motives and those observed in animal behaviour (refer to Table 6).

Motive Name	Motive	Animal Behavior	Intrinsic Feeling
Power	Desire to influence (including leadership; related to mastery)	Dominant animal eats more food	Efficacy
Curiosity	Desire for knowledge	Animal learns to find food more efficiently and learns to avoid prey	Wonder
Independence	Desire to be autonomous	Motivates animal to leave nest, searching for food over larger area	Freedom
Status	Desire for social standing (including desire for attention)	Attention in nest leads to better feedings	Self-importance
Social Contact	Desire for peer companionship (desire to play)	Safety in numbers for animals in wild	Fun
Vengeance	Desire to get even (including desire to compete, win)	Animal fights when threatened	Vindication
Honor	Desire to obey a traditional moral code	Animal runs back to herd when stared at by prey	Loyalty
Idealism	Desire to improve society (including altruism, justice)	Unclear: Do animals show true altruism?	Compassion

Physical Exercise	Desire to exercise muscles	Strong animals eat more and are less vulnerable to prey	Vitality
Romance	Desire for sex (including courting)	Reproduction essential for species survival	Lust
Family	Desire to raise own children	Protection of young facilitates survival	Love
Order	Desire to organize (including desire for ritual)	Cleanliness rituals promote health	Stability
Eating	Desire to eat	Nutrition essential for survival	Satiation (avoidance of hunger)
Acceptance	Desire for approval	Unclear: animal self-concept?	Self-confidence
Tranquility	Desire to avoid anxiety, fear	Animal runs away from danger	Safe, relaxed
Saving	Desire to collect, value of frugality	Animal hoards food and other materials	Ownership

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*Table 6: Reiss's 16 Motives, Reiss 2004, p. 187*

### 2.2.3.2. Traits vs. Motives

When examining personality theory and distinguishing between traits and motives, it is crucial to consider the underlying reasons that drive behaviour. While traits refer to habitual patterns of behaviour, human motives explore the fundamental motivations that prompt people to act in specific ways

(McAdams and Olson, 2010; Winter et al., 1998). Traits capture stable characteristics and tendencies, such as introversion or conscientiousness, which describe how individuals typically behave. In contrast, motives shed light on the deeper psychological needs, desires, and goals that influence why individuals engage in certain behaviours. Understanding both traits and motives is essential for comprehensively examining and explaining human behaviour and motivations.

Human motives are defined as an individual's capacity to experience a specific type of stimulus, incentive, or activity as pleasurable and refer to stable differences in classes of goals and desires from which people derive pleasure and satisfaction (McClelland et al., 1989; Schultheiss and Brunstein, 2010; Slabbinck and van Witteloostuijn, 2020). Personality traits ignore why individuals exhibit certain behaviours while human motives are concerned with understanding individual goals and reasons for behaviours (Döhrendahl et al., 2021; Lang et al., 2012; Winter et al., 1998).

Importantly, while a large number of studies have explored personality and innovative work behaviour, there is still a big gap when it comes to exploring intrinsic motives and how they relate to innovation and innovative work behaviour in particular. Especially the more fine-grained approach via the multi-faceted end motives is close to non-existent. The following section will show which personality aspects have been found to be related to innovativeness and creativity in research so far and what associations can be made to the fundamental motives.

#### **2.2.4. Personality Drivers for Innovation**

Research into the role of personality in entrepreneurship and innovation studies has regained popularity in the last 2 decades (e.g. Antoncic et al., 2015; Imran, 2019; Rossberger, 2014). Consequently, there is a large number of empirical studies that connect personality to entrepreneurship, creativity, innovation outcomes, and innovative work behaviour. Most of these studies, however, have primarily focused on linking personality to traits, overlooking the role of fundamental motives as a distinct aspect of personality. While traits are observable patterns of behaviour, they do not provide insight into the underlying motivations for that behaviour (Bilsky and Schwartz, 1994; Döhrendahl et al., 2021).

Understanding the underlying motivations provides a more comprehensive and accurate understanding of personality and can significantly aid in predicting behaviour. However, current research has not established a direct connection between the 16 end or fundamental goals proposed by Steven Reiss and further validated by Döhrendahl, Greiff, and Niepel (2021) and innovation or entrepreneurship. In order to assess the personality drivers that have been found to influence innovation and its related aspects, it is necessary to examine the existing literature connecting traits based on the Five-Factor Model (FFM) and intrinsic motivation based on the Big Three to Innovativeness. This analysis in the following subsections will shed light on the potential relationship between these established constructs and the fundamental motives proposed by Reiss. By exploring these connections, we can gain valuable insights into the factors that drive innovation and how they may align with fundamental motives.

#### 2.2.4.1. Open-Mindedness and Innovativeness

Various recent studies using measures based on the FFM have shown a strong connection between Openness to Experience (or “Open-Mindedness” in the BFI-2) and different aspects of creativity and innovation.

In a study exploring consumer innovation success, which involved responses from 547 German consumers, Stock, von Hippel and Gillert (2016) find their hypothesis that Openness to Experience positively affects idea generation supported. They further found that an increase in Openness to Experience increased idea generation by 51%. As idea generation is generally seen as a factor of Innovative Work Behaviour (Scott and Bruce, 1994; de Jong and Den Hartog, 2010), these findings support the assumption that Open-Mindedness positively affects IWB.

Similar findings are reported by Hsieh, Hsieh, and Wang (2011), who, in a study with 506 knowledge workers in Taiwan’s biotech companies, found that Openness to Experience has a significantly positive effect on innovation capability. In a study comparing national personality profiles using profiles from 33 countries from six different continents, Rossberger (2014) found a correlation between Open Mindedness and national innovativeness. Imran (2019) further found a positive correlation between Openness to Experience and individual innovativeness in a study with 613 students, and Antoncic, Kregar, Singh, and DeNoble (2015) found support for their hypothesis that Openness positively influences entrepreneurship in a study with 533 potential, and experienced entrepreneurs. While entrepreneurship is not the same as innovation, the two concepts are often interlinked (e.g. Drucker,

2014; Link et al., 2007; Tidd and Bessant, 2021) and many innovation management studies refer to people who display innovative behaviour in companies as “intrapreneurs” (e.g. Antoncic and Hisrich, 2001; Ibrahim, 2016).

Although many researchers consider Openness to Experience as the personality trait most often connected to innovation (Imran, 2019), there are some studies that do not support that notion. Woods, Mustafa, Anderson, and Sayer (2018) conducted a study that measured the personality traits of graduate management trainees using the Big Five self-report scale and their Innovative Work Behaviour by having their respective line managers fill out Janssen’s (2001) IWB scale. They found that, surprisingly, Openness to Experience was not found to be related to IWB as a whole or to any of its dimensions.

The mixed findings regarding the connection between open-mindedness and Innovativeness suggest that personality traits alone may not be sufficient in explaining innovative behaviour. Instead, it is crucial to consider the underlying level of personality, specifically the fundamental motives that drive individuals. Notably, research has indicated that *Curiosity* exhibits the strongest correlation with the open-mindedness factor (Döhrendahl et al., 2021).

This finding suggests that *Curiosity* may serve as the underlying motive driving the positive effects on innovation, rather than encompassing all aspects of the trait itself. It is plausible to argue that *Curiosity* serves as the underlying driving force behind the positive correlation between open-

mindedness and innovativeness, as it fuels the desire for exploration, learning, and acquiring new knowledge. Therefore, the mixed findings in the literature may be attributed to the fact that other motives associated with open-mindedness, which are less strongly correlated, could be influencing the negative observed outcomes. By considering the fundamental motive of *Curiosity* as a driver of innovativeness in individuals, a better understanding may be gained of what drives innovativeness in individuals.

#### **2.2.4.2. Conscientiousness and Innovativeness**

Conscientiousness generally showed mixed results in its relation to innovation in various studies. A small number of studies find Conscientiousness to have a positive effect on individual innovativeness (Imran, 2019), innovative behaviour (Zuraik, Kelly and Dyck, 2020), and innovation performance (Hsieh et al., 2011).

While many studies find no relationship between Conscientiousness and innovative work behaviour (Woods et al., 2018), creativity (Chen and Chen, 2012), and entrepreneurship (Antoncic et al., 2015), Stock et al. (2016) find mixed results in their study on consumer innovation. Their research showed a negative correlation between Conscientiousness and idea generation but a strong positive correlation between Conscientiousness and prototyping.

These mixed findings further support the argument that examining the level of traits alone may not provide a complete understanding of the relationship between Conscientiousness and innovativeness. When considering the fundamental motives proposed by Döhrendahl et al. (2021), it becomes

evident that the underlying motive of *Structure* strongly correlates with Conscientiousness ( $r = 0.65, p < 0.01$ ). This finding suggests that in studies where a negative correlation between Conscientiousness and innovativeness was observed, it is likely that the underlying motive of *Structure* played a significant role. On the other hand, in studies where no connection was found, it is plausible to assume that individuals who scored high on other motives associated with Conscientiousness influenced the outcomes. By examining the interplay between fundamental motives and innovativeness, a more nuanced understanding can be achieved, shedding light on the underlying individual drivers for innovative behaviours.

#### **2.2.4.3. Agreeableness and Innovativeness**

Similarly mixed results can be found in research trying to link Agreeableness to innovation and entrepreneurship. While some studies have shown a negative relationship between agreeableness and entrepreneurship, others have found no significant correlation.

Antoncic et al. (2015) conducted a study in Slovenia where they used multinomial logistic regression to test hypotheses regarding the relationship between agreeableness and entrepreneurship. The study involved 546 individuals who were interviewed face-to-face. The results indicated a negative relationship between agreeableness and entrepreneurship, suggesting that entrepreneurs may be less agreeable than non-entrepreneurs. While these findings were in line with the general assumption postulated previously that a low level of agreeableness was indicative of an

“entrepreneurial profile” (Schmitt-Rodermund, 2004; Schröder et al., 2007), a number of other studies have shown no correlation or even significantly positive relationships between agreeableness and entrepreneurship and innovativeness.

For instance, Obschonika et al. (2012) conducted a survey of 488 participants, which included German scientists, to examine the relationship between Agreeableness and entrepreneurial innovation, including idea generation and idea championing and found no significant relationship.

The findings of Rossberger’s (2014) study even indicated a positive relationship between Agreeableness and innovativeness. Rossberger's study involved 8,435 Big Five personality profiles from 33 nations. The study found that two of the Big Five dimensions, namely Agreeableness and Openness to Experience, were positively linked to innovation-supportive national cultural practices. These practices included high future orientation, performance orientation, uncertainty avoidance, and low in-group collectivism.

Overall, the mixed results on the correlation between agreeableness and entrepreneurship and innovativeness suggest that the relationship is complex and may be influenced by a range of factors, which may be underlying the traits.

In their comprehensive study, Döhrendahl et al. (2021) compared the Spearman rank correlations between the 16 fundamental motives and the Big Five traits. Their findings shed light on the relationship between Agreeableness and these fundamental motives. They discovered significant

small to medium-sized relationships between Agreeableness and seven fundamental motives.

Of particular relevance to the present thesis are the motives of *Dominance* and *Social Participation*, which are hypothesised to influence Innovative Work Behaviour. Döhrendahl et al. (2021) found that both motives exhibited small negative and small positive associations with the Agreeableness traits, respectively. The potential connection of these motives to innovativeness will be further explored in sections 3.1.2. and 3.1.5. of this thesis.

These mixed results present in the current state of literature underscore the notion that personality traits alone may not sufficiently explain innovative behaviours. By considering the underlying fundamental motives, we can gain a deeper understanding of the intricate dynamics at play. This highlights the importance of examining motivations in addition to traits when investigating innovativeness, as the interplay between the two may hold key insights into the mechanisms driving innovative behaviour.

#### **2.2.4.4. Extraversion and Innovativeness**

While Extraversion is not commonly regarded as a trait directly linked to innovation in theory, empirical studies have repeatedly demonstrated a significant correlation between the two. Antoncic et al. (2015), confirm a positive correlation between Extraversion and entrepreneurship. Similarly, Nguyen, Nguyen, and Nguyen (2023) report a positive direct and indirect relationship between Extraversion and entrepreneurs' innovativeness in their study with 2,574 SMEs from Vietnam and Hsieh et al. (2011) found a

significant connection between Extraversion and innovation performance. These findings support the notion that extraverted individuals probably display higher IWB. However, in their research with 534 engineers and other functional employees, Alam et al. (2020) found no direct connection between extraversion and intrapreneurship.

Regarding the fundamental motives, Döhrendahl et al. (2021) revealed eleven significant correlation coefficients for Extraversion, representing small to medium-sized effects. Notably, the largest correlation coefficient was observed with *Social Participation* ( $r = 0.47, p < 0.01$ ), followed by *Dominance* ( $r = 0.32, p < 0.01$ ). Furthermore, a significant negative correlation emerged for *Safety*. In the context of this thesis, the motives of *Dominance*, *Social Participation*, and *Safety* hold particular importance, as they are hypothesised to have a direct positive or negative influence on Innovative Work Behaviour, respectively, as will be discussed in chapter three.

The predominantly positive results found in most studies concerning the relationship between extraversion and innovativeness suggest that the fundamental motives of *Dominance* and *Social Participation* may serve as positive predictors of Innovative Work Behaviour (IWB). Additionally, it is worth noting that *Safety*, as a fundamental motive, may have a negative predictive relationship with IWB.

In the study by Alam et al. (2020) where no direct connection between extraversion and intrapreneurship was found, it is plausible that the higher number of participants with extraversion scores influenced by other underlying motives obscured the relationship. These underlying motives may

have different implications for innovative behaviour and could have masked the direct association between extraversion and entrepreneurship in that particular study.

By considering the influence of fundamental motives such as *Dominance*, *Social Participation*, and *Safety*, we can gain valuable insights into the underlying motivational factors that shape the link between extraversion and innovativeness. This approach allows for a more nuanced understanding of the complexities involved in predicting innovative behaviour and highlights the importance of investigating underlying motives, and their impact on innovative outcomes.

#### **2.2.4.5. Neuroticism and Innovativeness**

While theory (e.g., Imran, 2019; Rothmann and Coetzer, 2003; Stock et al., 2016) generally assumes that Neuroticism (the opposite of emotional stability on the FFM scale) has a negative effect on innovation and entrepreneurship, recent empirical research has yielded mixed results. Some studies support this notion, such as Nguyen, Nguyen, and Nguyen's (2023) research, which found Neuroticism to have a significantly negative indirect effect on technological improvement and new technology adoption, or Imran's (2019) study, which found Neuroticism to have a negative effect on individual innovativeness. However, Antoncic et al. (2015) found no correlation between Neuroticism and entrepreneurship.

In the context of fundamental motives, the spearman rank correlation analysis conducted by Döhrendahl et al. (2021) revealed that Neuroticism had very

small correlations with the fundamental motives, with only a small negative correlation to curiosity being potentially relevant to this study. However, it is important to once again note that motives operate at a different level of personality, serving as drivers for individuals to achieve their goals. Therefore, it is plausible that these motives may not have a significant influence on the manifestation of Neuroticism, which in essence describes negative emotionality (Döhrendahl et al., 2021).

The mixed results obtained thus far indicate a lack of compelling evidence supporting a general correlation between the Big Five traits and innovation. There are several possible explanations for these mixed findings. Firstly, the rather coarse-grained approach of the Big Five framework might contribute to variations in the observed relationships. The limited scope of the Big Five traits may overlook other relevant personality dimensions that could better capture the complexity of innovative behaviour. Secondly, it is plausible that the level of personality that exerts a more significant influence on creativity and innovative performance is motivation rather than personality traits. This viewpoint aligns with Amabile and Pratt's (2016) model, which highlights intrinsic motivation as a pivotal factor in fostering creativity. By recognising the central role of motivation as a key driver of innovative behaviour, a more comprehensive understanding of the underlying factors contributing to creativity and innovation can be achieved. The following subsection will explore the current state of literature regarding motivation and its relationship to innovativeness and creativity.

#### 2.2.4.6. Motivation and Innovativeness

The evidence provided by Hammond et al. (2011) lends further support to the notion that innovativeness is influenced more by motivational factors at the personality level rather than traits. Through a comprehensive meta-analysis of 80 studies, they found a correlation between different factors and innovative performance, with their results indicating that motivation exhibited stronger associations with individual innovation compared to traits. Fischer, Malycha and Schafmann (2019), conducted a study with 90 knowledge workers in Germany, Austria and Switzerland which explored the effect of synergistic extrinsic motivators and intrinsic motivation on creativity and innovation. According to their findings “intrinsic motivation demonstrated the highest significant beta values of all measures and a strong effect size of  $d = 0.42$ ” (p. 8). Their study was, however, conducted using Amabile’s (1994) WPI measure of intrinsic motivation, which is based on a different theory than the multi-faceted nature of motives or end goals as proposed by Steven Reiss (2004). It, therefore, measures how much a person is motivated rather than by which end goal.

Another big study with 2,385 respondents testing the influence intrinsic motivation and need satisfaction (based on Self-Determination Theory) have on IWB was conducted by Klæijssen, Vermeulen and Martens (2018). Their model confirmed that basic psychological need satisfaction was positively related to intrinsic motivation and IWB. However, it is worth noting that they encountered challenges in replicating the proposed three separate psychological needs of autonomy, competence, and relatedness within the framework of Self-Determination Theory.

Some research has been done connecting the explicit and implicit Big Three motives Power, Achievement and Affiliation (McClelland, 1978, 1989) with innovativeness yielding in similar results. In their experimental study using both questionnaires and a simulation in a laboratory with 193 undergraduate students from a US university, Schoen (2015) found the implicit achievement motive to be associated with creative problem-solving.

In a meta-study comparing 41 studies on the achievement motive and various aspects of entrepreneurship, Collins, Hanges, and Locke (2004) found achievement motivation to be significantly related to the choice of an entrepreneurial career and entrepreneurial performance. Similarly, Stewart and Roth's meta-study analysis from 2007 comprising 17 studies that compared the achievement motivation of entrepreneurs and managers indicated that the requirements of the entrepreneurial position align well with individuals who possess high levels of achievement motivation.

To date, the studies exploring the relationship between motivation and innovation have primarily examined whether motivated individuals are more likely to display innovative behaviour, rather than investigating which specific motives drive innovativeness. Similarly, when motives have been considered as a level of personality and their influence on innovation has been explored, the focus has been predominantly on the Big Three motives. However, this narrow perspective limits the understanding of the complex interplay between motives and innovative work behaviour. Hence, adopting a more nuanced framework that encompasses a wider array of motives is crucial to gain a more comprehensive understanding of the intricate dynamics between personality, motivation, and innovativeness.

This call for a more fine-grained approach aligns with the viewpoints of various researchers who have highlighted the potential limitations of using only five general traits to encompass a wide range of behaviours, as is the case with innovativeness and entrepreneurship (Postigo et al., 2021).

To gain more robust and comprehensive insights into the correlation between personality, motivation, and innovative work behaviour, further research is warranted. Specifically, investigating the theory of the 16 basic desires as a more detailed and nuanced approach may unveil more stable outcomes and deeper understandings in this domain.

### **2.3. Organisational Climate**

As employees do not operate as single entities, but rather as part of organisations, it is important to look at organisational climate as a contributing factor in the interplay between personality and innovative work behaviour. This section aims to provide valuable insights into the existing literature on organisational climate, distinguishing it from organisational culture. Furthermore, the following sections investigate approaches employed to measure climate, with specific attention given to the theoretical foundations of the Organisational Climate Framework and its associated dimensions. Finally, this section concludes by examining the current state of research concerning the climate dimensions that have been identified as influential factors in fostering innovative work behaviour.

### **2.3.1. Organisational Climate vs. Culture**

Organisational culture and climate are terms that are often used interchangeably but are in fact two distinct constructs. Although both concepts describe the way employees understand their work environment, both the approach to studying the concepts and the dimensions explored differ fundamentally. Culture has been defined as the accumulated shared learning of a group which is considered valid and therefore taught as the correct way to perceive, think, feel, and behave. It is a “pattern or system of beliefs, values, and behavioural norms that come to be taken for granted as basic assumption and eventually drop out of awareness” (Schein and Schein, 2017, p. 6).

The study of culture has its roots in anthropology and sociology describing the difference in values and behaviour between groups, tribes, nations, and organisations, in different stages of their life. These differences are usually studied using qualitative methods and observation (Schneider and Barbera, 2014).

The study of (organisational) climate has its roots in psychology. As early as 1939, Lewin, Lippitt and White introduced the concept of “social climate” as a psychological state which emerges out of the reactions of people to the social context of work (Schneider and Barbera, 2014). A student of Lewin’s, Douglas McGregor took the notion of social climate and applied it to organisations as early as 1944 and introduced the term “managerial climate”. In 1958, Chris Argyris contributed to the foundation of organisational climate studies by “conceptualising the multiple levels of organisational climate in firms”

(Schneider and Barbera, 2014, p. 4). The first ever widely used survey measure for organisational climate was developed in 1968 by Litwin and Stringer and formed the basis for the measurement of organisational climate. The quantitative approach to measuring organisational climate is one of the aspects that distinguish climate from culture. As climate is seen as a psychological construct, it has been measured on the individual level using surveys and referred to as “psychological climate” (James and Jones, 1974). The perceptions taken from individual accounts show how individuals cognitively assess their work environments. Most empirical studies in later research have moved from the psychological climate to an assessment of the organisational climate by using an aggregate unit of analysis (Schneider, Bowen, Ehrhart, and Holcombe, 2000). The climates of teams, departments, and organisations “have been operationally constructed by aggregating individual scores to the appropriate level and using the mean to represent climate at that level” (Patterson et al., 2005, p. 380). Using an aggregate unit of analysis offers a great advantage for the research in this thesis. As organisational climate will be investigated as a mediator of the relationship between individual intrinsic motives and innovative work behaviour, collecting surveys from individuals and analysing them as a unit, is likely to offer deeper insights. Moreover, it facilitates the comparison of organisational climates across various participating companies, allowing for an analysis of whether factors such as company age or industry exert any influence.

### 2.3.2. Organisational Climate Framework

Litwin and Stringer formed the basis for the development of organisational climate measures in 1968 and introduced nine climate dimensions: structure, individual responsibility, rewards, risk and risk-taking, warmth, support, standards, tolerance/conflict, and identity. In the same year, Schneider and Bartlett (1968) developed a measure with six dimensions of climate: managerial support, managerial structure, concern for new employees, intra-agency conflict, agent independence, and general satisfaction. Over the years, different researchers created measures including different limited climate dimensions, from risk orientation (Lawler, Hall, and Oldham, 1974), open-mindedness (Payne and Mansfield, 1978), to centrality (Joyce & Slocum, 1979), service quality (Schneider, Parkington, and Buxton, 1980) and equity (James, 1982) among others.

This initial premise, that work environments could be expressed and analysed by a limited number of climate dimensions, led to “confusion and slow theoretical progress” (Patterson et al, 2005, p. 381). A partial resolution of this issue was introduced by Schneider (1975) in a paper that proposed a focus of measures on a climate *for* something, such as climate for performance, climate for innovation, or climate for job satisfaction. Schneider suggested measuring climate for a specific outcome rather than measuring climate as a generic experience as general measures would contain irrelevant dimensions for the study of specific phenomena. This outcome-specific approach to climate has brought about the development of several specific dimensions of climate such as organisational climate for service (Schneider, 1990), trust (Huff and Kelley, 2003) and innovation (Anderson

and West, 1998; Isaksen, Lauer, and Ekvall, 1999; West, 1990) among others.

Both the comprehensive and specific approaches offer benefits when studying organisational climate. While the comprehensive approach allows for a deeper insight into organisational functioning in general, the domain-specific approach provides a more precise and focused view, which offers more detailed information that can be used to help organisations improve aspects of their organisational outcomes, such as innovation output.

The link between organisational climate and organisational outputs has been made in various theories and shown in an array of empirical studies. For example, in a study with 580 employees of pharmacies in Australia, Fenwick, Avery and Bergsteiger (2011) found that organisational climate directly relates to staff turnover, financial performance, and staff and customer satisfaction. Patterson, Warr and West (2004) conducted a wide-scale study with 4,503 employees from 39 industrial companies in the UK and found a significant association between organisational climate and job satisfaction, company productivity, and profitability. Organisational climate has further been found to show positive associations with employee performance (Brown and Leigh, 1996; Day and Bedeian, 1991), unethical behaviour (Kuenzi, Mayer, and Greenbaum, 2020), and service quality (Schneider, 1980; Schneider et al., 1980; Schneider, White, and Paul, 1998) among others.

The significance of organisational climate in influencing outcomes and behaviour has been widely acknowledged in the literature. However, there is a lack of consensus and synergy regarding the selection of dimensions that

accurately represent the overall climate, as well as those necessary to predict outcomes or mediate relationships between variables. Numerous studies examining organisational climates exhibit substantial variations in the measurement approaches employed, often utilising instruments that lack validation or failing to specify the level of analysis being conducted. Over the years, this has resulted in limited theoretical advancements in the field, despite numerous empirical studies examining different aspects of organisational climate. As a result, researchers in recent years (e.g., Ahmad, Jasimuddin, and Kee, 2018; Chernyak-Hai and Tziner, 2014; Yoo, Huang, and Lee, 2012) have continued to utilise Litwin and Stringer's (1968) Organisational Climate Questionnaire (LSOCQ) in their surveys. Despite its wide use, many researchers have raised considerable doubts about the validity of the measure. Two studies, one by Sims & LaFollette in 1975 and an extension of this study conducted in 1976 by Muchinsky, when replicating the study by Litwin and Stringer in an attempt to validate the instrument, both found the same four scales of the questionnaire (responsibility, risk, standards, and conflict) to “have reliabilities below an acceptable level” (Muchinsky, 1976, p. 377). Similarly, Rogers, Miles, and Biggs (1980) compared four-factor analytic studies of the questionnaire to assess the measurement's factor structure on an inter-organisational level. They also compared separate factor analytic results on an intra-organisational level. While they found moderately higher replicability factors when the questionnaire was administered intra-organisationally, both comparisons indicated low levels of validity.

A lack of validity for instruments used to measure culture and climate is not uncommon. Reasons for the inconsistency in reliability include little validity information (Ashkanasy et al., 2000), little or no confirmatory studies, and a lack of theoretical grounding (Patterson et al., 2005).

The competing values framework, developed in a series of articles and studies by Quinn and colleagues (e.g., Quinn and McGrath, 1985; Quinn and Rohrbaugh, 1981, 1983), is a theoretical model that has been extensively tested in various empirical studies and across different national cultures. It has been confirmed as valid by multiple researchers (e.g., Kalliath, Bluedorn and Gillespie, 1999; Kwan and Walker, 2004; Lamond, 2003). It organises the culture and effectiveness of organisations along the dimensions 'control versus flexibility' and 'external versus internal' creating four quadrants. Each quadrant of the framework represents a major model of organisation and management theory and organisational psychology:

1. **The Human Relations Model** is internally focused and emphasises flexibility. It is oriented towards the well-being, commitment and growth of employees and focuses on human resources, personnel development, and morale. Typical values of the Human Resource Model include teamwork, participation, and attention to employee concerns.
2. **The Open Systems Model** is externally focused and emphasises flexibility. It is concerned with the adaptation of the organisation to changes and growth through resource acquisition, external networks, and innovation in response to changing market demands. Typical

values of the Open System Model include creativity, decentralisation, and adaptation.

3. **The Rational Goal Model** is externally focused but defined by organisational control. It emphasises the importance of planning, productivity and goal achievement reflecting a rational economic model. Values of the Rational Goal Model include outcome excellence, performance, and achievement.
4. **The Internal Process Model** is internally focused and defined by organisational control. It emphasises formalisation and internal control in order to make the best use of resources. The Internal Process Model stresses the role of communication, information and knowledge management in an organisation and control. It values consolidation and continuity, predictability, stability, and order.

This model is described by Quinn (1988) as showing “competing values” because it seems to carry opposing criteria. However, Quinn proposes that an organisation should not be predominantly in one quadrant but needs to be active in and place value on all quadrants. For organisational effectiveness, it is necessary to nurture a balance between the dimensions. Taking this model as a basis for measuring climate, it is possible to nurture different quadrants for different departments and teams depending on the desired outcomes.

### 2.3.3. Dimensions of Organisational Climate

Taking the competing values framework as a theoretical foundation, Patterson et al. (2005) went on to generate climate dimensions within the four domains of the competing values model. They researched dimensions on climate which were most frequently used in research between 1960 and 2000 that fit into the competing values model. Through psychometric analyses as well as debates and conceptual analyses among the authors, Patterson et al. (2005) defined the following dimensions of climate within the Competing Values Framework

1. **The Human Resource Model** is very people centric. Its internal focus is expressed through values associated with trust, belonging, support, and cooperation. The flexible orientation of this model is connected to autonomy and empowerment, often achieved through decentralisation and human resource development measures. Climate dimensions found for the Human Resource Model include (Patterson et al., 2005, p. 385-386):
  - *employee welfare*—the extent to which the organisation values and cares for employees
  - *autonomy*—designing jobs in ways which give employees wide scope to enact work
  - *participation*—employees have considerable influence over decision-making

- *communication*— free sharing of information throughout the organisation
- *emphasis on training*—a concern with developing employee skills
- *integration*—the extent of interdepartmental trust and cooperation
- *supervisory support*—the extent to which employees experience support and understanding from their immediate supervisor

2. **The Open Systems Model** is focused on change and adaptation. Its external focus is expressed through an outward focus towards market changes and customer needs while its flexible orientation finds its expression in values associated with creativity, adaptation, innovation, and growth. Climate dimensions found to express this model include (Patterson et al., 2005, p. 386):

- *flexibility*—an orientation toward change
- *innovation*—the extent of encouragement and support for new ideas and innovative approaches
- *outward focus*—the extent to which the organisation is responsive to the needs of the customer and the marketplace in general
- *reflexivity*—a concern with reviewing and reflecting upon objectives, strategies, and work processes, in order to adapt to the wider environment

3. **The Rational Goal Model** is focused on productivity and control. Its external focus is visible in the emphasis on its competitive position in the market, improvement of performance, quality, and market shares.

The orientation towards control in this model is connected to efficiency, productivity, and performance, often achieved through centralisation and integration of processes (Lamond, 2003) as well as goal fulfilment and performance feedback. Climate dimensions of the Rational Goal Model include (Patterson et al., 2005, p. 386):

- *clarity of organisational goals*—a concern with clearly defining the goals of the organisation
- *effort*—how hard people in organisations work towards achieving goals
- *efficiency*—the degree of importance placed on employee efficiency and productivity at work
- *quality*—the emphasis given to quality procedures
- *pressure to produce*—the extent of pressure for employees to meet targets
- *performance feedback*—the measurement and feedback of job performance

4. **The Internal Process Model** emphasises its internal orientation with a focus on organisational stability and predictability, minimising or ignoring environmental uncertainties. The orientation towards control is exhibited in formal rules and procedures. Climate dimensions of the Internal Process Model include (Patterson et al., 2005, p. 386):

- *formalisation*—a concern with formal rules and procedures

- *tradition*—the extent to which established ways of doing things are valued

The challenge posed when choosing to work with a broad framework is selecting the most applicable scales for the research in question. It is crucial to establish a solid theoretical foundation that guides the decision-making process for choosing the appropriate scales. This theoretical framework helps determine which dimensions and aspects of organisational climate are best suited to address the research questions at hand.

Moving forward, the subsequent section will provide an overview of the current state of research on climate and its impact on innovative work behaviour. This literature review will serve as the theoretical underpinning for the dimensions that this study will focus on. In the hypotheses development chapter of this thesis, a more detailed explanation will be provided regarding the specific dimensions chosen and their expected influence on innovative work behaviour.

#### **2.3.4. Organisational Climate and Innovative Work Behaviour**

The key to creating an organisation which strengthens Innovative Work Behaviour (IWB) in individuals lies, as discussed in the previous sections, in the successful creation of a climate that empowers and motivates employees to engage in IWB. However, as climate is the cognitive interpretation of a person's work environment and organisational climate, in turn, is the

aggregative of these impressions within one team, department, or company, it is important to examine organisational climate not only in connection with innovation and innovative work behaviour but also take into consideration the level of the individual. To do this, it is crucial to look at the relationship between multi-faceted intrinsic motivation and innovative work behaviour and the effect organisational climate has on this relationship rather than on innovation alone.

The theory of multi-faceted motivation proposes the idea that basic desires or fundamental motives are “at least partially genetically determined” (Haverkamp and Reiss, 2003, p. 124). They further suggest that “the manner people choose to satisfy these motives is learned through culture and experience” (p. 124). Likewise, the interpretation of culture, which leads to an individual’s impression of climate, differs depending on the dominant intrinsic motives underlying an individual’s personality. For this reason, it is imperative to look at both the aggregated organisational climate as well as the psychological climate that is perceived by teams or even by single individuals and how these impressions differ depending on their end motives. It is further important to explore how national cultural contexts may influence the way an organisational culture is perceived and lived and thus how it translates into climate.

#### **2.3.4.1. Climate of Innovation and Flexibility and IWB**

When examining the Competing Values Framework, a closer look at the Open System Model reveals its potential as an indicator of Organisational Climate

for Innovation (OCI). The Open System Model encompasses key values such as creativity, decentralisation, and adaptation, which have been consistently identified as core factors in empirical studies defining OCI (Alpkan et al., 2010; Bysted and Jespersen, 2014; Gundry et al., 2016; Scott and Bruce, 1994).

Within the Open System Model, two specific dimensions, namely Innovation and Flexibility and Reflexivity, as defined by Patterson et al. (2005) in their Organisational Climate Measure (OCM), hold particular relevance. Although these dimensions may be labelled differently and measured using various approaches in different studies, they consistently emerge in research exploring the relationship between climate and innovation.

This understanding forms the theoretical underpinning for selecting the dimensions of Organisational Climate for Innovation that will be investigated in more detail in the subsequent section on hypotheses development.

The Innovation and Flexibility dimension includes aspects such as adaptability to change, support for creativity and readiness for new ideas and market changes. These ideas can be found in various studies exploring the connection between climate and innovation.

Based on the evidence from the literature, it is clear that flexibility within the context of organisational climate for innovation plays a crucial role in fostering employees' innovative behaviour. Flexibility can be defined as the organisational willingness to embrace and experiment with innovative ideas, creating a climate that encourages openness to change and new approaches.

Theoretical connections between an innovative and flexible climate and Innovative Work Behaviour (IWB) have been explored in several studies. Scott and Bruce (1994) found that perceiving an innovative and flexible climate within an organisation had a positive, albeit weak, direct effect on IWB. Similarly, Abbey and Dickson in 1983 found that only two of the ten climate measures tested in their research correlated to innovative performance among R&D units: performance rewards and flexibility.

Empirical research further supports the significance of Organisational Climate for Innovation (OCI) as a moderating variable. Afsar and Umrani (2019) conducted a study with 117 supervisors and 349 employees in Pakistan, using the innovation scale developed by Scott and Bruce (1994). Their findings revealed that OCI, as measured by the scale, plays a significant role in moderating the relationship between transformational leadership and IWB. In other words, the perception of an innovative and flexible climate within the organisation can enhance the impact of transformational leadership on employees' innovative behaviour.

In summary, the evidence suggests that an organisational climate characterised by openness to change, experimentation, and new ideas significantly influences employees' level of innovative behaviour. By fostering an innovative and flexible climate, organisations can stimulate and encourage employees to contribute their innovative ideas and initiatives. This understanding emphasises the importance of cultivating a supportive organisational climate for innovation to enhance innovative work behaviour.

#### 2.3.4.2. Climate of Tradition and Formalisation and IWB

The aspects of innovation and flexibility, as theorised by Scott and Bruce (1994), are further complemented by considering the presence of a climate characterised by tradition and formalisation. Items such as "In this organisation, we tend to stick to tried and true ways" or "This place seems to be more concerned with the status quo than with change" capture the essence of this climate dimension. These items align closely with what Quinn (1988) outlined as the "Internal Process Model" of the Competing Values Framework.

While the climate dimensions of tradition and formalisation may appear to be contrary to innovation and flexibility, it is important to explore the effect of this variable on the individual-level relationship between specific fundamental motives and Innovative Work Behaviour (IWB). It is plausible that the relationship between certain fundamental motives, such as a need for *Structure*, and IWB may be influenced or mediated by the presence of a high level of tradition and/or formalisation within a company.

Understanding the interplay between tradition, formalisation, fundamental motives, and IWB can provide valuable insights into how organisational climate influences employee behaviour. It allows for a more nuanced understanding of the factors that either hinder or support innovative work behaviour. By examining the potential mediating effect of tradition and formalisation on the relationship between specific fundamental motives and

IWB, this study seeks to shed light on the complex dynamics within organisational climates and their impact on employee innovation.

The findings can provide guidance for organisations seeking to create an environment that fosters innovation, considering both the dimensions of innovation and flexibility as well as tradition and formalisation.

#### **2.3.4.3. Climate of Autonomy and IWB**

In a comprehensive study conducted by Bysted and Jespersen (2014), involving a large sample of 8,310 employees from both the private and public sectors in Denmark, Sweden, and Norway, the relationship between autonomy, innovation trust, and IWB was examined. The findings of their study revealed a strong positive correlation between autonomy and IWB. This aligns with the results of other empirical studies such as those conducted by De Spiegelaere (2014), Fernandez and Moldogaziev (2013), and Ramamoorthy et al. (2005), which have also highlighted the significant influence of autonomy on IWB.

The influence of autonomy on IWB has been extensively discussed in sections 2.1.3.2 and 2.1.3.3, emphasising its crucial role as a direct factor in facilitating innovative work behaviour. The strong correlation consistently found across empirical studies underscores the importance of autonomy in fostering an environment conducive to innovation.

The presence of autonomy, however, is likely to not only directly influence IWB but may also act as a mediator between employees' fundamental motives and innovative work behaviour. The mechanisms that may lead to

mediating effects of autonomy will be discussed in more detail in section 3.2.1. and its subsections.

#### **2.3.4.4. Climate of Reflexivity and IWB**

In Bysted and Jespersen's (2014) study, the aspect of innovation trust was influenced by the work of Clegg et al. (2002) and centred around the exchange and acceptance of ideas among colleagues. This emphasis on trust in the context of innovation aligns with the findings of Gundry et al. (2016), who conducted a study involving 249 employees from Europe and the USA. They demonstrated that collaborative communication and trust had a positive and significant relationship, with trust being positively associated with innovation.

A key dimension related to collaborative communication and trust is reflexivity, which refers to the extent to which individuals and teams engage in critical self-reflection and examination of their own work processes, assumptions, and practices. While reflexivity and communication are distinct climate dimensions, there is a strong argument for including reflexivity when studying OCI.

The study by Patterson et al. (2005) provides evidence for the inclusion of reflexivity as a climate measure. They found that "Reflexivity" was significantly associated with researchers' ratings of innovativeness in products, technology, and work organisation. These findings highlight the importance of fostering a climate that encourages individuals to engage in

reflective thinking and self-evaluation, as it contributes to increased innovativeness in various domains.

By including reflexivity as a climate measure, this study aims to capture the extent to which individuals and teams engage in critical self-reflection and examine their own work processes, assumptions, and practices. This dimension provides valuable insights into the organisational climate's ability to foster an environment that supports innovation and promotes the generation of novel ideas. Furthermore, the inclusion of reflexivity, as a mediator, adds depth to the study by examining the cognitive processes and self-awareness necessary for generating innovative solutions and challenging the status quo and how these are triggered by the different fundamental motives, as will be discussed in more detail in the next chapter.

The call for a more individual and multi-faceted approach which includes the aspect of intrinsic motivation when studying the relationship between organisational climate and IWB is not only visible based on this literature review but was also made by Shanker et al. (2017). While their study significantly supported a positive relationship between OCI and IWB, they state that an examination of a direct relationship between OCI and IWB as done in most studies to date might be too limited. Shanker et al. (2017) call for research that is more multi-faceted in nature and includes other variables such as employee engagement or intrinsic motivation.

Building upon the need for a comprehensive investigation into the interplay between fundamental motives, organisational climate, and innovative work behaviour, the next chapter will show the process of the development of

hypotheses. It will provide a detailed explanation of how the hypotheses were derived, drawing from the theoretical foundations discussed thus far and incorporating the insights gained from the examination of existing research on climate and innovative work behaviour. By outlining the hypotheses, the subsequent chapter will pave the way for empirical testing and further exploration of the intricate relationships between fundamental motives, organisational climate, and employees' innovative work behaviour

## Chapter Three: Conceptual Framework and Hypotheses Development

Despite the complexity of the concepts and the theories of innovation, personality, and organisational climate they underpin, as discussed in the previous chapter, most research to date has taken a rather simple approach to connecting the levels of the individual and the organisation to innovativeness. By concentrating on the direct impacts of personality and climate on innovativeness, both in general and specifically in Innovative Work Behaviour (IWB), previous studies may not have adequately captured the complex interplay between personality, climate, and innovativeness. Thus, the analysis of immediate associations might not have fully diagnosed the intricate dynamics of these factors. Further, the sole focus on either personality traits or intrinsic motivation in many studies provides a rather narrow approach that does not account for the complexity of the issue at hand just as can be seen from the inconclusive results presented in the literature review. Previous research has primarily focused on examining personality traits, neglecting the significance of fundamental motives as an essential component of personality. While traits represent observable behavioural patterns, they fail to provide insights into the underlying motivations driving those behaviours (Bilsky and Schwartz, 1994; Döhrendahl et al., 2021). Understanding these underlying motivations offers a more comprehensive and accurate understanding of personality and enhances the ability to predict behaviour. This gap in the literature, which has been acknowledged by other researchers as well (Shanker et al., 2017), highlights the need for a more

individualised and multi-faceted approach that incorporates intrinsic motivation when investigating the relationship between organisational climate and innovative work behaviour. This thesis aims to close this gap and create a more comprehensive model which connects multi-faceted fundamental motives and Innovative Work Behaviour and depicts how Organisational Climate mediates these individual relationships.

This chapter provides the conceptual framework required for the development of hypotheses and the presentation of a model that reflects the variables under investigation. Firstly, the hypotheses development will showcase the fundamental motives and their hypothesised direct effect on Innovative Work Behaviour (IWB). Following that, the direct effect of selected organisational climate variables on IWB will be examined. Subsequently, the hypothesised mediating effects of the organisational climate items on the relationship between the fundamental motives and IWB will be explored. Lastly, the model depicting these variables and relationships, which will be tested at a later stage, will be presented. By undertaking these steps, valuable insights into the factors driving innovation efforts in the German private sector can be uncovered.

### **3.1. Influence of End Motives on Innovative Work Behaviour**

No research has been conducted to date linking end motives to Innovative Work Behaviour (IWB). However, there are existing studies that examine how personality traits can impact innovativeness at various levels (Ali, 2019;

Eastman et al., 2001; Rossberger, 2014). Additionally, some research has explored the connection between intrinsic motivation, as defined by the Big Three, and different facets of innovation or entrepreneurial endeavours (Collins, Hanges, and Locke, 2004; Demaree et al., 2009; Stewart and Roth, 2007).

The results from the current state of research as well as mechanisms underlying the different fundamental motives will be used to form hypotheses on the direct effect of fundamental motives on IWB and presented in the following subsections.

### **3.1.1. Curiosity and IWB**

The motive construct *Curiosity*<sup>7</sup> is defined by Dörendahl, Greiff, and Niepel (2021) as “interest in increasing one’s knowledge, gaining perceptions, and seeking intellectual challenges” (p.3). Many people who score high on the motive *Curiosity* report a need to encounter intellectual challenges in the workplace and in their personal lives and are easily bored with routines (e.g. Litman and Schuler, 2012; Murray, 1938; Mussel, 2013; Reiss, 2004, 2008, Reiss and Haverkamp, 1998).

*Curiosity* is likely to play a crucial role in facilitating innovation and entrepreneurial behaviour. For instance, Baron (2007) has connected the

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<sup>7</sup> It is important to stress that the psychological motive constructs (e.g. *Curiosity*, *Safety* etc.) differ from the common use of the terms. In the scope of this thesis the terms will, therefore, be capitalised and written in italics when referring to the motives.

active search for and alertness to opportunities as significant behavioural and cognitive factors in entrepreneurship and innovation. Individuals with a curious disposition are naturally inclined to actively seek out novel possibilities and remain open to diverse ideas and perspectives. This heightened alertness to opportunities increases their likelihood of recognising potential avenues for innovation within their work environment.

Moreover, Janssen and Yperen (2004) emphasise that innovative work behaviour necessitates the development of new knowledge and strategies. Curious individuals, with their inherent thirst for knowledge and intellectual challenges, are more likely to engage in the continuous acquisition of new knowledge. This acquisition process enables them to broaden their understanding and explore alternative approaches, thereby enhancing their ability to develop innovative strategies to tackle complex problems.

Creativity and originality are at the core of all innovation studies and are usually linked to the first stages of IWB: idea exploration and idea generation (de Jong and den Hartog, 2010; Probst, Romhardt, and Raub, 2000). Idea exploration involves a drive to improve existing products and processes, while idea generation calls for thinking of original ways to solve problems. Curious individuals, with their inclination towards intellectual challenges and novelty, are more likely to engage in these early stages of innovation. Their insatiable curiosity prompts them to actively explore and generate ideas that go beyond conventional thinking, resulting in the production of novel and creative solutions.

Additionally, Kanter (1988) speaks of "kaleidoscopic thinking," which further supports the idea that curiosity has a positive effect on innovative work behaviour. This mode of thinking involves continuously reimagining and recombining different elements and perspectives to create innovative outcomes. *Curiosity* serves as a catalyst, encouraging individuals to engage in this kaleidoscopic thinking process, which fosters the generation of unique and inventive ideas.

Taking all these aspects into consideration the first hypothesis is proposed:

H1: A high level of *Curiosity* motivation has a positive effect on Innovative Work Behaviour.

### **3.1.2. Dominance and IWB**

Innovations often occur simultaneously in competing organisations, where being the first to launch a new product or service can provide a significant market advantage. The ability to make fast decisions, possess organisational goal orientation and demonstrate action orientation are crucial aspects of the innovation process. Personality research consistently shows a correlation between an employee's proactive attitude and their tendency to exhibit innovative behaviour. Parker (1998) discovered that individuals with a proactive personality actively participate in organisational improvement initiatives, and this association is both positive and significant. Similarly, Seibert et al.'s (2001) study found that proactive employees were perceived

as more innovative by their leaders, and research by Kim et al. (2009) demonstrated a positive effect of proactive personalities on idea generation.

The concept of proactive personality, first introduced by Bateman and Crant in 1993, has gained increased attention in recent years. It refers to individuals who are not easily influenced by external factors and actively work to shape their surroundings. They identify opportunities and take action to bring about change, displaying determination and perseverance until meaningful progress is made (Crant, 2000). Campbell (2000) further defined the traits that constitute a proactive personality by analysing various research models from the contingency model, the Leader-Member-Exchange (LMX), and other literature streams. The proactive personality is characterised by task and job competency with high problem-solving skills, interpersonal effectiveness, organisational goal orientation, initiative and engagement, and personal integrity.

Similarly, individuals motivated by *Dominance* are driven by a desire to have an impact on others and influence people and processes (Döhrendahl et al., 2021). They are inclined to make fast decisions, solve problems, and demonstrate persistence in convincing others of their ideas and plans. These characteristics align with the crucial aspects of Innovative Work Behaviour (de Jong and Den Hartog, 2010). The *Dominance* motive can be seen as a proactive personality aspect that drives individuals to take initiative, be assertive, and exhibit influential behaviours within their work context.

The proactive and assertive nature of individuals with a higher drive for *Dominance* enables them to identify and capitalise on opportunities more

effectively. They are likely to take charge of situations, seek out challenges, and assert their ideas and proposals to drive innovation within their teams and organisations. By actively engaging with their surroundings and influencing others, individuals with a higher drive for *Dominance* are more likely to foster a work environment that supports and encourages innovative thinking and behaviour.

Moreover, the *Dominance* motive has been found to exhibit a strong coefficient correlation with explicit motives such as Achievement and Power, as identified by Döhrendahl et al. (2021). These motives, in turn, have been found to predict creative problem-solving (Schoen, 2015; Sternberg and Lubart, 1993), entrepreneurial activity (Collins et al., 2004; Pang, 2010), and creativity in general (Fodor, 2000). This suggests that individuals with a higher drive for *Dominance* possess the motivation and determination to overcome challenges, drive change, and generate innovative ideas and solutions. The proactive and assertive nature of individuals with a higher drive for *Dominance*, enables them to identify and seize opportunities, take charge of situations, and assert their ideas and proposals.

Based on these underlying mechanisms, the following hypothesis is proposed:

H2: A high level of *Dominance* motivation has a positive effect on Innovative Work Behaviour.

### 3.1.3. Safety and IWB

Innovation endeavours require high investments in both time and effort for all stages of innovative work behaviour. There is no certainty that an idea, even if championed well internally and externally, will reach the implementation stage and even if it does, nobody knows if the innovation will be a success. This makes innovations “high-risk endeavours” (Montani et al., 2014). The fundamental motive *Safety* is defined by Döhrendahl et al. (2021) as “being concerned with having a peaceful and secure life” (p.3). People who have a high level of *Safety* motivation usually report a high sensitivity to potential risks and dangers. Their own assessment of situations is often shaped by a sense of caution rather than opportunity and a need for stability and security. Bommer and Jalajas (1999) found that the willingness to take risks is directly linked to an individual's tendency to innovate, while fear has the opposite effect. This idea is supported by Ryan and Deci (2000) who found that employees are often hesitant to initiate new ideas when they are afraid of failure. Similarly, Afzal, Masur, and Manni (2018) found fear of failure to have a strong negative effect on entrepreneurial capabilities. Together, these studies suggest that individuals who are more willing to take risks tend to be more innovative, while fear can inhibit the development of new ideas.

Based on these findings, the following hypothesis is proposed:

H3: A high level of *Safety* motivation has a negative effect on Innovative Work Behaviour.

### 3.1.4. Structure and IWB

The process of innovation also necessitates a high degree of flexibility. Finding and implementing new solutions, whether it be new products and services for the market or changes to organisational processes, goes beyond the routine demands of daily business. IWB is characterised by its dynamic nature, requiring individuals to be able to adapt quickly to the regular and frequent changes and issues that arise (Bilal et al., 2019; De Jong and Den Hartog, 2010). Particularly, in this time and age, when technological advances in artificial intelligence are driving the speed of innovation to unimaginable heights, adaptability to these changes is an essential part of innovativeness. Since the innovation process centres around uncertainty and ambiguity, structured and standardised processes and routine tasks can hinder quick responses to changes in the market, while flexibility can enhance the exploration of new options and foster Innovative Work Behaviour (Georgsdottir and Getz, 2004; Montani, 2004). Flexibility within the organisation has been shown to predict innovative outcomes (Patterson et al., 2005), but the flexibility of individuals has also been the subject of studies trying to connect the cognitive and psychological aspects of flexibility to problem-solving, creativity, and innovation in some studies (Georgsdottir and Getz, 2004). However, flexibility does not have one but multiple definitions and is approached from various angles. From cognitive aspects such as adaptive and spontaneous flexibility to personality traits such as the Big Five factors of openness and low conscientiousness, the results when trying to predict innovativeness have been as varied as the different approaches that were taken (e.g. Feist, 1998; Gal, 2019; Gough, 1995; Imran, 2019; Stock et

al., 2016; Woods, Mustafa, Anderson and Sayer, 2018; Zuckerman and Kuhlman, 2000). One reason for these mixed results may be that the approach to personality, once again, is too narrow with only five factors and that the level of motivation may, with its deeper insights into the emotional reasons why individuals tend to behave a certain way, provide a better explanation and prediction of innovative behaviour.

The fundamental motive *Structure* reflects a strong drive to create and operate in an environment that is organised, predictable, and consistent (Döhrendahl et al., 2021; Reiss, 2004). Individuals with a high level of *Structure* motivation often prioritise planning, finding drive in detail, and adhering to established order and routines. While these characteristics are valuable in certain contexts where stability and efficiency are paramount, they may hinder the exploration and adaptability required for innovative work.

Innovation thrives in an environment that embraces uncertainty, ambiguity, and the willingness to take risks. However, individuals with a strong drive for *Structure* may feel uncomfortable with such dynamic and unpredictable situations. Their preference for order and planning can lead to resistance to change and an aversion to deviating from established processes and routines. As a result, their focus tends to be on maintaining stability and adhering strictly to predetermined structures, which may limit their ability to explore new ideas, challenge existing norms, and engage in innovative problem-solving.

Furthermore, a high level of *Structure* motivation may lead to a reluctance to take risks and experiment with unconventional approaches. The emphasis on

order and consistency can create a preference for predictable outcomes, discouraging individuals from venturing into unfamiliar territory. This aversion to risk and the unknown may stifle creativity and limit the willingness to explore uncharted paths, ultimately hindering the generation of innovative ideas and the pursuit of novel solutions.

Individuals driven by a strong need for *Structure* may struggle to embrace the flexibility, adaptability, and risk-taking inherent in the innovation process, ultimately resulting in a lower level of engagement in innovative work.

Considering these factors, it is hypothesised that:

H4: A high level of *Structure* motivation has a negative effect on Innovative Work Behaviour.

### **3.1.5. Social Participation and IWB**

Although new ideas often emerge from individuals' creative efforts, it is usually teams that turn ideas into innovations (Dodgson et al., 2014). People with high intrinsic motivation for *Social Participation* enjoy numerous social contacts and encounters (Brandstätter et al., 2013; Kämper, Döhrendahl and Greiff, 2017; Murray, 1938; Neel et al., 2015; Reiss, 2004, 2008; Reiss and Havercamp, 1998; Sokolowski and Heckhausen, 2010).

The stage of idea championing in IWB includes finding support within and outside the organisation, which helps secure funding for the implementation stage. It has further been suggested (Kanter, 1988; Kimberly and Evanisko, 1981; Perry-Smith and Shelly, 2003) that individuals with frequent contacts

outside the organisation may be more likely to engage in innovative behaviours because they have access to a variety of different ideas and perspectives that can inspire creativity (de Jong and Den Hartog, 2010). The notion of networks being a crucial factor for idea exploration and idea generation is supported by various studies (e.g. Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014). Burt (2004) demonstrated that a connection across social groups fosters individual creativity and innovation, while an empirical study by Björk and Magnusson (2009) illustrated the impact of network structures on ideation performance.

Individuals with a high level of *Social Participation* motivation exhibit a strong inclination towards engaging in social interactions and fostering connections with others (Brandstätter et al., 2013; Kämper, Döhrendahl and Greiff, 2017; Murray, 1938; Neel et al., 2015; Reiss, 2004, 2008; Reiss and Haverkamp, 1998; Sokolowski and Heckhausen, 2010). This intrinsic motivation drives them to actively seek out social contacts and encounters, which plays a crucial role in the process of innovative work behaviour (IWB).

In the stage of idea championing within IWB, individuals with high *Social Participation* motivation are more likely to leverage their extensive social networks, both within and outside the organisation. These networks provide them with a diverse range of perspectives, ideas, and resources that can inspire creativity and innovation (Kanter, 1988; Kimberly and Evanisko, 1981; Perry-Smith and Shelly, 2003;). By actively seeking support and collaboration from their social contacts, individuals with a strong motivation for social participation can secure the necessary resources and funding for implementing their innovative ideas.

Furthermore, the notion of networks as critical factors for idea exploration and generation is supported by empirical studies (Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014). These studies highlight the importance of network structures in facilitating the exchange of knowledge, sharing of diverse perspectives, and cross-pollination of ideas, all of which contribute to the generation of innovative solutions. The connections individuals establish across different social groups foster individual creativity and innovation (Burt, 2004), and the presence of robust network structures positively influences ideation performance (Björk and Magnusson, 2009).

Considering these underlying mechanisms, the hypothesis can be formulated as follows:

H5: A high level of *Social Participation* has a positive effect on Innovative Work Behaviour.

In addition to individual motivational factors, the organisational climate plays a crucial role in shaping employees' behaviours and outcomes. Understanding how organisational climate variables directly influence innovative work behaviour (IWB) is essential for comprehending the broader context within which motivation operates. Therefore, the next section will discuss the hypothesis development regarding the impact of organisational climate variables on IWB. Furthermore, the subsequent section will explore the potential mediating effect of organisational climate on the relationship between fundamental motives and IWB, shedding light on how the

organisational context interacts with individual motivations to shape innovative behaviours.

### **3.2. Organisational Climate as a Mediating Factor**

Corporate cultures and their resulting climates have been popular topics among management scholars and practitioners since the 1980s, with many studies showing their importance for innovation success. Companies known for their ability to create and commercialise new technologies often have unique cultures, such as Apple's focus on working towards a greater goal, 3M's emphasis on science, and Google's celebration of individuality and freedom. However, other companies with seemingly dissimilar cultures, such as SAS's focus on family and Toyota's production mentality, have also achieved innovation success (Büschgens, Bausch, and Balkin, 2013). Organisations have been trying to develop routines which help create an organisational culture oriented towards creativity and innovation for a long time (Leonard and Swap, 1999). Many of those routines have been researched and shown to foster innovation, yet others, have led to varying results, sometimes supporting innovation and other times hindering it (McLean, 2005). One possible explanation for these mixed results may lie in the fact that seemingly similar organisational cultures may still lead to opposing organisational climates. Corporate culture encompasses the routines, rules, and official values within an organisation, whereas the climate is defined by the employees' psychological perception of the values lived, the satisfaction of colleagues, and norms seen in daily business. The important

component that differentiates culture from climate is the psychology of the individual. So, while organisational climate plays a crucial role in shaping attitudes and behaviours, it is also shaped by the motives of individuals. To gain a deeper understanding of the relationship between organisational climate, intrinsic motivation, and innovative work behaviour, it is crucial to test for both direct and mediating effects. By examining the direct effects as well as mediating effects of organisational climate on the relationship between intrinsic motivation and innovative work behaviour, we can gain a more comprehensive understanding of the role of organisational climate in shaping attitudes and behaviours related to innovation. Based on the literature that will be presented in the following subsections, five variables have been identified to be tested as mediators in this thesis, representing different aspects of organisational climate.

### **3.2.1. Autonomy and IWB**

Autonomy is one of the very few climate dimensions that was included in most measures from the very beginnings of climate research (Campbell, Dunnette, Lawler, and Weick, 1970; James and James, 1989; James and McIntyre, 1996; James and Sells, 1981) to the more comprehensive Organisational Climate Measure by Patterson et al. (2005). But not only is autonomy part of a large body of theoretical work on organisational climate, but it is also the most frequently researched climate variable in connection to innovativeness. A climate of autonomy describes an environment in which employees feel they are trusted by their supervisors to make their own decisions and are not

tightly controlled in what they do and how they create their job roles. This climate provides individuals with a sense of empowerment and freedom, allowing them to exercise their creativity and explore new ideas without constant oversight or micromanagement. When employees have the autonomy to make decisions and take ownership of their work, they feel a higher level of responsibility and motivation to contribute their innovative ideas (Deci et al., 1989). One mechanism through which a high level of autonomy climate promotes innovative work behaviour is by fostering intrinsic motivation. In an autonomous environment, employees are more likely to experience a sense of meaningfulness and self-determination in their work. This sense of autonomy taps into their innate drive to seek challenges, engage in problem-solving, and explore new possibilities. When individuals feel empowered and trusted to make decisions, their intrinsic motivation is heightened, leading to a greater willingness to take risks, experiment with new approaches, and generate innovative solutions (Amabile et al., 1996; Deci et al., 1989). McLean et al. (2014) conclude that “an environment of freedom and autonomy is more likely to tap into the intrinsic motivation of its employees, which has been a key factor in promoting creativity in organisations.” (p. 237)

Literature suggests that autonomy is a key factor that impacts employee innovativeness. A great number of studies has established a positive correlation between autonomy and creativity, IWB, and other aspects that play an important role in the innovation process (De Jong and Kemp, 2003; De Spiegelare et al., 2014; Ramamoorthy et al., 2005; Sönmez and Yıldırım, 2019). Amabile et al. (1996) have identified autonomy for employees

to find their own ways of achieving goals as one of the six indicators of a high-creativity climate. In a study conducted with 399 middle managers from German organisations of different sizes, Krause (2004) identified that granting employees autonomy and freedom was the most influential factor in supporting idea generation and testing of ideas. A climate of autonomy provides individuals with the freedom to express their unique perspectives and exercise their creativity. When employees are not constrained by rigid guidelines or excessive control, they are more likely to think independently and offer diverse viewpoints. This diversity of ideas and perspectives fuels creativity and innovation within the organisation. Employees feel encouraged to think outside the box, challenge conventional thinking, and propose novel solutions that can drive organisational growth and competitiveness. When employees have the freedom to explore and experiment, they are more likely to engage in knowledge-sharing, seek feedback, and learn from both successes and failures. This continuous learning process enhances individuals' problem-solving skills, adaptability, and resilience, enabling them to approach challenges with a creative and innovative mindset.

Based on these mechanisms, the following hypothesis is proposed:

H6: A high level of autonomy has a positive effect on Innovative Work Behaviour.

### 3.2.1.1. Mediating Effect of Autonomy on Curiosity and IWB

Although autonomy has been an integral part of organisational and HR management research since the early 1970s, there has been a growing interest in the effect autonomy has on various aspects and behavioural outcomes more recently. Research has shown that autonomy in the workplace is becoming increasingly important, particularly in knowledge-based organisations. Studies have found that when employees have more discretion in their work, it leads to better performance and innovation. This is particularly true for knowledge workers, who have been found to perform better when they have more autonomy (Theurer et al., 2018). Autonomy in the workplace is crucial to innovation, as it allows employees to explore different ways of working, and experiment with new methods and has been shown to predict positive attitudes and behaviours at work (Dhar, 2016; Theurer et al., 2018).

It enables individuals to take ownership of their tasks, explore alternative approaches, and engage in creative problem-solving. While previous research has predominantly focused on the direct relationship between autonomy and innovative work behaviour (IWB), it is essential to explore the mediating role of autonomy between *Curiosity* motivation and IWB.

Individuals motivated by *Curiosity* are driven by the desire to improve and to gain a deeper understanding of things. They often express a desire for intellectual challenges in both their professional and personal lives and may find routine tasks unfulfilling (Litman and Schuler, 2012; Murray, 1938; Mussel, 2013; Reiss, 2004, 2008; Reiss and Haverkamp, 1998). According

to research by Swaroop and Dixit (2018), the level of autonomy that employees have in their work tasks and decisions can play a critical role in their engagement in complex and challenging tasks. In organisations with a higher number of employees motivated by *Curiosity*, there is an inherent drive to question the status quo, explore new possibilities, and challenge existing norms. These curious individuals exhibit a proactive attitude toward their work, actively seeking autonomy to explore their interests, experiment with ideas, and engage in innovative behaviours (Theurer et al., 2018).

The crucial link lies in the fact that *Curiosity*-motivated individuals are more likely to proactively seek autonomy within the organisation. Their inherent drive for exploration and intellectual stimulation pushes them to strive for greater independence, flexibility, and decision-making authority. These individuals actively seek out opportunities to exercise their autonomy, as it aligns with their innate curiosity-driven tendencies.

In turn, organisations with a higher proportion of curiosity-motivated employees are more inclined to foster a climate of autonomy. They recognise the value of allowing individuals to have control over their work processes, as it nurtures curiosity and creates an environment conducive to innovation. Such organisations acknowledge that granting autonomy provides a platform for curious individuals to fully leverage their intellectual capabilities, embrace challenges, and unleash their creative potential (Theurer et al., 2018).

Therefore, autonomy is likely to be a mediating mechanism between the fundamental motive *Curiosity* and IWB. *Curiosity* motivation leads individuals to actively seek autonomy, and in turn, the presence of autonomy in the

organisational climate empowers curious individuals to engage in innovative work behaviours. It is likely that the dynamic interplay between *Curiosity* and autonomy drives the translation of *Curiosity* into tangible outcomes, fostering innovation within the organisation.

Based on these propositions, the following hypothesis is proposed:

H7: Autonomy mediates the relationship between *Curiosity* motivation and innovative work behaviour.

#### **3.2.1.2. Mediating Effect of Autonomy on Dominance and IWB**

As was discussed in more detail in section 3.1.2., both proactive behaviour and the explicit motives of achievement and power, which are related to the fundamental motive *Dominance* (Döhrendahl et al., 2021), have been found to positively affect entrepreneurial behaviour, creativity, and other general innovative behaviours. Giving proactive employees the room to innovate is considered essential to achieve novel ideas. To drive innovation, employees need to come up with ideas independently, without external pressure (Park and Sung, 2018; Zhang et al., 2012). Individuals with high *Dominance* motivation are driven by the need to exert influence and take decisions, both in processes and with people. A work environment characterised by autonomy often also has free information flow, and transparency, and gives employees the opportunity to participate in decision-making processes (Patterson et al., 2005). It is further, as discussed in section 2.1.3.3., directly connected to managerial and psychological empowerment. Both forms of

empowerment were shown to have a direct effect on innovative work behaviours (Alisher et al., 2019; Bin Saeed et al., 2019; Javed et al., 2019; Knol and van Linge, 2009; Luoh, Tsaur, and Tang, 2014). It is worth mentioning that employees who seek to assume greater responsibilities and challenges have a positive view of managerial empowerment, according to Stryker and Burke (2000). Thus, individuals who score high on the end motive *Dominance* might not only exhibit higher levels of Innovative Work Behaviour (IWB) directly but may also be more receptive to leadership that fosters autonomy and empowerment and their own drive for higher autonomy and empowerment, in turn, may lead to a climate of autonomy.

Based on these premises, the hypothesis is proposed:

H8: Autonomy mediates the relationship between *Dominance* and IWB.

### **3.2.1.3. Mediating Effect of Autonomy on Safety and IWB**

People who are driven by the end motive *Safety* often exhibit heightened awareness of potential dangers and risks (Döhrendahl et al., 2021; Reiss, 2004). This often leads to a more cautious outlook when it comes to new situations and challenges and their need for stability often leads to behaviours characterised by caution and risk avoidance rather than a pursuit of opportunities. Previous research has shown that fear-motivated and risk-averse individuals are less likely to engage in entrepreneurial and innovative behaviours (Afzal, Masur, and Manni, 2018; Bommer and Jalajas, 1999; Ryan and Deci, 2000). Similarly, Döhrendahl et al. (2021) showed that people

motivated by *Safety* are less likely to engage in freelance work because it lacks the security employment typically provides.

Individuals who are motivated by taking challenges and score low on the *Safety* motive are likely to show a need to work autonomously (McClelland et al., 1989). Consequently, individuals motivated by *Safety* may be more hesitant to embrace autonomy as they may prefer a more structured and predictable work environment and avoid opportunities that could lead to uncertainty and challenge.

Based on these considerations, the following prediction is made:

H9: Autonomy mediates the relationship between *Safety* and IWB.

#### **3.2.1.4. Mediating Effect of Autonomy on Social Participation and IWB**

De Jong and den Hartog (2010) noted that external relationships and social networks play a pivotal role in promoting Innovative Work Behaviour (IWB). High levels of the end motive *Social Participation* often drive individuals to seek a broad range of connections within and outside the workplace. But as discussed previously, the direct effects of motives on IWB can only explain a part of a notion as complex as Innovative Work Behaviour.

A climate of autonomy allows employees to make their own decisions and create their job roles to their liking. In an autonomous organisational environment that encourages transparency and open communication, the input and inspiration drawn from external contacts are more likely to align with

the organisation's needs. This type of environment may also foster cross-functional collaboration, contributing to the promotion of open innovation within the organisation (Leonard and Swap, 1999) and with it develop opportunities for people motivated by *Social Participation* to satisfy that fundamental motive. Moreover, studies by Farfán et al. (2020) have indicated that a high level of extraversion facilitates the relationship between job autonomy, motivation, and performance, suggesting that individuals who are more inclined to engage in social interactions may particularly benefit from autonomy in the workplace. Given the above considerations, the following hypothesis is put forth.

H10: Autonomy mediates the relationship between *Social Participation* and IWB.

### **3.2.2. Reflexivity and IWB**

Reflexivity as a variable of organisational climate involves a continuous process of monitoring and critically examining goals and current processes in order to achieve better results. It constitutes the employees' perception that there is a culture of regular meetings and exchange directed at questioning the company's current approaches, which in turn is supposed to lead to higher self-awareness and enhance the learning process in companies (Farnese, Fida, and Livi, 2016; Oh and Lee, 2022; Patterson et al., 2005; Patterson, Warr, and West, 2004). Reflexivity has been found to lead to new shared meanings and a better understanding of the need for change and help

organisations be more adaptive by encouraging individuals to constantly reflect and improve their practices (Farnese, Fida, and Livi, 2016; West and Sacramento, 2006).

Importantly, the elements encompassed within reflexivity are closely aligned with the dimensions of Innovative Work Behaviour (IWB). The continuous process of monitoring and critically examining goals and current processes reflects the dimension of idea generation within IWB, as employees engage in reflective thinking to identify areas for improvement and novel approaches. The culture of regular meetings and exchange aimed at questioning the company's current approaches represents the dimension of idea creation, as it involves collaborative discussions and knowledge sharing to bring about meaningful changes. Through reflexivity, employees develop higher self-awareness, which aligns with the dimension of idea championing, as they become more proactive in promoting and advocating for innovative ideas within the organisation. Furthermore, the emphasis on enhancing the learning process and fostering adaptive practices resonates with the dimension of idea implementation, as reflexivity encourages individuals to constantly reflect, learn, and improve their practices to achieve better outcomes. By incorporating these elements, reflexivity contributes to creating an organisational climate that supports and nurtures Innovative Work Behaviour. To assess the predictive validity of reflexivity climate and its impact on innovativeness, Patterson et al. (2005) undertook a comprehensive study using a large sample of 6,869 respondents from 55 manufacturing companies throughout the UK. A year after conducting the study on the companies' organisational climates, the managing directors, or heads of production at

each participating company, respectively, were asked to complete a survey on their organisation's innovativeness. A high level of reflexivity climate was found to positively predict organisations' innovativeness in products, technology, and work organisation.

Another extensive study conducted in the UK in the public sector, using data from 1,156 national healthcare service workers also demonstrated a direct effect of team reflexivity on both performance and team innovativeness (Schippers, West and Dawson, 2012).

Similarly, in their study of 357 employees working in the Italian private sector, Farnese, Fida, and Livi (2016) found that reflexivity positively affected the organisations' innovation outcomes.

Taking the big body of literature on the influence of reflexivity on innovativeness into consideration, the following hypothesis is put forth:

H11: A high level of reflexivity has a positive effect on Innovative Work Behaviour.

#### **3.2.2.1. Mediating Effect of Reflexivity on Structure and IWB**

People motivated by *Structure* strive to plan, organise, and bring order into their work and lives. While the *Structure* motive itself is hypothesised to have a negative direct effect on Innovative Work Behaviour in this thesis, the dynamics of that relationship may change when mediated by an organisational climate of reflexivity. Holding regular meetings to discuss goals

and reflect on potential changes can provide a structured framework to help employees motivated by *Structure* engage in Innovative Work Behaviour.

In this study, it is proposed that an organisation with a significant number of *Structure*-motivated employees is likely to experience an increase in meetings that specifically address procedures, plans, and processes. These meetings offer valuable opportunities for structured dialogue and contribute to the cultivation of a heightened climate of reflexivity within the organisation. This climate of reflexivity, in turn, is hypothesised to act as a mediating variable between the organisational structure and the manifestation of Innovative Work Behaviour.

A very intriguing effect of reflexivity on innovativeness was found by Farnese, Fida, and Livi (2016). While they found both flexibility and reflexivity to have direct positive effects on innovativeness in organisations, they also determined that “reflexivity becomes a relevant protective factor in promoting innovation when the structure is not very flexible” (Farnese, Fida, and Livi, 2016, p. 414). This indicates that when there is a high level of structure in a company, whether it’s due to the industry it operates in, formalisation, or by having a high number of *Structure*-motivated employees, reflexivity may help mediate this relationship through a generative learning process.

Based on these findings, the following hypothesis is proposed:

H12: Reflexivity mediates the relationship between *Structure* and IWB.

### 3.2.2.2. Mediating Effect of Reflexivity on Social Participation and IWB

Networks are an important factor in fostering innovation because they provide access to a range of diverse perspectives, knowledge, and resources. Connections made within and outside of the organisation can facilitate the exchange of ideas, and problem-solving, and provide opportunities for collaboration and co-creation. Additionally, they can serve as a source of social support and encouragement, which can be crucial for individuals and organisations seeking to pursue innovative endeavours. Research has consistently demonstrated a positive relationship between network diversity and innovation (Burt, 1992; Pittaway et al., 2004) and it is essential for organisations and individuals to actively cultivate and maintain connections in order to foster a culture of innovation. According to Döhrendahl et al. (2021) and Reiss (2004), *Social Participation* motivates individuals who have a deep internal drive to take part in social interactions. These individuals are stimulated by the desire to connect with others and have numerous social experiences. It is, therefore, valid to assume that companies with a high number of *Social Participation* motivated employees would have a climate of more reflexivity which in turn would lead to higher knowledge exchange and thus higher innovativeness. Based on these findings, the hypothesis is proposed:

H13: Reflexivity mediates the relationship between *Social Participation* and IWB.

### 3.2.3. Formalisation and IWB

One of the most fascinating stories of growth and innovation has recently been told in the book “No Rules Rules” (2020) by Netflix CEO Reed Hastings and business professor Erin Meyer. They give fascinating insights into how the tech company underwent a significant transformation, evolving from a fledgling DVD-by-mail service to a highly acclaimed entertainment giant with over 200 million subscribers in 190 countries through the implementation of unique management techniques that cultivate employee empowerment and drive innovation. As the title of the book suggests, one of the key elements of this transformation was the company’s attitude towards formal procedures, rules, and decision-making processes. They have attributed their rise in innovation efforts to eliminating approval processes and coaching employees to avoid taking decisions just to appease their superiors (McCord, 2014). But not only practice cases such as that of Netflix or Spotify (Mankins and Garton, 2017) argue for a climate of autonomy and low formalisation; research has also shown that excessive bureaucracy and strict regulations hinder employee autonomy and creativity, leading to a detrimental impact on innovation efforts. In a quantitative study with 342 employees from the Turkish banking industry, Nayir, Tamm, and Durmusoglu (2014) found a direct negative effect of organisational formalisation on innovative behaviour. Similarly, a case study using mixed methods was carried out at a Brazilian branch of a global company known for its innovativeness and the interviews with 39 managers revealed that they considered avoiding excessive formalisation and bureaucracy key aspects to create a climate of innovation

and stimulate their employees' IWB (Gaspary, Moura, and Wegner, 2020).

The following hypothesis is suggested as a result of these findings:

H14: A high level of formalisation has a negative effect on Innovative Work Behaviour.

#### **3.2.3.1. Mediating Effect of Formalisation on Curiosity and IWB**

While the interviews conducted in the study by Gaspary, Moura and Wegner (2020) pointed towards the importance of low formalisation as a key aspect of innovation climate, the survey conducted in the same study showed an interesting correlation which might explain one of the reasons for this phenomenon. The results of the quantitative part of their research suggested that a higher level of formalisation in the company leads to a lower perception of work challenges among employees. Job complexity along with autonomy has been shown to be a crucial component of the innovativeness of knowledge workers (Anderson, Potočnik and Zhou, 2014; Shalley et al., 2009; Theurer et al., 2018), while intrinsic motivation and positive affect serve as crucial mediating factors in this relationship (Anderson et al., 2018; Liu et al., 2016). It is important to note, however, that the influence of job characteristics on creativity may vary among individuals (Anderson et al., 2018). The theory of multi-faceted end goals states that by following the individual basic desires inherent to a person, an individual's intrinsic motivation is elevated as fundamental motives, when fulfilled, act as

stimulants (Brunstein et al., 1998; Döhrendahl et al., 2021; Reiss and Havercamp, 1998; McDougall, 1925; Murray, 1938; Reiss, 2004).

Individuals who score high on the fundamental motive *Curiosity*, often express a desire for intellectual challenges both in their professional and personal domains and tend to experience boredom with repetitive activities (e.g. Litman and Schuler, 2012; Murray, 1938; Mussel, 2013; Reiss, 2004, 2008; Reiss and Havercamp, 1998). Job complexity is a stimulant for *Curiosity*-motivated individuals and as established earlier, research has shown that high formalisation leads to lower job complexity. While Anderson et al. (2018) have pointed out the individual differences between how much complexity is perceived as a stimulant or as a stressor is in fact individual, there is very little insight into how motivational differences may be correlated to the perception of the level of job complexity. Looking at the relationship between the fundamental motive of *Curiosity*, formalisation, and Innovative Work Behaviour should give more insight into these aspects. Taking all these factors into consideration, the following hypothesis is put forth:

H15: Formalisation mediates the relationship between *Curiosity* and IWB.

### **3.2.3.2. Mediating Effect of Formalisation on Dominance and IWB**

People motivated by *Dominance* are driven by the desire to influence people and situations and the motive was shown to be closely related to both the Power motive and the Achievement motive (Döhrendahl et al., 2021). While there is no study yet connecting the end motive *Dominance* and

innovativeness, research has shown a positive correlation between the achievement motive and entrepreneurial behaviour (Collins, Hanges, and Locke, 2004; Stewart and Roth, 2007) as well as a positive relationship between trait dominance and risk-taking behaviour (Demaree et al., 2009).

Stewart and Roth (2007) have conducted a meta-analysis of 17 studies that contrasts the achievement motivation of entrepreneurs and managers. The results showed that high levels of achievement motivation are consistent with the demands of the entrepreneurial role. One important factor found, which should be emphasised in this context, is that, unlike managers, entrepreneurs are less constrained by organisational systems and structures, and the entrepreneurial role is less specialised, standardised, and formalised by agency demands. An explanation offered for this is that achievement-motivated individuals prefer entrepreneurship as they are more likely to accept the challenge and uncertainty while trying to avoid the formalisation that comes with employment (Stewart and Roth, 2007). The authors further concluded that the challenges of difficult task cues are more likely to activate achievement-oriented behaviour than routine, less challenging tasks. As discussed in the previous section, studies have shown that a high level of formalisation in companies leads to a lower level of job complexity.

The second study that provided interesting insights is an experiment and survey of 120 participants conducted by Demaree et al. (2009) that examined the relationship between dominance and financial risk-taking. The findings showed that dominance significantly predicts financial risk-taking, highlighting the importance of dominance as a predictor of risk-seeking behaviour.

Similarly, *Dominance*-motivated individuals are more likely to look for challenges, deviating from established protocols and procedures in order to generate novel and creative solutions. Moreover, individuals driven by *Dominance* are less likely to be constrained by formal rules and regulations, which can foster an environment that is conducive to innovation. They may also be more comfortable making decisions quickly, which can help to move projects forward and avoid delays caused by excessive bureaucracy. Taking these findings into consideration, the following hypothesis is formed:

H16: Formalisation mediates the relationship between *Dominance* and IWB.

#### **3.2.3.3. Mediating Effect of Formalisation on Safety and IWB**

The relationship between an individual's willingness to take risks and their propensity for innovation has been explored in various studies as discussed in section 3.1.3. of this thesis. Bommer and Jalajas (1999) found that a willingness to take risks is positively associated with innovation, while fear of failure can impede the initiation of new ideas by employees (Deci and Ryan, 2000) and have a significant negative impact on entrepreneurial capabilities (Afzal, Masur and Manni, 2018).

For this reason, it was hypothesised earlier in this thesis that individuals with a high *Safety* motivation may engage less in innovative behaviour as they view it as too uncertain or risky. One way to mitigate uncertainty is through the creation of rules and procedures, which can lead to a formalised climate. An organisational climate characterised by bureaucracy and formalisation

aims to reduce uncertainty by ensuring highly predictable processes and outputs (Gajduschek, 2003). However, rules can stifle the creativity and motivation of employees and are often implemented to enforce compliance (Adler and Borys, 1996).

Bernards et al. (2021) conducted a 2-week daily online diary study among 65 public professionals in the Netherlands, consisting of 270 surveys, to examine the relationship between organisational rules and uncertainty. The results showed that consistent rules are linked to lower levels of cognitive uncertainty. However, the more rules a professional encounters on a given day, the more cognitive uncertainty they experience.

Employees with a high score on the fundamental motive of *Safety* are likely to contribute to a climate for formalisation which in turn may further inhibit innovative work behaviour. Based on the previous research presented and these rationalisations, the hypothesis is put forth:

H17: Formalisation mediates the relationship between *Safety* and IWB.

#### **3.2.3.4. Mediating Effect of Formalisation on Structure and IWB**

The innovation process, which involves embracing new challenges and taking calculated risks, necessitates a level of adaptability. It requires individuals to transcend the routine demands of daily business and seek out and implement new solutions, such as new products and services or organisational process changes (Bilal et al., 2019; De Jong and Den Hartog, 2010). This calls for a high degree of flexibility, as innovation is characterised by its dynamic nature,

requiring individuals to swiftly adjust to the frequent and ever-changing demands that arise. People motivated by *Structure* are driven by a desire to create and maintain order and are motivated by making detailed plans, as noted by Döhrendahl et al. (2021) and Reiss (2004). The stressors of this motive are chaotic environments as well as sudden and unforeseen changes in plans. One of the key reasons for creating a bureaucratic organisation with a highly formalised climate is to avoid uncertainty (Gajduschek, 2003) as discussed in the previous section. As a climate of formalisation is created through strict rules and processes it is likely that a high number of *Structure*-motivated employees will foster such a climate as it is probable to give them more stability. Considering the previous studies indicating that climates of bureaucracy, rules, low flexibility, and autonomy have a negative effect on IWB (Gasparly, Moura, and Wegner, 2020; Nayir, Tamm, and Durmusoglu, 2014) and *Structure*-motivated individuals are driven by making detailed and fixed plans and avoiding uncertainty, the following hypothesis is formed:

H18: Formalisation mediates the relationship between *Structure* and IWB.

#### **3.2.3.5. Mediating Effect of Formalisation on Social Participation and IWB**

The importance of networks and idea and information exchange for the innovation process as discussed in previous sections has been shown to be an essential element in the innovation process. Studies, such as those conducted by Cross (2010) and Partanen et al. (2014), affirm that networks

play a significant role in ideation and idea generation. Similarly, Burt (2004) showed that bridging across social groups can enhance individual imagination and creativity. Individuals motivated by *Social Participation* are driven by frequent exchange with others, meeting, and networking, making new acquaintances and participating in social events (Döhrendahl, 2021; Reiss, 2004; Reiss and Haverkamp, 1998). However, when employees driven by *Social Participation* operate in climates which are characterised by more rigid rules and bureaucracy, the frequent exchange may actually serve to foster more rigid procedures and processes instead of creativity and championing of ideas. An abundance of rules and regulations can stifle the free flow of ideas and creativity and reduce the potential for spontaneous encounters between individuals, which can play a critical role in inspiring innovative thinking (Schilling, 2005). Furthermore, formal communication mechanisms that limit the freedom of interaction can lead to a decrease in intrinsic motivation and self-efficacy in creativity, and idea championing (Liu et al., 2016; Shalley et al., 2004). According to Shalley et al. (2004), when the aspect of control is more pronounced, individuals experience a sense of restriction on their thoughts, emotions, or actions. They feel that the context itself is dictating their behaviour, and they are no longer in control of their own choices. This diminished sense of autonomy through formalisation can lead to a decline in intrinsic motivation and, in turn, low levels of creativity. To satisfy their need for social encounters at work, employees driven by *Social Participation* may resort to more frequent official meetings in climates where informal communication is constrained which in turn may lead to an even

higher climate of formalisation. Based on these findings, the hypothesis is formed:

H19: Formalisation mediates the relationship between *Social Participation* and IWB

### 3.2.4. Tradition and IWB

In the global business environment commonly characterised by VUCA<sup>8</sup> – Volatility, Uncertainty, Complexity and Ambiguity – organisations are pressed to enhance their agility, speed, and efficiency to remain competitive (Dorenbosch et al., 2005; Shanker et al., 2017). But to remain competitive in a time where technological advances develop at an incredible pace, fostering innovativeness through new products and services as well as internal processes becomes inevitable. This might pose a special challenge for rather old and traditional companies, particularly those run by families. Research has shown that family-run and traditional businesses typically have longer decision-making processes, tend to invest less in innovation due to parsimony and are generally more risk-averse than companies which are not run by families (Naldi, Nordqvist, Sjöberg, and Wiklund, 2007; Rondi, De Massis and Kotlar, 2019). However, research has also shown that traditional and family-run companies have some advantages when it comes to change

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<sup>8</sup> The term VUCA was coined by Bennis and Nanus (1986) and has experienced a revival in the 2010s to describe the rapidly changing and complex nature of the (business) world brought about through the rise of technology and globalisation.

and innovation. Although their decision-making processes tend to be longer compared to their non-family counterparts, once a decision has been made, new technologies are implemented more quickly according to research by König, Kammerlander and Enders (2013). Another important aspect that can enhance innovation is the knowledge stock of a company. Accumulated over time through long-lasting practices and experience, traditional companies have larger knowledge bases which can significantly positively impact their innovation performance (De Massis et al., 2016). However, the tendency to rely on existing knowledge and traditions in a company may pose a threat to its ability to innovate when it translates to operational routines that are not questioned regularly (Blank, 2019). It is therefore important to differentiate between traditional companies and companies with an organisational climate of tradition. A climate of tradition within an organisation is characterised by a preference for established, conventional methods and a resistance to new ideas. This is demonstrated by senior management's strong adherence to tried-and-true practices, a lack of willingness to experiment with new approaches, and a slow pace of change within the organisation (Patterson et al., 2005). As the innovation process is driven by fast changes and risks, based on the presented arguments, the hypothesis is proposed:

H20: A high level of Tradition has a negative effect on Innovative Work Behaviour.

#### 3.2.4.1. Mediating Effect of Tradition on Curiosity and IWB

When it comes to innovation, traditional companies are, according to Rondi et al. (2019) facing the challenge of the “willingness-ability innovation paradox that leads them to innovate less despite having a greater ability to do so” (p. 3). Rondi et al. (2019) conducted a study that relies on primary data gathered through interviews with teams of family business consultants with more than 40 years of experience. The consultants shared in-depth case stories on the innovation practices of family businesses that consulted with them. The researchers observed, collected presentations, and interviewed the consultants on the uniqueness of family business innovation. In addition, the researchers conducted interviews with the family successors of three family firms to gain more insights on the willingness-ability innovation paradox. Corresponding with the existing literature, they found two dimensions of innovation particular in traditional companies: risk-taking propensity and tradition attachment. While the attitude towards risks will be the subject of discussion in the following two sections, tradition attachment refers to the way traditional companies deal with knowledge and will therefore be examined in its possible relation to the *Curiosity* motive. The end motive *Curiosity*, as discussed previously, refers to an individual’s basic desire to acquire new knowledge, find new ways of solving problems, gain in-depth insights into a topic, and avoid operational routines. Tradition attachment in family-owned and other traditional businesses refers to the degree to which a company is rooted in and seeks to transmit its past to the future (De Massis et al., 2016). Companies with high tradition attachment share rhetorically reconstructed narratives of the family's and the founder's past behaviour (Kammerlander,

Dessi, Bird, Floris, and Murru, 2015), attribute high importance to their history, celebrate their ancestors, and want to preserve their legacy over time. An important aspect of high tradition attachment is the building of a high knowledge base. This can be both used to foster innovation and help the company become more efficient (Albino and Peruzzeli, 2012; De Massis et al., 2016) if the climate of the company is turned towards innovation and flexibility. It can, however, also hinder innovation efforts if the knowledge stock is mainly rooted in operational knowledge which consists of the routinisation of processes. Such an approach can lead to path dependency, causing inflexibility, and reducing the capacity for innovation (Blank, 2019). Moreover, if a company focuses too much on its conventional ways and processes, it may miss out on recognising the changing needs of its customers, thereby hindering innovation (Sorensen and Stuart, 2010). As previously stated, as *Curiosity*-motivated employees seek to find new ways of working and try to avoid routine tasks, it is very likely that a high number of *Curiosity*-motivated employees in a company will lead to a lower level of tradition climate. Based on these considerations, the following hypothesis is put forth:

H21: Tradition mediates the relationship between *Curiosity* and IWB.

#### **3.2.4.2. Mediating Effect of Tradition on Safety and IWB**

In Germany, the majority of private sector companies are owned and managed by families, comprising over 90% of all businesses and employing

58% of the workforce. While this family-centric approach provides a solid foundation for the economy, it can also present challenges for innovation due to the more rigid, traditional structures often seen in these types of businesses. Furthermore, given that management carries full responsibility for the company's success, it also assumes all the risks, which can be both a strength and a vulnerability. As Rondi et al. (2019) have established, one of the most important factors in traditional family-owned businesses which has a high influence on their innovativeness is their risk-taking propensity. Research indicates that family-owned businesses tend to exhibit lower risk-taking propensity compared to nonfamily firms, as evidenced by studies at the firm level (Naldi, Nordqvist, Sjöberg, and Wiklund, 2007). The extent of family involvement in the business is also a key factor influencing risk-taking behaviour, as shown in research by Li and Daspit (2016). This is corroborated by the findings in Rondi et al.'s (2019) study which has found that companies with higher levels of risk-taking propensity also have higher levels of innovativeness. A climate of tradition is typically characterised by a preference for established practices, and reluctance to explore new approaches and change (Patterson et al., 2005). This echoes a culture of low risk-taking propensity which is less tolerant of uncertainty and less likely to encourage a culture of failure and new thinking. Individuals motivated by a high level of *Safety* are driven by the desire for security and predictability in their lives and strive to avoid uncertainty and risks. Innovations, however, as Kanter (1988) states not only bring uncertainty but also pose a threat to vested interests. It is likely, therefore, that family-owned businesses with a high level of traditional climate would have an appeal to *Safety*-motivated

employees and these in turn would contribute to a climate of tradition within those companies. Based on these previous findings and arguments, the following hypothesis is proposed:

H22: Tradition mediates the relationship between *Safety* and IWB.

#### **3.2.4.3. Mediating Effect of Tradition on Structure and IWB**

One essential aspect of tradition is a long-term orientation which often translates into standardised processes built on past experiences driven by the wish to preserve their legacy (Rondi et al., 2016). Spending some time in a traditional organisation to explore its culture, Blank (2019) observed that the organisation he spent time with had great management processes that were once a strength, but now hindered its ability to respond to new challenges. The management processes were deeply ingrained in the company's culture and translated into a climate of high tradition, leading to a lack of flexibility in responding to new threats. Moreover, Blank (2019) noted that when faced with new adversaries, both the internal process managers and external contractors were reluctant to obsolete their own systems and develop radically new solutions. This reluctance was attributed to the fear of losing existing revenue streams for contractors and the comfort of the status quo for employees. Individuals motivated by *Structure* are driven by a desire to create a sense of order and consistency in their surroundings, so they can organise and function effectively within them (Döhrendahl et al., 2021; Reiss, 2004). Traditional companies typically offer the order *Structure*-motivated

employees desire, while a company which employs a high number of *Structure*-motivated employees is likely to have a climate more motivated by tradition as less change might be desired and driven by these employees. Based on previous research and this reasoning, the following hypothesis is put forth:

H23: Tradition mediates the relationship between *Structure* and IWB.

### **3.2.5. Innovation and Flexibility and IWB**

To keep up with the rapidly changing environment, it is imperative for organisations to stay flexible, oriented towards innovation, and open for change. A climate of flexibility enables individuals to respond quickly to changing circumstances, experiment with new ideas, and learn from their experiences (Bilal et al., 2019; De Jong and Den Hartog, 2010; Montani, 2004).

Studies have shown that flexibility within organisations is positively associated with innovation outcomes (Farnese, Fida, and Livi, 2016; Patterson et al., 2005). In a comprehensive study of 55 manufacturing companies throughout the UK<sup>9</sup>, a high level of flexibility climate was found to predict organisations' innovativeness in products, technology, and work

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<sup>9</sup> Both studies mentioned here again covered and found the reflexivity as well as the Innovation and Flexibility climate variables to positively relate to innovation outcomes, which was already discussed in connection with reflexivity in section 3.2.2. of this thesis.

organisation (Patterson et al., 2005). This suggests that organisations that foster a climate of flexibility are more likely to engage in innovative activities and be successful in bringing new products and services to the market.

Likewise, using a sample from the Italian commercial sector, as these industries are known to operate in rapidly changing markets, Farnese, Fida, and Livi (2016) surveyed 357 employees from operative, managerial, and technical fields and found a climate of flexibility to strongly relate to innovation outcomes. Similarly, Oke (2013) found, in a survey of 136 manufacturing companies in the UK, that both mix flexibility and labour flexibility positively related to product innovation.

Based on these previous findings, the following hypothesis is proposed:

H24: A high level of Flexibility has a positive effect on Innovative Work Behaviour.

### **3.2.5.1. Mediating Effect of Innovation and Flexibility on Curiosity and IWB**

While Oke's (2013) study, as discussed in the previous section, has shown both mix flexibility and labour flexibility to have a positive effect on innovativeness in companies, having a deeper look at this phenomenon will shed light on the relationship of a climate of flexibility and the *Curiosity* motive.

"Mix flexibility" can be defined as the ability of a manufacturing system to produce multiple products with varying product types and combinations, often

without requiring major changeovers between products. In essence, mix flexibility refers to the capability of a manufacturing system to handle a wide variety of product types and combinations efficiently and effectively. "Labour flexibility" can be defined as the ability of a workforce to perform multiple tasks and operations, use different tools and machines effectively, and be easily transferred between organisational units. This type of flexibility allows for cross-training of workers, which enables them to perform a broad range of manufacturing tasks within the organisation. In essence, labour flexibility refers to the capability of a workforce to adapt to changing production needs and demands, by possessing a versatile skill set that allows them to perform a wide range of tasks effectively, and the ability to transfer workers between different units within the organisation, as needed. Introducing these two types of flexibility into a manufacturing business poses a special challenge for knowledge workers as it requires a higher level of capability to cross-train the labour force, create new processes that can efficiently depict the mix flexibility as well as generate different ideas for new products that span across different skill sets (Oke, 2013). Both mix flexibility and labour flexibility are therefore likely to raise job complexity for knowledge workers. In section 3.2.3.1, it was established that job complexity plays a critical role in the innovativeness of knowledge workers, as supported by studies conducted by Anderson, Potočnik and Zhou (2014), Shalley et al. (2009), and Theurer et al. (2018). Additionally, intrinsic motivation and positive affect have been found to be significant mediators in this relationship, as demonstrated by research conducted by Anderson et al. (2018) and Liu et al. (2016). As employees with a high score on the fundamental motive *Curiosity* are driven by various

aspects of job complexity, it can be inferred that companies with a climate that enhances job complexity will be raising the intrinsic motivation of *Curiosity*-motivated employees which in turn is believed to have a positive effect on their Innovative Work Behaviour. Based on this reasoning, the following hypothesis is advanced:

H25: Flexibility mediates the relationship between *Curiosity* and IWB.

### 3.3. Other Influencing Factors

While some factors may not serve to answer the research question at hand, they still might be present in the population sample and influence the dependent variable. This is why it is essential to also look at other potential influencing factors on Innovative Work Behaviour within the German private sector in this research. Control variables have experienced a surge in popularity in recent years in management literature with a substantial proportion of journal articles, approximately 70%, integrating control variables in their studies. A comprehensive analysis of 812 empirical articles published between 2005 and 2009 exploring the utilisation of control variables in management research (Atinc, Simmering, and Kroll, 2012) found that incorporating control variables is crucial because these variables frequently account for more variance than the primary effects, highlighting their crucial role in empirical research.

Having a closer look at the current state of the literature, the following factors have been found to have an influence on innovativeness within organisations and will therefore be included in this research as control variables.

### **3.3.1. Age**

The influence of age on various stages of innovative work behaviour has been researched in various empirical studies with conflicting results (Ng and Feldmann, 2013; Parsons, 2015) ranging from positive and no associations to negative correlations between these two variables.

Interestingly, most studies that have reported a positive or no significant correlation between age and innovativeness were those conducted with self-reports on the participants' innovative behaviour (e.g. Ardts, van der Velde, and Maurer, 2010; Choi, 2004; Newton and Nowak, 2010; Sanders et al., 2010; Zhou et al., 2009). However, a majority of studies which have found that employees who are older in age tend to display lower levels of innovative behaviour were based on studies which used super-visor rated IWB (or similar) scales (e.g. Janssen, 2000, 2005; Pieterse et al., 2010; Scott and Bruce, 1994).

Due to these conflicting results in previous research, it is important to include age as a control variable in this research. As this thesis aims to use supervisor-rated IWB scores to test the correlation between various independent and control variables in IWB as the independent variable, it is hypothesised that the control variable age may show a negative correlation with innovative work behaviour.

### 3.3.2. Gender

Controlling for gender as an influencing factor has become standard in most management and psychological research, yet despite the wide use of gender as a control variable, Atinc et al. (2012) warn against adding any control variables to a study without a proper explanation or theoretical basis.

Gender has been extensively studied in the context of entrepreneurship, and numerous studies have found significant differences between men and women (Agnete Alsos, Ljunggren, and Hytti, 2013; Minitti, 2009). However, the relationship between gender and innovation is less well understood. Despite some studies suggesting gender differences in innovative activities, the literature on this topic is still inconclusive (Agnete et al., 2013).

A large body of literature has investigated gender differences in innovative activities such as patenting, commercialisation, and industry cooperation, and has shown that women tend to be underrepresented in these areas (Azagra-Caro et al., 2006; Bozeman and Gaughan, 2007; Whittington, 2011). However, the relationship between gender and innovative work behaviour (IWB) or innovation as a process in organisational contexts is less clear. While some studies, such as the research conducted by Ng and Feldman (2013) found gender to have no effect on Innovative Work Behaviour, other studies conducted did find some correlations. According to Foss et al. (2013), while women exhibit a similar capacity for generating innovative ideas as men, they tend to have lower levels of innovation activity since their ideas are less frequently implemented within the organisation. This may be due to

limitations imposed by organisational practices or the perception of lower levels of support among female employees in male-dominated workplaces. Research by Zastempowski and Cyfert (2021) found that in a study of 1,017 small enterprises in central-northern Poland, female entrepreneurship had a positive impact on the product and process innovativeness of small enterprises, with female-managed enterprises having higher chances of introducing product and process innovation compared to those managed by men. The study highlights the importance of gender diversity as a factor that can influence small enterprise innovativeness.

Pinela, Guevara, and Armijos (2022) found that the relationship between entrepreneurial leadership and Innovative Work Behaviour is moderated by gender, with a stronger impact observed for women than for men.

Given the mixed findings on the relationship between gender and IWB, this study will take gender as a control variable to account for any potential confounding effects. Controlling for gender will ensure that any observed relationships between fundamental motives, organisational climate variables, and IWB are not simply due to gender differences in these variables. However, based on the existing literature, gender is not expected to be a significant predictor of IWB once fundamental motives and organisational climate variables are considered.

### **3.3.3. Tenure**

The effect tenure has on an employee's Innovative Work Behaviour has been researched from various perspectives including testing for direct, moderating,

and three-way effects with seemingly conflicting results. The study conducted by Ng and Feldman (2013) with 196 participants in three surveys over the course of a year, found organisational tenure not to have any effect on any of the stages of Innovative Behaviour<sup>10</sup>. However, Lius, Ge, and Peng (2016) conducted a meta-analysis of 76 empirical studies with an overall participant number of N=21,659 with slightly different results. While they found organisational tenure of employees to only have a weak positive direct effect on employee innovative behaviour, their analysis showed a complex relationship between organisational tenure and innovative behaviour which they found to be influenced by two other factors. This relationship was evidenced by a three-way interaction among status hierarchy, position tenure and organisational tenure.

Similarly complex results were found by Kunze, Boehm, and Bruch (2013) in their study with N=2,981 employees from 93 German companies researching the effect of age and organisational tenure on employees' resistance to change (RTC), which stands in stark opposition to Innovative Work Behaviour. Their study found that the relationship between age and resistance to change (RTC) depends on organisational tenure, with the negative relationship between age and RTC being stronger for employees with short individual tenure than for those with long tenure. This suggests that employees who are both old and long tenured are more likely to exhibit

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<sup>10</sup> The study called used a concept very close to IWB, called Innovation Related Behaviour (IRB) consisting of three dimensions: idea generation, idea dissemination, and idea implementation.

routine seeking, cognitive rigidity, and emotional aversion to change than those who are of higher age but relatively new to the company.

As this research does not deal with variables as hierarchy or job safety, which were relevant to the influence of organisational tenure in previous research but rather seeks to control for potential direct effects of tenure, the prediction is made that there will be no significant effects of this factor on the model or IWB in particular.

### **3.4. Model**

The hypotheses developed in this section, along with the inclusion of control variables, have been structured into a comprehensive path model, as depicted in Figure 2. The path model represents the hypotheses that will be tested in this study using a quantitative approach. It illustrates the relationships between the fundamental motives, organisational climate, autonomy, and Innovative Work Behaviour (IWB). Moreover, the path model incorporates control variables to account for potential confounding factors and ensure the robustness of the findings.

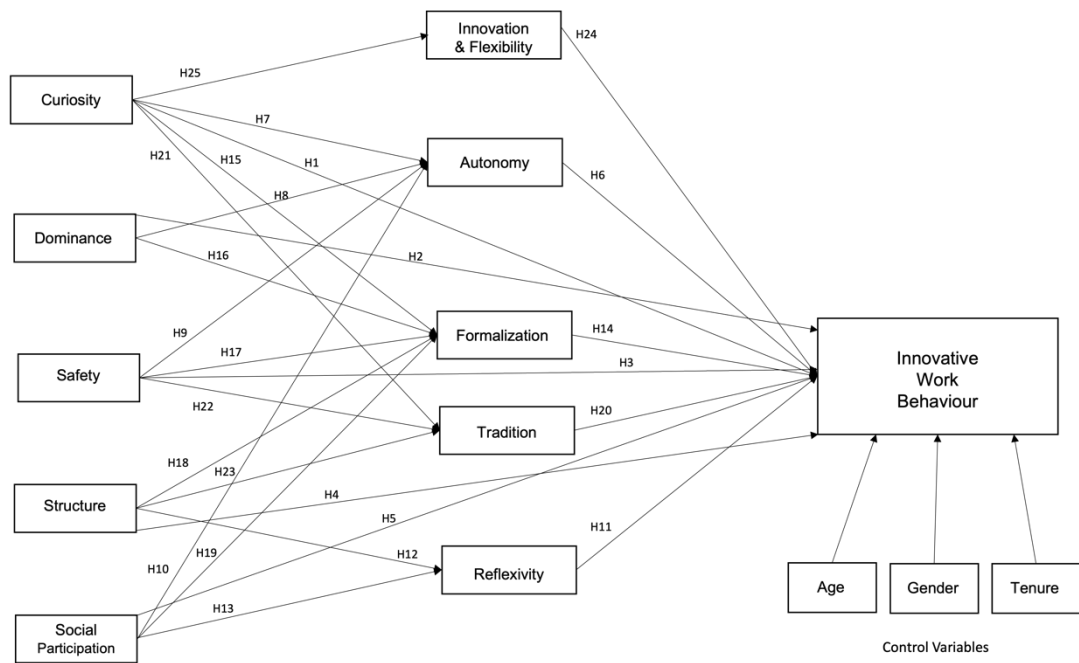


Figure 2: Path Model – Mediation including Control Variables

To enhance the robustness and validity of the findings in this study, a methodological approach that utilises data from two distinct groups of respondents within a single Structural Equation Modelling (SEM) model has been employed. This approach aligns with what is considered the 'gold standard' in applied management research (Jordan and Troth, 2020; Podsakoff et al., 2012).

The rationale behind this approach is to control for Common Method Bias (CMB), a potential source of systematic error that can distort the results of empirical research. By obtaining predictor measures from one group of employees, individual end motives were used as independent variables. Perceptions of the organisational climate served as mediating variables. On the other hand, criterion measures, or the dependent variable of Innovative Work Behaviour, were sourced from another group, namely supervisors. By

employing this approach, the effects of social desirability and acquiescence tendencies can be significantly diminished. Additionally, the influence of dispositional mood states is reduced. This methodological approach is not uncommon in applied management research. For instance, Chiew et al. (2019) collected ratings from customers following a retail exchange and matched these data with those collected from the individual who served them. Similarly, Kong et al. (2018) collected data from supervisors on employee creativity, which were then matched to data from team members who completed surveys on their personal learning goal orientation.

In the context of this study, the use of two distinct data sources allows for a more accurate and unbiased assessment of the relationships between fundamental motives, organisational climate, and Innovative Work Behaviour. This approach ensures that the findings of this study are not only statistically robust but also practically significant, providing valuable insights for both academic research and organisational practice.

The specific details regarding the methodology employed to test this model will be thoroughly discussed in the subsequent chapter, providing a comprehensive understanding of the research design and data analysis procedures.

## Chapter Four: Research Methodology

The following chapter presents the development of the research methods needed to answer the research question by testing the hypotheses on how fundamental motives and organisational climate affect Innovative Work Behaviour in the German private sector. It discusses the reasons for placing the research within the post-positivist paradigm and illustrates why the ontological and epistemological position taken and the resulting methodology approach chosen was deemed the most suitable to answer the research questions presented.

This chapter further presents the survey design and the scales selected to be used to test the hypotheses and the model introduced in Chapter 3. This includes the rigorous translation process undertaken to eliminate translation errors in the research as well as the pre-pilot and pilot studies conducted, which have led to further adaptations of the survey and the administration process before starting data collection. In addition, this chapter also covers the data collection process including the sampling strategy and measures taken to ensure anonymity.

The chapter closes with a summary including ethical guidelines and methodological limitations to the research.

### 4.1. Philosophical Background

To conduct meaningful and insightful research, it is imperative for researchers to have a comprehensive understanding of the underlying assumptions and

principles of the paradigms they are operating within. As emphasised by Creswell and Creswell (2018), these paradigms play a crucial role in shaping the overall direction and methodology of the research.

Moreover, the impact of paradigms extends beyond the individual research project, as they also play a significant role in facilitating meaningful dialogue and exchange between researchers and fields. Several scholars have suggested that the choice of a specific research approach is contingent upon various factors, such as the nature of the research problem, the personal experiences of the researchers, and the intended audience of the study. Lewis (2015) and Creswell and Creswell (2018) argue that it is crucial to consider these factors in order to ensure that the research approach chosen is appropriate and effective in addressing the research problem at hand. Given this argument, it comes as no surprise that a broad variety of research paradigms have developed over time, each with its distinct principles and assumptions (Saunders and Tosey, 2015). To fully understand current research in this diverse field, it is crucial to have a thorough understanding of the concepts and beliefs of these individual paradigms. Therefore, the following sections seek to briefly explore the diverse research paradigms in general and then explain why this research will be conducted within the postpositivist tradition.

#### **4.1.1. Research Paradigms**

Paradigms are broad frameworks that guide research design, conduct, and interpretation. They are important because they shape how researchers

understand and study the world and interpret their findings (Guba and Lincoln, 1996). Before the rise of social sciences, most research was conducted within natural sciences which follow strict laws and leave no room for interpretation and context. Thus, the discussion and ultimately also debate around philosophical frameworks of research only emerged with the rise of social sciences which deal with more complex notions derived from human psychology, sociology, and communication and can be subject to interpretations. Upon his visit to the Centre for Advanced Study in the Behavioural Sciences in the late 1950s, American historian and philosopher Thomas Kuhn, observed that social scientists never seemed to agree on what constituted legitimate scientific problems and methods. In his book *The structure of scientific revolutions*, originally published in 1962<sup>11</sup>, Kuhn developed the concept of paradigms to differentiate between the social and natural sciences. Although Kuhn himself did not believe paradigms to be appropriate for social sciences, his work highlights the importance of being aware of one's own paradigm and the preconceptions that underlie it in order to foster a better understanding of the limitations and possibilities of one's research and has given structure to various fields of research, such as Business Management Research or Organisational Management Theory (OMT) which forms the framework of this thesis (Shepherd and Challenger, 2013).

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<sup>11</sup> The book was originally published in 1962. The version used in this thesis, however, is the third edition, published in 1996.

Lincoln and Guba (1985) propose that a paradigm is comprised of four key components: ontology, epistemology, methodology, and axiology. These elements are essential to comprehend, as they encapsulate the fundamental assumptions, beliefs, norms, and values that underpin each paradigm. Understanding these components is crucial in the development of the study to answer the research questions at hand.

#### **4.1.1.1. Ontology**

Ontology, the branch of philosophy concerned with the nature of being and existence, enables researchers to examine their underlying belief systems and philosophical assumptions (Richards, 2003). It helps them conceptualise the form and nature of reality and what can be known about it. By asking questions such as whether reality is one, objective, and measurable or a construct of the mind and thus multiple in nature (Patton, 2015), ontology seeks to determine the foundational concepts that constitute themes in the research data and make sense of their meaning. It is essential to a research paradigm because it provides an understanding of the things that constitute the world as we know it (Scott and Usher, 2011).

#### **4.1.1.2. Epistemology**

Epistemology is important for understanding how we come to know something, how we determine truth or reality, and what counts as knowledge within a particular field of research. Epistemological assumptions of researchers are shaped by their ontological belief systems, which determine

their perspectives on objectivity, subjectivity, causality, validity, and generalisability (Patton, 2015). Researchers who believe in a singular verifiable truth assume an objective detachment, while those who believe in socially constructed multiple realities engage with their subjects to understand phenomena in context. According to Slavin (1984) epistemological approaches can be based on intuitive knowledge, authoritative knowledge, logical knowledge, or empirical evidence, which in turn leads to the next key component of paradigms: the methodology.

#### **4.1.1.3. Methodology**

Methodology is an essential component of any research study that encompasses a range of methods, techniques, and procedures that are applied to gather, analyse, and interpret data. According to Keeves (1997), methodology involves the systematic planning of how the research will be conducted, including the selection of participants, data collection methods, and the interpretation of results. It further involves the consideration of the assumptions made, the limitations faced, and how these challenges were addressed. In line with this, Crotty (1998) argues that methodology is a strategic plan of action that determines which research methods are best suited to achieve a research objective. Overall, methodology, which is influenced by the ontology and epistemology of the research at hand, is the key to the study of the research problem and provides a foundation for the research design, implementation, and data analysis.

#### **4.1.1.4. Axiology**

The final component of a paradigm according to Lincoln and Guba (1985) is axiology which refers to the ethical considerations that researchers must account for when designing their studies. It involves evaluating and defining the concepts of right and wrong in the context of research and determining the value of various aspects of the research such as the participants, data, and audience. It encompasses questions such as what ethical behaviour entails, what values should guide research, how to respect the rights of all participants, and how to address cultural and moral issues (Saunders et al., 2015). It further raises the question of how much a researcher should be involved and whether to take a more value-free and detached position when conducting the study or be value-bound and subjective. Researchers must consider the ethical dimensions of their research and make decisions that are socially just, peaceful, and respectful of participants. The questions raised by axiology require that researchers minimise or avoid any potential harm that could result from their studies, whether it be physical, psychological, legal, social, economic, or otherwise (Finnis, 1980).

#### **4.1.1.5. Subjectivism vs. Objectivism**

Saunders et al. (2015) have defined that these four assumptions of paradigms move on continua between Subjectivism and Objectivism and the individual combination of the standpoints on each continuum is what defines the major philosophies typically used in business and management research.

Objectivism, according to Saunders et al. (2015), is a research approach that assumes social reality is external to social actors and can be studied in the same way as nature. It embraces realism, meaning social entities exist independently of how they are labelled or perceived. Objectivists seek to discover the truth about the social world through observable, measurable, facts and law-like generalisations. They also try to remain detached from their own values and beliefs throughout the research process. The aim of research using an objectivist stance is to discover the principles that govern management behaviour to predict how management will act in the future.

Subjectivism, on the other hand, is a perspective that focuses on how individuals attach their own meanings to their work, actions, and environment. It assumes that social reality is created through the perceptions and actions of social actors and rejects the idea of a single objective reality. Subjectivists believe that “social phenomena are in a constant state of flux and revision” (Saunders et al., 2015, p. 130), and that different actors have different realities. As a result, subjectivist researchers are interested in different opinions and narratives that can help account for different social realities. In contrast to objectivist researchers who seek universal facts and laws governing social behaviour, subjectivist researchers reflect on and incorporate their own values in their research.

To illustrate how some of the philosophical approaches typically taken in OMT are set on the continua of Subjectivism and Objectivism in relation to the four aspects of the paradigms, a figure was created for this thesis based on the research of Saunders et al. (2015) as can be seen in Figure 3. The orange line furthest towards objectivism represents positivism, the yellow line

represents post-positivism, the green line mirrors the aspects of post-modernism while the line representing the most subjective form of research paradigm stands for Interpretivism/Social Constructivism.

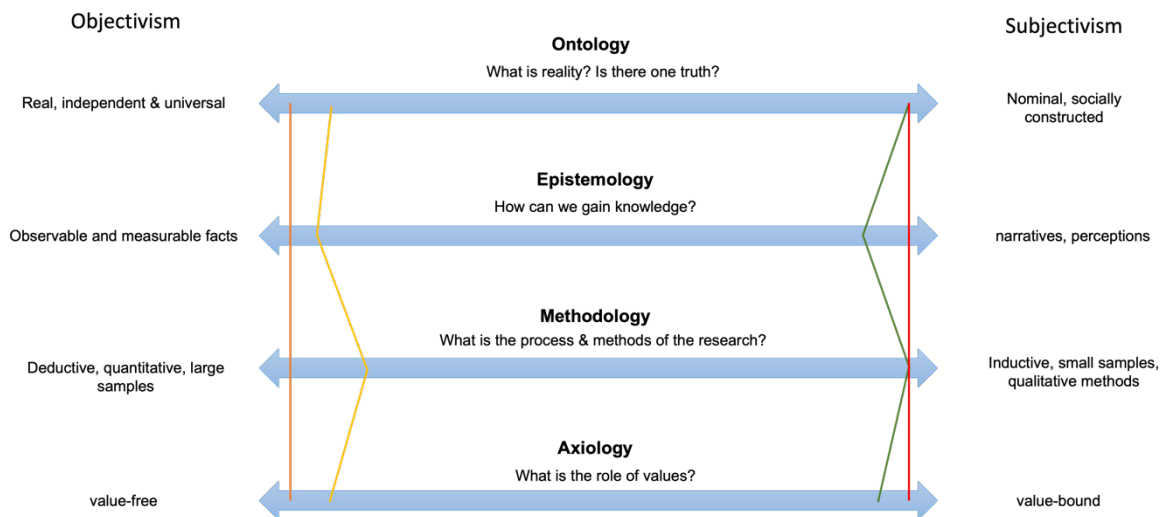


Figure 3: Research philosophies on the continua of the four key aspects of paradigms. Source: adapted and extended from Saunders et al. (2015)

#### 4.1.2. Paradigm choice for this research

To gain deeper insights into the Innovative Work Behaviour of individuals within the German private sector, it would have been possible to take various philosophical and methodological approaches.

As one might argue that organisations are just social constructs created by the individuals who work at the organisation and who in turn are also shaped by ideas, social norms, and experiences, a possible approach to this research would have been via the paradigm “Interpretivism”. The ontological position of interpretivists is the belief that there is no objective truth in a positivist sense

but rather multiple realities depending on the humans involved. Therefore, their epistemological position is the notion of “verstehen”, understanding, rather than uncovering or making law-like statements. Within the tradition of interpretivism, Berger and Luckman published their work *The Social Construction of Reality* in 1966, creating “Social Constructionism”, a metatheory that is often used synonymously with interpretivism, yet has established its own following and gained great influence, especially within Organisational Management Theory (OMT). Berger and Luckman argue that there is no objective reality or knowledge of reality but that all reality and knowledge are in fact constructed. The perception of each human being differs and is influenced by various factors (even their dreams) unknown to the observer and even by their perception of and interaction with the observer themselves.

The French philosopher Michael Foucault was a strong advocate of these ideas and objected to the notion that the biological aspects of human beings shape knowledge and social behaviour. In his works, as well as in his famous televised debate from 1971 with Noam Chomsky, he argues that knowledge is in fact constructed by the different ranges of discourse throughout the various historic eras. For Foucault and many social constructionists, it is “discourse practices that construct the social body at both the macro and micro level” (Wilkin, 1999: p. 183). According to Layder (1994), Foucault was the key figure of what is commonly referred to as the linguistic turn in social theory and the introduction of the discourse aspect to social constructionism has had a big effect on various fields within social sciences.

OMT is one of the fields that has been greatly influenced by the narrative turn in social constructionism and discourse analysis has taken a firm place in many business studies. According to Phillips et. al. (2008: p. 1) “critical discourse analysis has become an increasingly popular methodology in organisation and management studies” and the number of critical discourse articles has gone up from around 30 in 1995 to over 130 in 2005. As Fairhurst and Grant (2010) state, researchers in OMT and particularly leadership studies have embraced constructionist approaches, which has led to a greater concentration on communication issues.

A focus on communication through interviews and discourse analysis can be a helpful approach when analysing issues within a team during the idea generation or idea championing stage of IWB in a specific case when defining the meaning of “innovation” to individuals within an organisation, or to give deeper insight into organisational cultures, for instance. However, because notions, such as the one put forth by Foucault, that biological aspects do not shape knowledge and social behaviour, are at the core of this philosophy and stand in stark contrast to trait psychology in general, social constructionism would be contrary to the idea presented by the multi-faceted theory of motivation that basic desires are at least partially biologically influenced. Further, as Westwood and Linstead (2001) point out, in the constructionist tradition organisations do not have autonomous, stable, or structural status as they only exist through and within their linguistic constitution.

To answer the question of which dimensions of organisational climate influence the relationship between fundamental motives and Innovative Work

Behaviour, it is important to look at organisations as structural entities that create a shared perception in form of climate among most employees.

Lastly, and most importantly, this research aims to make generalised statements, assuming the ontological position of a social reality which follows patterns and relative stability that can be observed in parts.

The epistemological position taken is that all adult human beings, independent of culture, gender, or other differences, are driven by 16 basic human desires which are measurable. The different intensity in those motives leads to different behaviours and outcomes, which in turn are also measurable. Therefore, this thesis is going to construct the methodology in the post-positivist tradition.

Post-positivism embraces the positivist ontology that there is a universal truth, however, believes that it cannot be fully and perfectly known but always must be placed in context. Both positivists and post-positivists pursue objectivism but while positivists believe that objective truth is attainable, post-positivists recognise possible biases and the risk of research not being objective and value-free. Therefore, post-positivists avoid making law-like statements and instead try creating statements of probability to best depict their observation of an objective truth which can be subject to falsification (Guba, Lincoln, 1996). Falsification itself was an important aspect of the development of the paradigm and was first introduced by Karl Popper. His philosophy of falsifiability as described in his book "Conjectures and Refutations" states that for a theory to be truly scientific it should be falsifiable. This was a rather radical turn against the proponents of logical positivism or the so-called

“Vienna Circle”, who were advocates of verificationism. While they believe that a statement or theory must be empirically verifiable to be scientific, Popper argued that “the distinctive feature of *any* scientific theory is that its hypotheses can be put to a test. The distinctive feature of a *good* scientific theory is that its hypotheses pass the test.” (Mautner, 2000: p. 195). According to Adam (2014, p. 6) “postpositivism distinguishes itself from the different variants of positivism mainly through the view that the quantification and use of sophisticated statistical methods and mathematical models in itself and a priori do not enable the attainment of scientifically relevant insights.”

Many studies conducted within organisational and management theory take a post-positivist approach or an implicit postpositivist position, among them, papers used to establish the research aims presented earlier. The advantage of taking a postpositivist approach to innovation is that clear measurement standards can be identified to evaluate innovation output within organisations. Taking a “roundabout way via deep structures and underlying non-observable tendencies” (Alvesson and Skoldberg 2000: p.19) makes little sense when the goal is to summarise data to reduce “reality”, in this case, innovative work behaviour, to what is observable or, even better, measurable. This can be of great importance for the product development aspect in innovation studies and is thus especially relevant for manufacturing or software development businesses. The postpositivist approach here furthermore helps establish patterns that can be used to predict future developments in the field and applied practically when consulting businesses, but it also recognises the limitations and specific views given through the context. As the context of the German private sector is very important in this research, a pure positivist

approach would not suffice. Interpretation of the results will be imperative and an embedding of the results in the cultural and social context of the German private sector will be necessary to answer the research question of why the German economy, despite its strength, has fallen behind in its innovation efforts and how the German private sector can become more dynamic.

Moreover, it is important to highlight that the concepts examined in this study have been clearly defined. This clarity enables their measurement, eliminating the need for extensive qualitative work to clarify their meanings. By adopting a post-positivist approach, a focus can be made on utilising quantitative methods to analyse data and draw empirical conclusions. This approach offers several benefits, including objectivity, replicability, and the ability to identify measurable standards for evaluating innovation output within organisations.

## **4.2. Methods**

Empirical evidence is at the centre of all positivist metatheory but while positivists generally rely on quantitative methods, post-positivists sometimes also include qualitative methods, mainly for the purpose of redressing the intra-paradigm problems as outlined above and avoid bias with the aim of reaching and uncovering an objective truth (Guba and Lincoln, 1996). Further, as Innovation Management is rooted in multiple disciplines from economics, to psychology, management and engineering, the field itself is interdisciplinary and the approaches taken with respect to research design vary (Goffin et al., 2019; Ritala et al., 2020; Shafique, 2013).

One of the methods first considered, when developing the research questions, was experimentation. The original question posed when starting the thesis was “Which motives influence people’s innovativeness?”. To answer the question, the participants in an experiment would have been required to first do a motivational survey to determine their fundamental motives according to the multi-faceted theory of motivation as presented earlier and in the next step solve problems that require creative thinking. However, as the review of literature progressed and the research questions as well as hypotheses formed, the following issues transpired. Firstly, as the combination of fundamental motives in a person plays a great role and the varying degrees of severity of a motive lead to different behaviours (Döhrendahl et al., 2021; Kemper et al., 2017; Reiss and Havercamp, 1998) a rather large number of probands would be necessary to conduct the experiments to test as many combinations as possible. As conducting experiments in a controlled environment is both time and funds-consuming, gathering a large set of data through experimental research would have gone beyond the scope of possibility for this thesis.

Secondly, in experimental research, manipulating independent variables is done in a controlled environment. However, for one, the participants are not motivated by one basic desire at a time, but it is an interplay of various end motives simultaneously. Further, as employees, they operate as part of organisational structures. For these reasons, the complexity of the research question at hand, could not be answered in a satisfactory way using experimental research.

Thirdly, and most importantly, innovativeness goes beyond creativity and while many studies that are placed within the realm of innovation management research do in fact deal with creativity research, it would not have sufficed to look at only creativity in order to truly explore the innovativeness of employees. This is why the focus was shifted towards Innovative Work Behaviour, which, being an interrelated process is hard to observe in an experiment but is typically observed by colleagues and supervisors of employees over time and can thus be better reported in the form of interviews or a survey.

As mentioned earlier, the use of qualitative methods, such as interviews, is not unusual within the post-positivist paradigm and was considered a possible way to address the notion of innovative work behaviour in this thesis by conducting interviews with supervisors about their individual employees. The use of structured and semi-structured interviews in management study research offers some advantages. With the research question posed in this thesis, conducting (semi)structured interviews with the supervisors on their employees' Innovative Work Behaviour could have granted deeper insight into what the supervisor considers "innovative" or "problem-solving" and would have clarified how often exactly the interviewee considers "most of the time" or "rarely" as these definitions may vary among individuals after all. It further could have provided a deeper insight into the organisational culture which in turn may have an influence on employees' IWB. However, interviews also bear several disadvantages. In an interview setting, a potential source of error is interviewer bias, which can be displayed both by the interviewer and the interviewee. Another disadvantage is the time and effort needed to

conduct interviews. To make generalised statements as desired in this study, it would have been necessary to lead interviews about all participating employees with each of their respective supervisors. This would not have only been impracticable but given the fact that most managers are rather limited in their time, it would not have been possible to conduct long interviews about each employee.

One aspect that was shown to be of great importance to the participating German organisations was anonymity. During the preparation and talks when trying to source potential respondents, the question of anonymity was raised by most companies. Since there is no anonymity given in an interview setting, even if the responses are anonymised in the paper, the risk of interviewee bias seemed too high. Based on these arguments and given the fact that all variables developed in the model can be and are typically measured using questionnaires, and there were several validated scales available to measure the variables presented, the shift towards collecting data through questionnaires was made. Given the reasons outlined above, it posed the most appropriate choice to answer the research questions, test the hypotheses developed based on the literature review and make generalisable statements. The following section will discuss in more detail which scales were chosen to measure the variables presented in the model in chapter three and why they were selected.

### 4.3. Survey Design

The questionnaire is a vital component of any survey research project and can have a significant impact on the success of the study (Brace, 2013; Saunders et al., 2018). Therefore, it is essential to pay careful attention to the development of the questionnaire and follow a structured approach (Creswell and Creswell, 2018). While much of the literature on research design emphasises the choice of questionnaire type and administration, as well as the design of the questionnaire itself and individual questions, there are other important steps in the questionnaire development process that are often overlooked.

For example, researchers may fail to conduct a rigorous search for already existing research instruments, which can result in the adoption of scales with low validity and a lack of comparability between studies (Dermatol, 2014). Additionally, in multicultural studies, it is crucial to define a translation procedure explicitly, yet this step is frequently omitted (Saris and Gallhofer, 2007; Sousa and Rojjanasrirat, 2011). The absence of a sophisticated and structured translation process can lead to inadequate quality control and the risk of a lack of equivalence between multilingual research instruments (Epstein et al., 2015; Eremenco, Cella, and Arnold, 2005).

To ensure that no relevant step is overlooked, a structured procedure for the development of the research instrument has been defined based on the recommendations in the literature (Brace, 2013; Neuman, 2014; Saris and Gallhofer, 2007; Saunders et al., 2018; Sousa and Rojjanasrirat, 2011). This process includes the following steps:

1. Definition of research objectives and questions
2. Selection of appropriate measurement scales
3. Search for existing instruments
4. Adaptation of existing instruments or development of new questions
5. Translation of the questionnaire (if necessary)
6. Pretesting and pilot testing
7. Finalisation of the questionnaire

Each step in the process is essential to the development of a reliable and valid research instrument. The first step involves defining the research objectives and hypotheses, which should be clear, concise, and directly related to the research problem (Neuman, 2014). The selection of appropriate measurement scales is also critical, as different scales may be better suited for different types of questions (Bastos et al., 2014; Dillman et al., 2014).

Researchers should conduct a rigorous search for existing instruments before developing new questions, as this can save time and ensure comparability across studies (Bastos et al., 2014; Hyman et al., 2006). If no suitable instruments are found, researchers can adapt existing instruments or develop new questions. The translation of the questionnaire is crucial in multicultural studies, and a structured and sophisticated translation process should be followed to ensure the equivalence of the research instrument across languages (Sousa and Rojjanasrirat, 2011).

Pretesting and pilot testing of the questionnaire can help identify any potential problems with the instrument, such as unclear or confusing questions

(Dillman et al., 2014; Saris and Gallhofer, 2007). Finally, the questionnaire should be finalised based on the results of the pretesting and pilot testing.

Following the seven steps outlined in this section, the following subsections will show how this process was applied in this research to create a questionnaire which allows for meaningful comparisons between research findings, ensures high validity and reliability of the measures and adheres to the ethical considerations necessary, particularly from a postpositivist standpoint, such as objectivity of the researcher and anonymity for the participants.

#### **4.3.1. 16 Motives Research Scales**

To assess the multi-faceted intrinsic motivation based on the theory proposed by Reiss and Havercamp (1998) as described in more detail in section 2.2.3., there are two different types of questionnaires that can be used. For one, there are questionnaires which use eight and nine items respectively to measure each fundamental motive, which were developed for professional consultation and counselling services such as the Reiss Motivation Profile (Reiss and Havercamp, 1998, 1998; Reiss, 2004), the LUXXprofile (Kemper, Döhrendahl, and Greiff, 2017), and ID37 (Staller and Kirschke, 2019)<sup>12</sup>. All three tools are royalty-based questionnaires for commercial use. While there are some studies using the Reiss Motivational Profile, they were all either

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<sup>12</sup> The LUXXprofile (Kemper et al., 2017) and ID37 (Staller and Kirschke, 2019) are both the exact same questionnaire but distributed by two different companies. Both were developed by the team of Prof. Greiff including Kemper and Döhrendahl.

studies only discussing theoretical implications but not actually using the questionnaire in practice (Mengel, 2012) or testing with only a small number of participants<sup>13</sup> (Chudzicka-Czupala and Basek, 2019; Mieczysław and Lidia, 2021). The only study that was found that had a larger sample size of 152 participants was Laughlin et al. (2019). It was conducted in cooperation with IDS Publishing, the company that distributes the commercial Reiss Motivational Profile. When the estate of the late Professor Steven Reiss was contacted to request the possible use of the Reiss Motivational Profile in this research, it was discovered that the only available option was to purchase each profile through a licensed consultant, with costs ranging from 400 to 1000 Euros per profile. Given the large sample size of the present study, such an option was deemed infeasible. In addition, there are other instruments available that have been more recently re-validated and updated, making it viable to explore alternative measures.

The LUXXprofile and ID37 are the same questionnaire distributed commercially by different companies and thus branded differently. The questionnaire was developed by Kemper, Döhrendahl and Greiff (2017) and the use of the nine-item per motive questionnaire is reserved for commercial use only. The alternative provided by the researchers for academic use is a short scale named 16 motives research scales (16mrs) (Döhrendahl et al., 2021).

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<sup>13</sup> The participants in the studies varied between 10 and 32.

The Reiss Profile's 16 scales consist of eight items each and show test–retest correlations ranging from 0.69 to 0.88 with a mean of 0.80 for a 4-week interval (Havercamp, 1998). The LUXXprofile scales, with nine items each, demonstrate internal consistencies ranging from 0.62 to 0.90 with a mean of 0.84 (Kemper et al., 2017). Both measures have undergone validation procedures and require an approximate completion time of 15 minutes, as reported by Havercamp in 1998 and Kemper et al. in 2017. However, most consultants' report that it takes their clients around 30 minutes to fill in the questionnaire on average.

In light of the significant methodological advancements that have been made in short-scale construction over the past two decades, as reported by Olaru et al. (2015), Döhrendahl et al. (2021) have developed a short-scale measure with three items each assessing fundamental motives in research settings, building on the theoretical foundations laid by Reiss and Havercamp (1998). The 16mrs has undergone a rigorous research, development, and validation process in three studies. Firstly, the authors revised the construct definitions of Reiss and Havercamp (1998) and Reiss (2004) as they found inconsistencies. Secondly, they developed an item pool of 144 items and selected preliminary scales using exploratory factor analysis, and ant colony optimisation (ACO) in combination with confirmatory factor analysis, based on which they revised the item pool in Study 2 by removing 108 items and adding 58 new items. The construction process was based on two samples (N=569), representative of the German population in terms of age, gender, and education. The final items for the 16mrs were selected using Mokken scale analysis. Additionally, the authors constructed 16 short scales, each

consisting of three positively keyed items for the assessment of fundamental motives. This approach was chosen based on extensive research indicating that the inclusion of negatively keyed items in a scale introduces method variance, which can ultimately decrease reliability. The 16mrs questionnaire is rated on a 6-point Likert scale ranging from 0 (*does not apply at all*) to 5 (*applies completely*).

To address the first aim of finding a balance between shortness and desirable psychometric properties, the authors wanted the scales to have reliabilities that would be sufficient for the assessment of group differences, rendering the short scales suitable for research purposes. To address the second aim of validating the 16mrs and investigating its nomological network, the authors conducted Study 3, cross validating the results from Study 2 and computing correlational validity with the LUXXprofile and convergent and discriminant validities for the 16mrs with the Big Five personality traits and the explicit Power, Affiliation, Achievement, Intimacy, and Fear motives<sup>14</sup>.

The final measure consisted of 16 short scales, each with three positively keyed items, and was validated with 999 participants, who completed the 16mrs and additional measures. The participants' age ranged from 18 to 78 years, and 61% of them were women. The reliability coefficients for the different scales in a study ranged from 0.52 to 0.87 using the Latent Class Reliability Coefficient (LCRC), as can be seen in more detail in Table 7. As

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<sup>14</sup> The correlation tables of the 16mrs and the Big Five as well as the explicit Power, Affiliation, Achievement, Intimacy, and Fear motives can be found in the Appendix.

all scales except *Autonomy* motivation met the minimum standard of .60, it was advised to use that scale cautiously in future studies. However, fundamental motive *Autonomy* was not hypothesised to have any effect on IWB in this thesis and the five motives intended for the study all showed high reliability scores of 0.76-0.84.

Although there is some controversy surrounding the use of short scales in research (Kemper et al., 2018), they can be advantageous in certain settings, such as large-scale assessments and online assessments in general due to the fact that lengthy assessments run the risk of participant dropout or decreased response rates, particularly when administered via the internet (Hoerger, 2010; Sandy et al., 2014). As this research intends to draw correlations to behaviours aiming to gather a fairly large sample size as will be discussed in section 4.4., the 16mrs questionnaire was chosen as the only freely accessible, validated measurement tool to assess fundamental motives in research. Further, as the 16mrs was validated in German, a translation of the tool is not necessary. Although only five of the 16 fundamental motives have been hypothesised to affect Innovative Work Behaviour (IWB), the decision was made to use the full 16-scale questionnaire for the following reasons. For one, as there has not been any previous study connecting fundamental motives and innovation or creativity in any capacity, despite being deductive, this research still holds the potential to be exploratory in nature as the other motives can also be tested to explore potential correlations, although unexpected.

<b>Scale</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>H</i></b>	<b>LCRC</b>	<b><math>\alpha</math></b>
Curiosity	3.52	0.97	0.68	0.84 (4)	0.84
Social Acceptance	2.53	0.97	0.40	0.63 (3)	0.64
Dominance	2.39	1.13	0.61	0.82 (4)	0.82
Status	2.17	1.09	0.58	0.78 (3)	0.79
Retention	3.35	0.92	0.49	0.71 (3)	0.72
Autonomy	3.47	0.77	0.32	0.52 (2)	0.55
Social Participation	2.74	1.00	0.57	0.76 (3)	0.78
Morality	3.61	0.77	0.43	0.65 (3)	0.64
Idealism	3.02	1.04	0.56	0.74 (3)	0.76
Structure	2.92	1.18	0.61	0.79 (3)	0.80
Safety	3.16	0.96	0.56	0.75 (3)	0.76
Revenge	2.11	1.19	0.53	0.74 (3)	0.75
Physical Exercise	2.58	1.30	0.76	0.87 (4)	0.89
Food Enjoyment	3.26	1.06	0.64	0.81 (4)	0.82
Family	3.65	1.04	0.62	0.80 (4)	0.81
Sex <sup>a</sup>	2.38	1.06	0.48	0.68 (3)	0.68

<sup>a</sup>*n*=921.

Table 7: Descriptive statistics for the 16 scales, Source: Döhrendahl et al., 2021, p. 8

Further, due to the shortness of the scales, using the full questionnaire would not affect the time needed to answer the questionnaire too much. Therefore all 48 items were added to the source language questionnaire (SLQ) and tested in the pre-pilot in their English version, but since the questionnaire was validated with German items, the scales will not be subject to translation. Permission for use of the questionnaire in this thesis was obtained from the researchers.

### **4.3.2. IWB**

Since the conceptualisation of Innovative Work Behaviour by Scott and Bruce (1994) as described in section 2.1.2., multiple measures have been developed that assess the concept. One of the main differences in the measures available lies in the number of sub-dimensions identified, which range from two (e.g. Krause, 2004; Yuan and Woodman, 2010), to three (Scott and Bruce, 1994), four (de Jong and Den Hartog, 2010; Dorenbosch et al., 2005; Knol and van Linge, 2009; Messmann and Mulder, 2012) or even five sub-dimensions (Kleysen and Street, 2001; Tuominen and Toivonen, 2011).

One of the most frequently used measures in the last five years is a 10-item scale by De Jong and Den Hartog, which defines four stages of Innovative Work Behaviour (IWB): the exploration, generation, championing, and implementation of ideas. While the three latter stages of IWB are found in Scott and Bruce's and Janssen's (2000) research, De Jong and Den Hartog define a pre-stage before idea generation: the exploration of ideas. This stage

describes an individual's exploration of opportunity, e.g. the recognition of problems or disruptors that create possibilities for change and improvement, gaps in the market etc. It draws on creativity research (e.g. Runco and Chand, 1994; Basadur, 2004) which argues that exploration and generation of ideas are rooted in different cognitive abilities. The second stage, the generation of ideas, is strongly linked with creativity and explores the process of developing ideas that are applicable to previously identified problems, new products, or processes. The stage of championing ideas entails the promotion of ideas by gaining the approval of one's work environment and by getting and building the support in form of information and (human and monetary) resources. The final stage in all theoretical IWB models is the implementation of ideas. This includes the realisation of the idea in form of the creation of an intellectual or physical prototype, its improvements and finally integration into the organisational processes or product portfolio.

While most IWB scales are multi-dimensional in theory, the empirical studies are usually one-dimensional in measurement (e.g., Scott and Bruce, 1994; Reuvers et al., 2008). Janssen (2000) was the first to implement a multi-dimensional scale but found such strong correlations that his research suggested that the items can be combined and used as a single additive scale covering all theoretical dimensions.

De Jong and Den Hartog developed an initial 17-item scale, which they tested in a pilot study including 81 employees and their supervisors.

How often does this employee...	Factor 1 (idea generation)	Factor 2 (idea exploration)	Factor 3 (idea championing)	Factor 4 (idea implementation)
(x1) ... pay attention to issues that are not part of his daily work?	0.20	<b>0.52</b>	-0.25	-0.10
(x2)... wonder how things can be improved?	0.19	<b>0.59</b>	-0.22	-0.12
(x3)... search out new working methods, techniques or instruments?	<b>0.75</b>	-0.12	-0.18	-0.03
(x4)...generate original solutions for problems?	<b>0.85</b>	0.07	-0.06	0.03
(x5)...find new approaches to execute tasks?	<b>0.79</b>	0.17	0.15	-0.13
(x6)...make important organizational members enthusiastic for innovative ideas?	0.02	0.03	<b>-0.92</b>	-0.06
(x7)...attempt to convince people to support an innovative idea?	0.05	0.12	<b>-0.76</b>	-0.09
(x8)...systematically introduce innovative ideas into work practices?	0.29	-0.26	-0.18	<b>-0.56</b>
(x9)...contribute to the implementation of new ideas?	-0.01	0.05	0.05	<b>-0.95</b>
(x10)... put effort in the development of new things?	0.02	0.12	-0.22	<b>-0.69</b>
Explained variance	49.9%	15.7%	9.8%	7.4%
Cronbach's $\alpha$ (of bold items)	0.90	0.88	0.95	0.93
Mean correlation (of bold items)	0.74	0.78	0.90	0.82

Table 8: Exploratory Factor Analysis of IWB ( $n = 81$ ), De Jong and Den Hartog (2010), p. 29

While the employees answered self-reporting scales on external work contacts, innovation output and participative leadership, it was the supervisors who were asked to report on the IWB of each participating employee within their team. After the pilot study, the initial 17-item scale was reduced to 10 items (see Table 8) using exploratory factor analysis (EFA). In the main study, the 10-item scale was answered by managers rating a total of 879 “knowledge subordinates” (e.g. engineers, consultants, IT managers) on IWB. The results of six CFA models (Table 9 and Figure 4) show that the four factors all contribute to an overall construct of IWB, confirming the previously conducted research (e.g. Scott and Bruce, 1994; Janssen, 2000) of a one-dimensional additive scale.

Model	Absolute fit		Incremental fit		Parsimonious fit
	GFI (>0.90)	RMSEA (<0.08)	TLI (>0.90)	NFI (>0.90)	$\chi^2/df$ (<5.0)
One factor	0.78	0.18	0.81	0.85	30.19
Two factors	0.85	0.15	0.88	0.90	20.49
Three factors	0.96	0.07	0.97	0.97	5.80
Four factors	0.97	0.06	0.98	0.98	4.63

Table 9: Overall Fit Indices for IWB Scales (n = 879), De Jong and Den Hartog (2010), p. 30

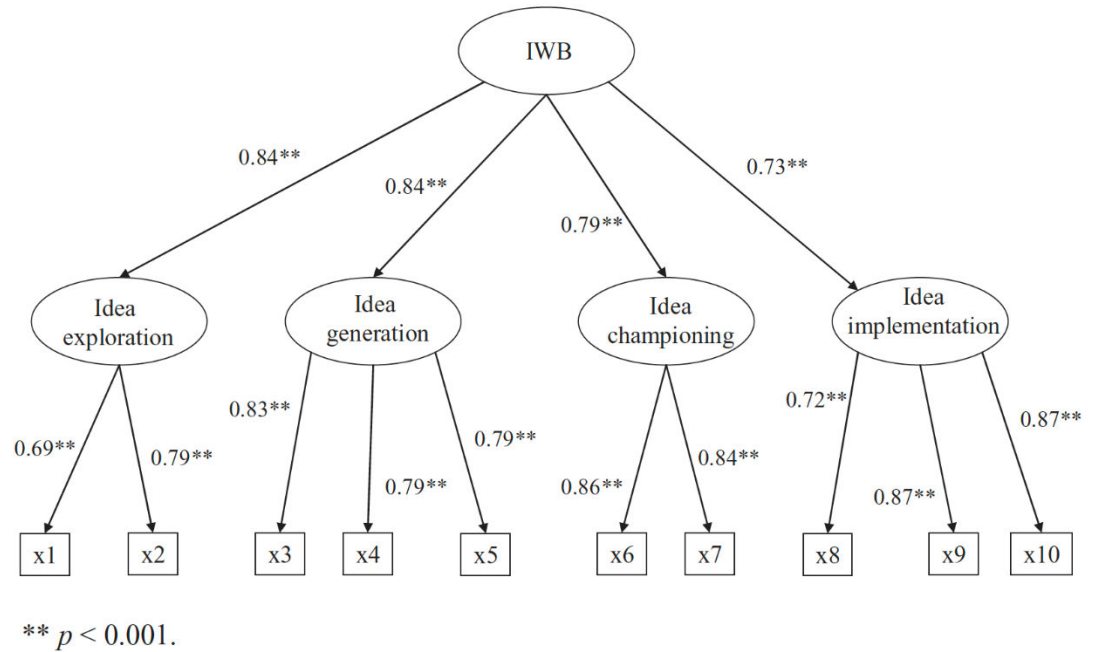


Figure 4: Second Order CFA of IWB ( $n = 879$ ), De Jong and Den Hartog (2010), p. 30

As self-reporting on IWB carries a high potential of social desirability bias because the questions directly relate to employees' work behaviour, the questionnaire using the ten items developed by De Jong and Den Hartog will be distributed to the supervisors of the participants in this study. They will be asked to indicate how often the respective employee performs Innovative Work Behaviour by using a 5-point Likert scale ranging from 1= "never" to 5= "always".

Permission for use was obtained from the researchers. As the scale is only available and validated in English, the 10-item questionnaire will undergo a rigorous translation process which will be explained in detail in section 4.3.6.

### 4.3.3. OCM

One extensively researched and validated theoretical model for understanding organisational culture and effectiveness is the Competing Values Framework (CVF) as discussed in more detail in section 2.3.2. The CVF defines culture along two dimensions: control versus flexibility and external versus internal, which form four quadrants as can be seen in Figure 5. Each quadrant represents a major model of organisational theory and psychology.

Based on the quadrants proposed by the CVF, Patterson et al. (2005) have defined resulting climate variables, which can be measured with their Organisational Climate Measurement tool. Measuring climate can help nurture different quadrants for different departments and teams depending on their desired outcomes (Lamond, 2003; Kwan and Walker, 2004; Kalliath, Bluedorn and Gillespie, 1999).

The OCM by Patterson et al. (2005) for the initially defined 19 subdimensions of climate was first created using 10 items per scale, which they tested, refined, and validated in a study with 6,869 respondents. Refinement of the initial items of the questionnaire was conducted using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). As they found strong correlations between the latent factors “innovation” and “flexibility” (0.94) and between “participation” and “communication” (0.98), they merged the scales into two respective scales “Innovation and Flexibility” and “Participation and Communication”.

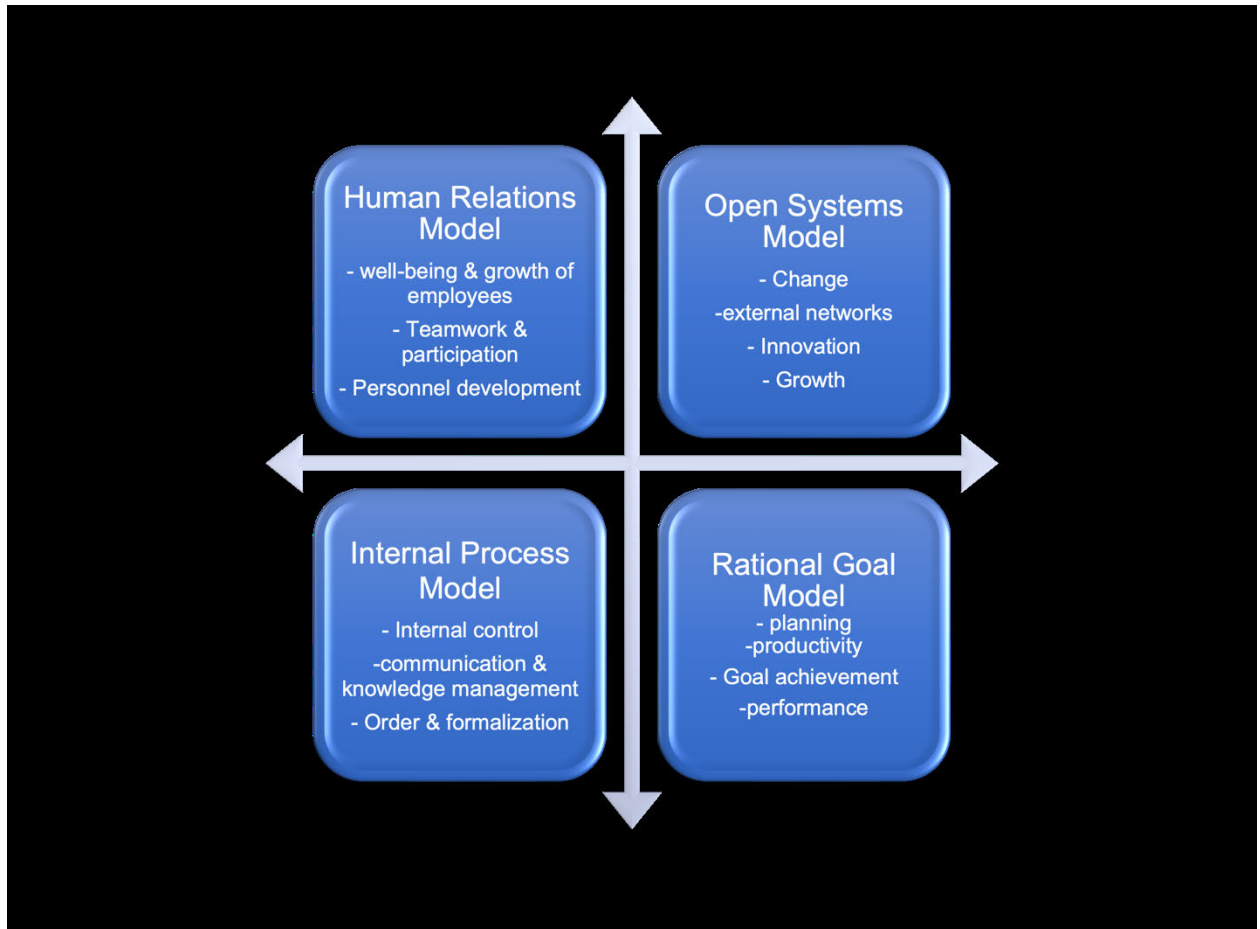


Figure 5: Competing Values Framework Models, based on Quinn (1988)

Further, the initial testing and the refinement stage yielded in the removal of overall 108 items from the questionnaire and into a final 17-scale, 82-item validated questionnaire. The items are rated on a 4-point Likert scale from 1= “definitely false” to 4= “definitely true”.

The final 17-scale Organisational Climate Measure (OCM) created by Patterson et al. (2005) showed good internal reliability with all scales showing a Cronbach’s Alpha of 0.67-0.90, and both concurrent and discriminant validity. In respect to innovation output, the climate measure “Innovation and Flexibility” also showed strong predictive validity. A year after the collection

of climate data from employees, managing directors or heads of production of the respective companies were asked to complete a survey relating to organisational innovation in the areas of products, production technology, and work organisation. Their answers to the organisation's current state of innovativeness were compared to the climate scores collected a year prior in the dimensions "Innovation and Flexibility" and "Reflexivity" and were shown to be significantly associated with each other, thus showing predictive validity of the two scales in connection with a company's innovation performance, as discussed in Chapter Three of this thesis.

The OCM by Patterson et al. (2005) offers many advantages over the old LSOCQ by Litwin and Stinger (1968). It is rooted in a strong theoretical base, the Competing Values Framework, which has prior been developed from extensive theoretical research and validated in various empirical studies. It is comprehensive and offers an extensive look at an organisation's climate across many fundamental dimensions. Further, it is possible and recommended by the authors for other researchers to use the instrument flexibly. It is possible to look at one whole domain by using all scales of one model such as the Open Systems Model. It is also possible to use the OCM in accordance with the tradition proposed by Schneider in 1975 to study a climate *for* a specific purpose as is the case in this study. The climate variables hypothesised to have a direct and mediating effect on IWB in Chapter Three of this thesis autonomy, formalisation, reflexivity, tradition, and flexibility can all be found as measurable and validated scales on Patterson et al.'s (2005) 17-scale OCM. As they were validated in English, all 25 items

of the five scales will be added to the SLQ for translation, after permission for use was obtained from the researchers.

#### **4.3.4. Control Variables**

The utilisation of control variables in management research has become increasingly popular in recent years, with a significant portion of journal articles, approximately 70%, incorporating control variables. Atinc, Simmering, and Kroll (2012) conducted a thorough analysis of 812 empirical articles published from 2005 to 2009, to examine the use of control variables in management research. Their findings suggest that the inclusion of control variables is essential as it is not uncommon for these variables to account for more variance than the main effects.

Nevertheless, the authors caution against simply including control variables without justification or theoretical foundation. They emphasise the importance of providing a strong rationale for the use of control variables and linking them to relevant theories. Additionally, researchers are advised to articulate their expectations regarding the relationship between control variables and dependent variables.

In light of their observations, Atinc, Simmering, and Kroll (2012) suggest that researchers should avoid blindly following the practices of others and instead critically evaluate the theoretical foundation for control variables included in their studies. By adhering to these guidelines, management researchers can better ensure the effectiveness and reliability of their studies.

Following these recommendations, the theoretical underpinnings for using the control variables included in this thesis and presented in this section, have been discussed in more detail in the hypothesis development and conceptual framework section 3.3. and its subsections.

#### **4.3.4.1. Age**

Age is a variable that has been researched in various contexts of change and innovation as was discussed in more detail in section 3.3.1. of this thesis. As the results of the various studies have been mixed overall (Kunze, Boehm and Bruch, 2013; Parsons, 2015), controlling for age in context with Innovative Work Behaviour in this thesis seemed imperative. Due to the relatively small size of some of the companies and teams selected to participate in the study, it was deemed inappropriate to request the precise age of each participant to avoid any potential identification concerns. Therefore, to ensure the anonymity of the participants, adhering to the ethical standards applied in this thesis, which will be outlined in section 4.5., the decision was made to collect data on age ranges, with the options provided as follows: 18-25, 26-35, 36-45, 46-55, and over 56.

#### **4.3.4.2. Gender**

Gender has been included as a control variable in this research as the current body of research that examines innovation through a gender lens (Agnete Alsos, Ljunggren, and Hytti, 2013) has shown that the field of innovation is heavily influenced by gender, as discussed in section 3.3.2. Building on

Wajcman's (2010) perspective, the researchers contend that gender relations both shape and are shaped by innovation. Although the most widely employed response options for questions pertaining to sex or gender remain limited to the binary categories of "male" or "female" in most surveys (Lussenhop, 2018), recent legislative measures have expanded the scope of gender identity categories recognised within official civil records. The German Bundestag<sup>15</sup> passed a resolution in December 2018 that legally permits citizens to identify their gender as "diverse" in addition to the traditional male and female options. As this survey is conducted in Germany with German knowledge workers, to comply with this mandate and to avoid ethical violations by excluding and thus discriminating against non-binary participants, the current questionnaire adopted the response options of "male," "female," and "diverse" when soliciting participants' gender identification.

#### **4.3.4.3. Tenure**

Tenure, like age, is a variable that has been studied by various researchers both empirically and theoretically and has led to some mixed results as has been discussed in more detail in section 3.3.3. Liu, Ge and Peng (2016) conducted a meta-analysis of 76 empirical studies and found a three-way interaction among status hierarchy, position tenure, and organisational

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<sup>15</sup> The "Bundestag" is the German federal parliament, composed of the "Bundestagsabgeordnete" (members of parliament) who are elected by the people of Germany.

tenure, indicating that the relationship between organisational tenure and innovative behaviour is complex and depends on various factors. These findings provide the theoretical foundation to control for tenure as a variable in this thesis. To ensure participant anonymity, tenure will be categorised into four groups (<1 year, 1-5 years, 6-10 years, and >10 years) instead of requesting the exact number of years spent in the organisation, much like the treatment of the control variable "age."

Further, the supervisor survey included control variables to account for any outliers and ensure the validity of the results. Specifically, the variables of tenure in the company, leadership experience with personnel responsibility (optional), years of working with the employee, and years of managing the employee (optional) were included. While these variables are not used to control their effect on innovative work behaviour, they serve to control for any potential confounding factors such as supervisor inexperience or lack of familiarity with an employee. The details of the survey development and changes taken after the pre-pilot test will be discussed in the following sections.

#### **4.3.5. Pre-Testing**

The development of high-quality questionnaires is an essential component of (post)positivist empirical research. The aim of this study was to create two questionnaires: one to measure the fundamental motives of employees and the organisational climate of participating employees and the other to

measure the innovative work behaviour of said employees via their supervisors.

As discussed in section 4.3. rigorous research and finding pre-existing measurement tools can be of great importance and both aspects are part of the recommended structure when designing a survey (Dermatol, 2014). Inaccurate measurement tools can result in data of poor quality (Hair et al., 2019; Henseler, 2015). Even if an instrument has been proven reliable and valid in one environment, it cannot be assumed that it will work equally well in another (Meadows, 2003).

As demonstrated in the previous sections, there are measurement instruments available in German for one and in English for two of the concepts and variables of interest in this study that have undergone testing. Thus, it is logical to employ these scales in this research. To mitigate the potential risks that can come with using existing measurement tools, it was ensured that all scales employed in the study have achieved a minimum Cronbach's Alpha of  $>.60$ , as recommended by Hair et al. (2019) and Zikmund et al. (2013).

To further improve the quality of the data collected, a pre-test was conducted on the draft questionnaires (Schrauf and Navarro, 2005). By doing so, any issues with the questionnaire's clarity, language, and structure were identified and addressed prior to starting the translation process and the subsequent actual data collection.

To ensure the validity and reliability of the questionnaires for the study, pre-testing was conducted using the draft versions of the employee and supervisor questionnaires.

#### 4.3.5.1. Pre-Testing of the Employee Questionnaire

After the evaluation of the measures available and variables to be controlled, a first draft of the questionnaire was created in English. The measures assumed including their scales, number of items and Cronbach's Alpha from previous research can be seen in Table 10. Pre-testing of the questionnaire drafts was an essential step in ensuring the validity and reliability of the survey instruments. For the employee questionnaire, a total of eight individuals were selected to participate in the pre-test. The group comprised three experienced survey researchers, who were also native English speakers, and five knowledge workers from the German private sector. The latter group were selected as they were part of the target population and spoke English fluently, despite not being native speakers.

Dimension	Measure	Scale	Items	Cronbach's Alpha
<b>Fundamental Motives</b>	16mrs (Döhrendahl et al., 2021)	6-point scale, 0 = "does not apply at all" to 5= "applies completely"	48	<i>Curiosity</i> =0.84 <i>Dominance</i> =0.82 <i>Structure</i> =0.80 <i>Safety</i> =0.76 <i>Social Participation</i> =0.78
<b>Organisational Climate</b>	OCM (Patterson et al., 2005)	4-point scale, 1= "definitely false" to 4= "definitely true"	25	<i>Autonomy</i> =0.67 <i>Formalisation</i> =0.77 <i>Tradition</i> =0.73 <i>Innovation and Flexibility</i> =0.86 <i>Reflexivity</i> =0.76

<b>Company</b>		nominal	1	
<b>Department</b>		nominal	1	
<b>Age</b>		18-25 26-35 36-45 46-55 >56	1	
<b>Gender</b>		male female diverse	1	
<b>Tenure in company</b>		<1 year 1-5 years 6-10 years >10 years	1	
<b>Tenure in department</b>		<1 year 1-5 years 6-10 years >10 years	1	
<b>Total items</b>			<b>77</b>	

*Table 10: First Draft of Employee Survey Questionnaire*

The questionnaire was distributed via the web based JISC Surveys, formerly known as BOS, which was also intended for use in the actual study. Participants were asked to time themselves as they completed the survey, including reading the introductory text and closing statement, to ensure that the survey could be completed within a reasonable timeframe. Cognitive interviews were conducted to gather feedback from the pre-test participants on the clarity of the questionnaire and to address any questions they may have had. Cognitive interviews are a research method used to evaluate

survey questions by asking participants to verbalise their thought processes as they respond to the questions (Ryan et al., 2012). This method allows researchers to identify areas of confusion or ambiguity in survey questions and to make necessary revisions.

#### 4.3.5.2. Pre-Testing of the Supervisor Questionnaire

Similarly, a pre-pilot test was conducted for the first draft of the supervisor questionnaire. The measures assumed including their scales, number of items and Cronbach's Alpha from previous research can be seen in Table 11. Four English native-speaking supervisors working for a German organisation were asked to fill in the survey and imagine evaluating a real employee of theirs when completing the questionnaire about the Innovative Work Behaviour of employees. The supervisors were instructed to time themselves as they filled in the survey, including reading the introductory text and closing comments. They were encouraged to fill in the survey multiple times, imagining filling it in for different team members, and to provide feedback through cognitive interviews.

Dimension	Measure	Scale	Items	Cronbach's Alpha
<b>Innovative Work Behaviour</b>	IWB (de Jong and Den Hartog, 2010)	5-point scale, 1="never" to 5="always".	10	Factor 1=0.90 Factor 2=0.88 Factor 3=0.95 Factor 4=0.93
<b>Company</b>		nominal	1	
<b>Department</b>		nominal	1	

<b>Age</b>		18-25 26-35 36-45 46-55 >56	1	
<b>Gender</b>		male female diverse	1	
<b>Tenure in company</b>		<1 year 1-5 years 6-10 years >10 years	1	
<b>Management experience</b>		<1 year 1-5 years 6-10 years >10 years	1	
<b>Total items first time</b>			<b>16</b>	

Table 11: First draft Supervisor Survey Questionnaire

Overall, the pre-testing phase was critical in the development of valid and reliable survey instruments. The feedback gathered through cognitive interviews allowed for revisions to be made to the questionnaire drafts, which improved the clarity and overall quality of the survey instruments. This process was instrumental in ensuring that the final versions of the questionnaires and will be discussed in the following subsection.

#### 4.3.5.3. Adaptation and Second Draft of Questionnaire

Pre-pilot testing was conducted on both questionnaires using cognitive interviews to gather feedback on their clarity and content. This section will summarise the adaptations made to the questionnaires in response to this feedback.

The pre-test for the employee survey involved eight participants, including three experienced researchers and five knowledge workers from the German private sector who spoke English proficiently. The participants reported taking between 8 and 12 minutes to fill in the questionnaire and read the introductory text and closing statement, which was deemed an appropriate time frame for the survey.

Feedback from the researchers included suggestions that the language used in the introduction text was too stilted, the study title was not engaging enough, and the introduction text revealed too much detail about the study. They also criticised the fact that there were too many items per page.

Conversely, the feedback from the knowledge workers was more content-related than form-related. They expressed concerns about the inclusion of items from the "sex" scale from the 16mrs, stating that they personally felt uncomfortable answering those items and did not see their relevance. They further believed that many participants, being aware of the cultural context of German businesses, would drop out when reaching the first of those questions. Additionally, they expressed concerns about obtaining permission from the works council to distribute the survey, which is typically required in German organisations, if the scale was included.

Another point of confusion for the knowledge workers was the question about the department in which they worked. Some raised concerns about anonymity, as some people work in very small departments with only three or four people, while others said it influenced the understanding of the organisational climate questions. It confused them whether the organisational climate referred to the climate in the whole company or in their team because those could potentially be very different.

Overall, participants found the items to be clear and easily understandable, and the questionnaire was deemed engaging.

In response to the feedback gathered from the pre-pilot testing, several changes were made to the questionnaire. The language in the introduction text was revised to be less stilted, the study title was made more engaging, and the introduction text was shortened to avoid revealing too much detail about the study. Items per page were reduced, and items from the "sex" scale were removed to avoid potential discomfort and dropouts from participants.

Dimension	Measure	Scale	Items	Cronbach's Alpha
<b>Fundamental Motives</b>	16mrs (Döhrendahl et al., 2021)	6-point scale, 0= "does not apply at all" to 5= "applies completely"	45	<i>Curiosity</i> =0.84 <i>Dominance</i> =0.82 <i>Structure</i> =0.80 <i>Safety</i> =0.76 <i>Social Participation</i> =0.78
<b>Organisational Climate</b>	OCM (Patterson et al., 2005)	4-point scale, 1= "definitely false" to 4=	25	<i>Autonomy</i> =0.67 <i>Formalisation</i> =0.77 <i>Tradition</i> =0.73 <i>Innovation and Flexibility</i> =0.86

		"definitely true"		Reflexivity=0.76
<b>Company</b>		nominal	1	
<b>Department (optional)</b>		nominal	(1)	
<b>Age</b>		18-25 26-35 36-45 46-55 >56	1	
<b>Gender</b>		male female diverse	1	
<b>Tenure in company</b>		<1 year 1-5 years 6-10 years >10 years	1	
<b>Total items</b>			<b>74 (75)</b>	

Table 12: Second draft of Employee Survey Questionnaire

Finally, the department question was made optional, and a clarification sentence was added to the introduction text to specify the context of the organisational climate questions. The adaptations made were added to the overview in Table 12.

To evaluate the supervisor survey questionnaire, a pre-pilot was conducted with four supervisors, all of whom were English native speakers working in German private organisations. Each participant was asked to complete the questionnaire at least twice, and to time how long it took to complete on the

first and each subsequent occasion, as supervisors in the survey may be required to rate multiple employees.

Overall, the supervisors provided positive feedback regarding the introductory text and the items included in the IWB scale. However, they expressed some concerns about the control variables included in the survey. Specifically, they criticised the use of the term "management experience," which they believed should instead refer to leadership experience with personnel responsibility, as that was deemed more relevant to the study. Additionally, the supervisors indicated that they may not be able to answer IWB items for all employees if they have only managed or known them for a few weeks or months.

Regarding the time required to complete the survey, the supervisors reported an average completion time of two minutes, which they considered reasonable and estimated a completion time of one minute for the items of the IWB questionnaire. However, all four participants commented that answering the same demographic questions for each employee was tedious and redundant, and negatively impacted their motivation to complete the questionnaire.

To address these concerns, several adaptations were made to the questionnaire. Firstly, the term "management experience" was replaced with "leadership experience (with personnel responsibility)" to more accurately reflect the skills and competencies required by supervisors in the study. Additionally, two new questions were added to determine the length of time supervisors had known and directly managed each employee, which would help control possible outliers later in the data analysis.

To address the issue of tedious and redundant demographic questions, a new question was added to determine whether participants were completing the survey for the first time or not. If they indicated that it was their first time, they were prompted to answer the full set of demographic questions, while subsequent completions only required them to answer questions about the employee in question but not about their own demographic data.

Dimension	Measure	Scale	Items	Cronbach's Alpha
<b>Innovative Work Behaviour</b>	IWB (de Jong and Den Hartog, 2010)	5-point scale, 1= "never" to 5= "always".	10	Factor 1=0.90 Factor 2=0.88 Factor 3=0.95 Factor 4=0.93
<b>Company (only first time filling out the questionnaire)</b>		nominal	1	
<b>Department (only first time filling out the questionnaire)</b>		nominal	1	
<b>Age (only first time filling out the questionnaire)</b>		18-25 26-35 36-45 46-55 >56	1	
<b>Gender (only first time filling)</b>		male female	1	

out the questionnaire)		diverse		
Tenure in company (only first time filling out the questionnaire)		<1 year 1-5 years 6-10 years >10 years	1	
Leadership Experience – with personnel responsibility (optional and only first time filling out the questionnaire)		<1 year 1-5 years 6-10 years >10 years	(1)	
Years of working with the employee		<1 year 1-5 years 6-10 years >10 years	1	
Years of managing the employee (optional)		<1 year 1-5 years 6-10 years >10 years	(1)	
<b>Total items first time</b>			<b>16 (18)</b>	
<b>Total items subsequently</b>			<b>11 (12)</b>	

Table 13: Second draft of Supervisor Survey Questionnaire

These adaptations were designed to improve the overall user experience of the survey and increase the likelihood of full completion by all participants.

The overview of the adapted questionnaire can be seen in Table 13.

#### 4.3.6. Translation Process

Accurate translations of questionnaires are crucial in ensuring the validity of research studies conducted in multilingual environments. Translations, therefore, need to be carried out sensitively to capture nuances, shades of meaning, and cultural differences. The challenge lies in accurately translating words and phrases that have no direct equivalent in the target language. In addition, positioning statements as well as attitude dimensions can be difficult to translate due to their subtle differences in meaning (Bruce, 2003). One of the most comprehensive methods for translating questionnaires is forward-backwards-translation. This method involves translating the source instrument into the target language by a bilingual expert and then translating it back into the source language by another bilingual expert to ensure quality. However, this approach is costly and time-consuming, and the availability of bilingual experts is often limited. Additionally, there is no absolute guarantee of equivalence between the source and target instrument despite back-translation. Despite these limitations, back-translation or the even more rigorous double-back-translation (Brislin, 1980) is considered to be the most effective method to achieve equivalence in questionnaire translation compared to other approaches (Sousa and Rojjanasrirat, 2011). The literature generally recommends this method over other approaches when translating questionnaires although there are some limitations here too as certain terms are very particular to the target population and finding bi-lingual experts who also belong to the target population is extremely difficult. Further, as Bruce (2003) points out, some native speakers who are bi-lingual may have lived in a foreign country for too long to correctly translate more modern

colloquialisms. For this reason, the more rigorous version of the double-back-translation method (Brislin, 1980), the FACIT (*Functional Assessment of Chronic Illness Therapy*) method (Eremenco et al., 2005), was used as the basis for developing the translation process in this research but adjusted to the research at hand and the available resources. The translation process steps taken are outlined in Figure 6. The FACIT method recommends two professional translators to independently translate the source document into the target language. This was done and it is important to mention that both translators have degrees in English, a master's degree, and a PhD respectively, and are German native speakers. While the FACIT method recommends using a third independent translator to reconcile the two forward translations, a slightly different approach was chosen for this research. In a one-hour-long meeting with the two forward translators, the author, and their supervisor the translation was reviewed, and the discrepancies were discussed. A version was found that was considered suitable by all four parties involved. The details of the discussion that have led to changes will be discussed in more detail in the following subsection.

While the FACIT method recommends spending the reconciled version to be blindly back-translated by a native English speaker fluent in the target language, a more rigorous approach was chosen in this study. The reconciled version in German was independently sent to two professional translators for blind retranslation. Again, both translators had master's degrees in English and German, but this time both translators were British English native speakers, one living in the UK and one living in Germany. This was an attempt to avoid the pitfall raised by Bruce (2003) as mentioned earlier in this section

that living in a foreign country may influence a native speaker's colloquialism usage. While the FACIT method again recommends a review by the questionnaire developer of the back-translation to be carried out, this research has chosen to do this in a meeting with both back-translators and the author where the blind retranslation was compared to the original items. In an hour-long meeting, the discrepancies between the original English items and the blind retranslation were compared and the reconciled translation in German was discussed and reviewed.

The full document including the English original, the two forward translations, the reconciled translation and the blind retranslation was sent to two independent reviewers to suggest appropriate translations for each item.

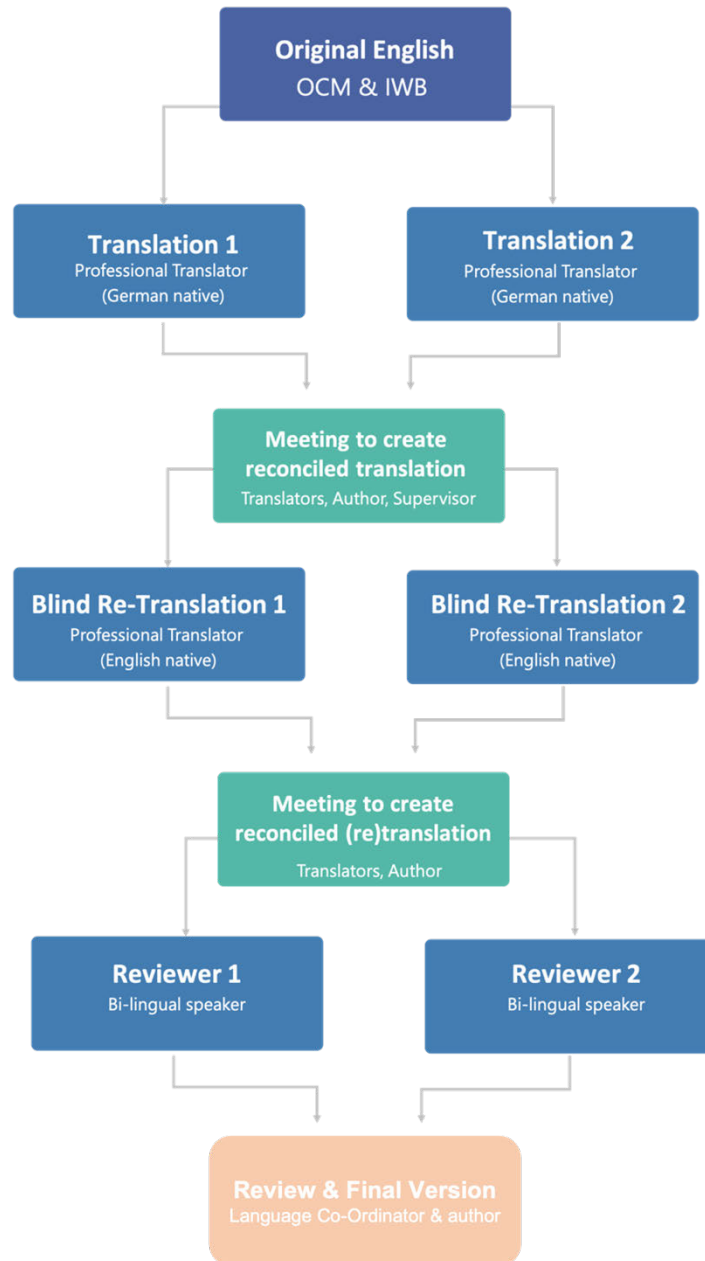


Figure 6: Translation process used in this research by adapting the FACIT methodology, (Eremenco and Arnold, 2005) and recommendations by Wild et al. (2005)

While the FACIT method suggests sending this to at least three independent reviewers, the decision here was made to send this to two reviewers first. One was an English native speaker living in Germany who has worked in the German private sector for over 30 years, while the other was a

German native speaker living and working in the UK, who has worked in both the German and British economy for over 20 years. It was deemed important to have the input of people who are bi-lingual and have experience with the terminology used in German organisations. The full document including the reviewers' comments was sent to a language coordinator, as recommended by the FACIT method. The language coordinator in this research was a state-certified translator for German-English and English-German who has been working as a professional translator and interpreter for a big German corporation for over 20 years. The review and finalisation process were done subsequently and in a written form and the full translation and review document has been added to the appendix. Ultimately, the finalised version of the language coordinator was reviewed by the author of this study, a bi-lingual speaker of English and German, and the final German version was put forth. The changes made and issues raised in the translation process will be discussed in detail in the following subsection.

#### **4.3.6.1. Discussion Points in the Translation Process**

Translation and review processes play a vital role in ensuring the accuracy and consistency of research findings, particularly when it comes to translating text from one language to another as discussed in the previous section. In this study, several translation and review meetings were held to ensure that the German translations accurately reflected the original English text.

During the translation process, it became apparent that certain phrases and terms were difficult to translate directly into German, which led to a discussion

during the review meetings and negotiation among the translators and reviewers. For example, the phrase "much of the time" posed a challenge, as it could be translated as either "häufig" or "meistens", which respectively mean "often" or "mostly". After careful consideration, it was decided that "meistens" more accurately conveyed the intended meaning of the phrase in the context of the research study.

Another term that proved difficult to translate was "people at the top", as the original English phrasing was ambiguous and did not clearly specify whether it referred to senior management, direct supervisors, or the board. Given the precise nature of the German language, the translators and reviewers struggled to find an appropriate German equivalent that accurately reflected the intended meaning of the phrase. Two translations were suggested: "Personen in Führungspositionen" which translates to "people in leadership positions", and "Führungsspitze" which translates to "top management". However, it was determined that the former term was too broad, while the latter term was too narrow, as it is commonly understood to refer exclusively to board members. After consulting with an HR and a legal expert working both nationally and internationally for a big German corporation, a reconciled version was agreed upon: "Führungsebene", which translates to "management level employees". This term was accepted by all reviewers and the language coordinator.

Similarly, the colloquial phrase "check things with the boss" posed a challenge for translation. Two translations were suggested by the forward translators: "konsultieren" (consult) and "besprechen" (discuss). After a discussion with the translators, the reconciled version agreed upon was

"abklären" (clear), but reviewer 2 suggested "Rücksprache halten" which translates to "confer". This latter phrase was ultimately deemed the most appropriate translation by the language coordinator and the author of the thesis.

Another example of a term that was carefully considered and discussed during the translation and review process was the term "performance". One forward translator translated the term as "Leistung", which, however, can carry various meanings from "achievement" to "effort", and "power" to "accomplishment". The other forward translator suggested using the English loanword "performance", which is commonly used in the business context. After considering both options, it was determined that "performance" more accurately conveyed the intended meaning of the term in the context of the research study, and this was accepted by both reviewers, the language coordinator, and the author.

The term "search out" was also a matter of discussion, with one forward translator suggesting "suchen nach", which translates to "search for", and the other translator suggesting "aufspüren", which translates to "seek out". The decision was made to use "aufspüren" as it more closely conveyed the active search for new methods and tools as an aspect of Innovative Work Behaviour. However, both reviewers preferred the softer "suchen nach". After careful consideration and discussion, it was ultimately determined that "aufspüren" was the most appropriate term to use, and this was reflected in the final version of the translation.

Lastly, the term "senior management" proved to be particularly contentious, with one forward translator suggesting "Geschäftsführung," which commonly refers to the executive board, while the other suggested "gehobenes management," which translates to upper management. The second version was accepted by Reviewer 1 and the language coordinator, while Reviewer 2 suggested using the term "Geschäftsleitung" which translates to executive board, so in fact is a synonym of the term suggested by one of the forward translators. However, during cognitive interviews conducted with one member of a legal department and one member of the HR department of a large German private company who had agreed to do the pilot test, both experts, who work both nationally and internationally, said that an important distinction needs to be made here, as senior management in English typically refers to managers with the power to hire and fire, and that the correct German equivalent for this legally would be "leitende Angestellte." For this reason, the final version was changed to reflect this.

The consultation with the HR and legal expert did not otherwise change the final versions agreed upon with the language coordinator, as they found, independently of each other, that everything else was clear and reflected colloquialisms used in the German private sector well.

In conclusion, the translation and review process undertaken in this research involved the use of forward translation, blind retranslation, reconciliation meetings, review, and cognitive interviews. While forward translation helped to identify problematic terms and concepts, blind retranslation helped to identify errors and inconsistencies that needed to be addressed. Reconciliation meetings provided a forum for discussing and resolving

differences in translation choices, and cognitive interviews helped to ensure that the translations were clear and meaningful to the intended audience. Overall, this process helped to produce a final German version that accurately and appropriately conveyed the meaning and intent of the original English text.

Furthermore, the discussions that took place during the translation and review process highlighted the importance of understanding the cultural context and nuances of language when translating between languages. Differences in language structure, cultural connotations, and legal frameworks can all affect the appropriate translation of terms and concepts. Therefore, it is important to involve language experts and subject matter experts in the translation and review process to ensure that the translations accurately reflect the intended meaning and audience. The full translation and review process document can be found in the appendix.

Despite the rigorous process undertaken, it is still important to test the questionnaire with a small sample of the target audience (Neumann, 2014) as will be done in the pilot test and discussed in more detail in section 4.4.3.

#### **4.4. Sampling and Data Collection**

Before administering the questionnaire or even running a pilot study, which is recommended to be done using the same administrative process for testing purposes and a representative subset of the participant sample (Meadows, 2003), it is essential to first identify the target population and subsequent

sample and sample size properly before embarking on the pilot and finally main study.

Thus, in this section, the methodology employed in the present research will be presented, with a focus on the target population, the sampling process, and the data collection process. As emphasised by Creswell and Creswell (2018) a representative sample that accurately reflects the relevant population of the research is essential for generating reliable findings. Therefore, this chapter will begin by introducing the target population and outlining the process of determining the appropriate sample size.

Furthermore, this section will provide insight into the adjustments made to the actual data collection process based on the learnings from the pilot study. One of the challenges addressed in the pilot study was how to maintain participant anonymity while still enabling a matching process between the responses of employees and their supervisors. This section will explore the strategies employed to address this challenge and maintain the confidentiality of the participants.

#### **4.4.1. Target Population**

In our ever faster changing digital world, the involvement of all employees in innovation processes is required and as Mumford (2003) pointed out, research is needed that includes all knowledge workers rather than only the ones directly involved in innovation projects as they are essential for driving innovation, productivity, and competitiveness. As originally defined by Peter Drucker (1959/2019), knowledge workers in a company are those who use

their expertise and intellectual abilities to create products and services based on theoretical and analytical knowledge. The rise of globalisation and thus outsourcing of manufacturing into emerging markets and machine learning are making knowledge workers invaluable contributors to economic growth, social cohesion, and innovation (Kriechel, Düll and Vogler-Ludwig, 2016; Mumford, 2003). According to the long-term forecast for the German labour market for 2030 by Vogler-Ludwig, Düll and nine other researchers (2016), which analyses the economic and social implications of digital transformation, the German labour market is expected to face several challenges, including demographic change, skill shortages, technological transformation, and global competition. To overcome these challenges, knowledge workers will play a crucial role in fostering innovation as they are uniquely positioned to generate new ideas, create, and implement innovative solutions, and drive the development of emerging technologies. According to the report, Germany's competitive edge is perceived to be primarily in knowledge-based services, where human capital is viewed as the key resource for the future. This not only holds the potential for success in global markets but also generates the most significant developmental impacts in the domestic market. For this reason, the target population of the study is the knowledge workforce of the German private sector.

Determining the target population is a critical step in survey research, however, finding the exact number of “knowledge workers” in Germany proved a rather difficult endeavour despite a rigorous web search. For this reason, the number of knowledge workers in the German private sector was estimated using the approach detailed below.

According to the “Statistisches Bundesamt”<sup>16</sup>, there are approximately 41.6 million employees in Germany, excluding "non-standard employees", such as individuals who are self-employed, on zero-hour contracts, or working as freelancers or gig workers. Around 42.2% of workers in total, according to the European Labour Force Survey (LFS) from 2022, were estimated to be knowledge workers in Germany in 2021. The public sector employed around 33% of the workforce in 2021, compared to 67% in the private sector. Based on the study's definition, assuming the same percentage for standard employee knowledge workers and applying this to the private sector would amount to an estimated 11.7 million individuals.

#### **4.4.2. Sampling**

Surveying the entire population of 11.7 million employees, as would be the case in this research, is neither practical due to time and budget constraints nor, most importantly, necessary. Therefore, a common method applied is the survey of a sample. As stated by Saunders, Lewis, and Thornhill, the accuracy of the findings and the amount of time and money spent on data collection, checking, and analysis are balanced by probability sampling (Saunders et al., 2012).

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<sup>16</sup> The “Statistisches Bundesamt” is the German Federal Statistical Office. Its UK equivalent is the "Office for National Statistics" (ONS) and its US equivalent would be the “United States Census Bureau”. These are the national principal agencies responsible for producing data about the people and economy of a nation.

Statistical probability is the basis for generalisations about populations from data collected using any probability samples. The choice of sample size is determined by the level of certainty needed in the data, the margin of error that can be tolerated, and the types of analyses that will be conducted. Many statistical techniques have a minimum threshold of data cases for each category, and this, to a lesser extent, is influenced by the size of the total population from which the sample is drawn.

Determining the appropriate sample size is a crucial step in planning a research project as it impacts the power of the study (Tabachnick and Fidell, 2018). However, determining the appropriate sample size can be challenging for researchers as there are no universally accepted guidelines (Kline, 2015), however, several rough guidelines are available in the literature to determine the minimum sample size. For instance, Kline (2015) suggests that SEM analyses of moderate complexity necessitate at least 200 cases as a minimum sample size. On the other hand, Muthén and Muthén (2002) propose that for normal distribution and no missing data, a minimum sample size of 150 cases is required. Additionally, researchers often use N:q ratios, which refer to the ratio of observations to estimated parameters or variables, as a guideline when determining the appropriate sample size for their study. One common guideline is the 10:1 ratio, meaning that for every estimated parameter or variable, there should be at least 10 observations. According to Kline (2015), however, the appropriate sample size for advanced analytical methods like structural equation modelling (SEM) should be determined based on a ratio of 20:1. Kline argues that these methods are particularly sensitive to inadequate sample sizes and require a larger number of cases to

ensure sufficient statistical power. Therefore, a larger ratio of observations to estimated parameters is recommended to minimise the risk of obtaining inaccurate or misleading results in SEM analyses. The research at hand, as shown in the previous chapter and the previous section of this chapter consists of five independent and five mediating variables. Thus, 20:1 ratio proposed by Kline (2015) for SEM analysis intended to be used in this research, a sample of a minimum of 200 participants would be necessary to achieve sufficient power in this analysis.

A third way of calculating the necessary sample size is by taking into consideration the confidence level necessary and the margin of error tolerated in your data, as well as the population size and the population portion studied. For the purpose of this study, a web-based sample size calculator<sup>17</sup> was used, which, for calculations of finite population size, like the study at hand, operates on basis of the following formula where **z** is z score, **p̂** is the population proportion, **n** and **n'** are sample size, and **N** is the population size.

$$CI' = \hat{p} \pm z \times \sqrt{\frac{\hat{p}(1-\hat{p})}{n'} \times \frac{N-n'}{N-1}}$$

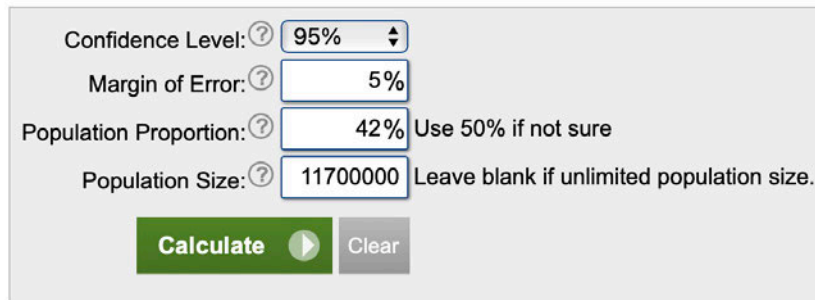
As can be seen in Figure 7, the confidence level required for this study was set to 95% with a margin of error of 5%, which is the typical recommendation for most studies (Saunders et al., 2007).

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<sup>17</sup> <https://www.calculator.net/sample-size-calculator.html>

## Sample size: **375**

This means 375 or more measurements/surveys are needed to have a confidence level of 95% that the real value is within  $\pm 5\%$  of the measured/surveyed value.



Confidence Level: ?	95%	
Margin of Error: ?	5%	
Population Proportion: ?	42%	Use 50% if not sure
Population Size: ?	11700000	Leave blank if unlimited population size.


**Calculate**  **Clear**

Figure 7: Result of Sample Size calculator, Source: <https://www.calculator.net/sample-size-calculator.html>

As knowledge workers comprise 42% of the finite population of workers in the German private sector with an estimated 11.7 million, the population portion was set to 42%. The results indicate that a sample size of 375 survey participants would be sufficient or satisfactory for achieving reliable and accurate findings. Before preparing a plan on how to distribute the surveys and which companies to approach, a pilot study was conducted with the IT department of a big manufacturing company in the German food sector. The procedure and insights which have led to modifications of the intended approach will be discussed in more detail in the following subsection.

### 4.4.3. Pilot Study

Pilot studies should entail conducting a comprehensive test of the administrative process by administering the questionnaire to a subset of the participant sample before embarking on the main study (Meadows, 2003). In line with this recommendation, the administrative procedure intended for the

main study was employed during the pilot test and then adjusted according to the feedback and experience gathered through the pilot.

The pilot study was carried out within the IT department of a family-owned German company that employs approximately 18,000 people globally. The IT department employs around 120 German-speaking IT experts based in their German headquarters. A one-page document was initially created to outline the objectives and procedures of the study, which was then requested by the senior executive manager to be disseminated among the entire department to encourage participation. As evident from the document found in Appendix N, the original approach required participants to disclose their real identities to establish a connection between the managers' and employees' questionnaires. However, it was promised that the data collected would be treated with the utmost confidentiality, and only anonymised, aggregated data would be published or reported.

Nevertheless, this approach was rejected by the senior executive manager, who suggested using a coding system instead of the employees' actual names. The revised approach was accepted, and a new version of the one-pager was sent to the senior executive reflecting the change as. Subsequently, the team leads were requested to develop codes for their employees, complete the supervisor survey for each employee, and encourage their team members to participate. All participants in the pilot study were offered the option to contact the researcher if they had any questions or comments and to provide feedback on the questionnaire's clarity. The pilot study was conducted from November 4th to November 12th, and 33 questionnaires were returned. A return rate could not be established as the

information to how many employees the survey was distributed by the team leads, was not disclosed. Of these 33 returned surveys, 11 were employee surveys on motivation and organisational climate, and 22 were supervisor surveys on their team members' Innovative Work Behaviour. Only one match was found between the employee and supervisor surveys. One team lead and two employees contacted the researcher with feedback on the questionnaire as it contained some orthographical mistakes. This chance was used to ask for feedback on the clarity of the questions and the time needed to complete the survey. The feedback was positive, confirming the clarity of all items and the time needed to fill in the employee and the supervisor survey confirmed the times participants of the pre-test had given of 10-12 and 1 minute respectively.

Despite the initial disappointment of the pilot study, which revealed that only one match between the supervisor and employee surveys could be made, additional problems were uncovered. Specifically, it was discovered that two different supervisors filled out a survey for the same employee or that the same code was created by different supervisors, resulting in duplicate codes. As the team leads created their own codes without consulting the researchers, verifying these codes in advance was impossible. Furthermore, the original distribution method, which relied on the senior executive and team leads to disseminate the study information, proved ineffective, as the senior executive was too preoccupied to send out reminders to encourage employee participation.

To address these issues, changes were made to the administration process of the questionnaires, which will be discussed in more detail in section 4.4.4.2.

#### **4.4.4. Data Collection**

As discussed in 4.4.2 the study aims to gather a sample size of N=375. Assuming the most conservative response rate of 30% (Sekaran and Bougie, 2016), the goal is for the questionnaire to be distributed to at least 1250 knowledge workers and their respective supervisors using the tool “Online Surveys” (formerly BOS). The following section will outline how participating companies were sourced in detail followed by a section on the actual data collection process.

##### **4.4.4.1. Sourcing of Participating Companies**

Several methods to source participants from the target population and to raise the response rate, while ensuring informed consent and maintaining anonymity, were applied. A full analysis of the organisational climate was promised to participating organisations and departments, along with a benchmark comparison with other participating companies, and a short consultation on supporting innovative work behaviour of employees. It was further ensured and communicated with both the companies, their HR departments and ultimately the participants that individual data would not be shared with organisations, but only summary data would be provided.

To source participants from the target population, various avenues were pursued. Two different business networks were contacted which chose to approach their network in two different ways. The one-pager previously created for this research was distributed via email by the first network, with

the contact information of the researcher provided for questions on the study. Overall, around 30 companies were approached using this method, and five companies showed interest. These companies were given a 30-minute pitch with a presentation deck and sent additional material on the study, such as the measures taken to adhere to the GDPR, and the incentives offered. These incentives, as outlined above, include a benchmark analysis between all participating companies, a presentation of the results, and a short two-hour consultation on what the business can do to support the innovative work behaviour of their employees. One of the five initially interested companies that were sourced via the network participated in the study. The second network invited the researcher to present the study digitally via Zoom to their interested members. Six companies attended the presentation, and all of them showed interest. Eventually, one of the six companies participated in the study.

The researcher's own personal and business network was also utilised. Clients, students, and university professors were asked for direct participation of their companies, to send out calls into their own networks, or provide the researcher with a list of companies and names to approach. Overall, emails and calls were made to 60 companies, and 20 companies showed interest and were given presentations. Five companies sourced via this avenue ended up participating. While many companies expressed interest, quite a few had issues obtaining approval from their works council and HR departments respectively, as they preferred to only conduct internal employee surveys for their own interest. Others cited time constraints or economic difficulties arising from COVID-19.

Finally, the researcher utilised the social network LinkedIn to post a call for participation, specifically targeting start-up and young (<20 years old) companies in order to diversify the age range of participating companies. Three companies expressed interest in the study, and two of them ultimately participated.

In total, eight companies from different industries participated in the study, with questionnaires sent to 1,024 knowledge workers across these companies. The data collection process is detailed in the following subsection, while response rates and data analysis are further discussed in Chapter Five.

#### **4.4.4.2. Distribution of questionnaires**

In order to collect data for the study, participating companies assigned a project manager, typically an HR manager or an assistant, who was responsible for overseeing the data collection process. These project managers allocated time to contact participants and their supervisors to inform them about the study and their involvement in it.

The project managers then created a list of participants to whom the company would send the link to the study. To ensure anonymity, a code was assigned to both the supervisor and each employee, and this code was used throughout the study to identify participants. The list was then given to the researcher without the participants' names, although the company retained this information in case it was needed. The researcher only received

individual answers with the code, and the company only received aggregated results, which helped to ensure anonymity for participants.

Once the list of participants was created, the project managers sent out employee survey links requesting participants to fill out a questionnaire on motivation and organisational climate. To encourage participation, project managers reminded employees at least twice during the data collection period to fill out the survey.

Upon completion of the employee survey, the project manager received an Excel sheet from the company with the codes that had been created. This file indicated which employees had participated and kicked off the data collection process of the second data set. The list of participating employees, including names and codes, was sent to their respective supervisors with their own codes. This two-step process helped to avoid wasting supervisors' time filling out surveys about employees who would not end up participating, ensuring a higher level of engagement from supervisors. Furthermore, supervisors knew that some work had already been done by their team members, which helped encourage their participation. Due to this two-step process and as other participating companies were being sourced during the ongoing data collection process, the time frame of the data collection is not as straightforward and has therefore been summarised in Table 14.

Using the coding system, data sets 1 and 2 were matched to test correlations between an employee's fundamental motives and their perception of the organisational climate using Structural Equation Modelling, which will be discussed in more detail in Chapter Five.

In summary, the process of data collection for this study involved assigning project managers to oversee the data collection process, creating lists of participants with assigned codes to ensure anonymity, sending out survey links to participants, and matching data sets to test correlations between variables. The use of codes and anonymous surveys helped to protect participants' identities and ensure confidentiality, while reminders from project managers and a two-step process for supervisors helped to increase participation rates.

<b>Company</b>	<b>Data Set 1 time frame</b>	<b>Data Set 2 time frame</b>
1 – Pilot	4th Nov 2020-12th Nov 2020	5th Nov 2020-9th Nov 2020
2	2nd Jan 2021-20th Apr 2021	27th Apr 2021-4th May 2021
3	19th Jan 2021-23rd Feb 2021	24th Mar 2021-6th Apr 2021
4	27th Jan 2021-31st Mar 2021	21st Apr 2021-7th Jun 2021
5	5th Feb 2021-30th Mar 2021	14th Apr 2021-25th Jun 2021
6	11th Feb 2021-15th Feb 2021	22nd Mar 2021-29th Mar 2021
7	10th Mar 2021-18th Mar 2021	11th Jun 2021-12th Jul 2021
8	19th May 2021-21st Jul 2021	14th Jun 2021-26th Jul 2021

Table 14: Data collection time frame

## 4.5. Ethical Considerations

In the research context, ethics pertain to the guidelines for behaviour that direct researchers' actions with respect to the rights of those who are subjects of or affected by their work (Easterby-Smith et al., 2015). In order to address ethical quandaries that may arise from divergent cultural norms and competing philosophical perspectives, numerous codes of ethics have been developed. Typically, such codes incorporate a set of principles that outline the fundamental characteristics of ethical research, as well as a statement of ethical standards intended to steer researchers' conduct (Saunders et al., 2012).

This section will show the general ethical principles that guide research, refer to the University of Gloucestershire's "Research Ethics: A Handbook of Principles and Procedures" (2012) in particular and then show how these principles were considered and adhered to in this research.

### **4.5.1. Ethical Principles in Research**

The University of Gloucestershire's "Research Ethics: A Handbook of Principles and Procedures" (2021) states six principles which govern research at the University, namely: autonomy/respect, beneficence, non-maleficence, justice, fidelity and academic freedom. Similarly, the American Psychological Association (APA) summarises their ethical principles as beneficence and nonmaleficence, fidelity and responsibility, integrity, justice, and respect for people's rights and dignity. Saunders et al. (2012) define ten principles, which are a more fine-grained approach to ethical principles and have been taken in combination with the APA's and University of Gloucestershire's ethical principles to form the basis of ethical principles in this research. They are summarised in Table 15 and the following subsection will explain in more detail how each principle has been adhered to in this thesis.

Academic Integrity, Respect and Objectivity	<p>Integrity in management/behavioural science research means being truthful, promoting accuracy, avoiding deception, misrepresentation, partiality, reckless commitments, and disingenuous promises. It also involves upholding professional standards of conduct, managing conflicts of interest, and contributing professional time for little or no personal advantage.</p> <p>Objectivity means acting openly and promoting accuracy in research, while avoiding dishonesty and bias. It also entails recognising and managing conflicts of interest or commercial associations and respecting the rights and dignity of research participants. Researchers should use sound judgment and take necessary measures to prevent their personal biases, areas of expertise, and limited knowledge from contributing to or supporting unfair practices.</p> <p>Respect by the researcher means upholding the autonomy of research participants to think, decide, and act freely, while also protecting the rights of vulnerable participants. It also involves recognising the academic freedom of researchers to design, conduct, and disseminate their research without interference, as well as fulfilling social responsibility and obligations to those who participate in or are affected by the research.</p>
Beneficence and Nonmaleficence	<p>In management/behavioural science research, beneficence refers to the principle of doing good and taking action that promotes the well-being of research participants. This may include direct or indirect benefits, such as contributing to knowledge. On the other hand, nonmaleficence refers to the principle of avoiding harm and preventing any negative consequences to research participants. Harm can come in various forms, such as emotional distress, discomfort, pain, or conflict, and may result from intrusive research methods that cause mental or social pressure, violation of confidentiality or anonymity, or harassment and discrimination. Therefore, researchers must strive to avoid any harm to participants and minimise risks, even if there is a trade-off with the potential benefits of the research.</p>
Protection of Participant	<p>Protection of the participant in management/behavioural science research involves respecting the dignity, worth and rights of all individuals, including vulnerable groups, and taking measures to safeguard their privacy, confidentiality, and self-determination. This includes being aware of and respecting cultural, individual and</p>

role differences, and eliminating biases based on such factors. The principles of privacy, respect for others, avoidance of harm, voluntary participation, informed consent, confidentiality, and anonymity are all interconnected and important for protecting the participant. Participants have the right to voluntary participation, the right to withdraw from participation, the right to modify their consent, and the right to expect the researcher to abide by the extent of the consent given. Anonymity of participants should be maintained, and researchers should not attempt to prolong the duration of an interview or observation or widen the scope of research without first seeking and obtaining permission.

Protection of Research Data

Protection of research data refers to the ethical and legal obligation of researchers to ensure the privacy, anonymity, and confidentiality of individuals and organisations who provide data for research purposes. Researchers must assure anonymity and confidentiality of research data, ensure the accuracy of the data analysis and reporting, and comply with legal restrictions and regulations relating to the management of research data within the country or countries where they conduct research. It is important to note that the anonymity and confidentiality of data of the research site/participating companies need to be taken into consideration. This means that researchers must protect the privacy and confidentiality of the organisations or sites involved in the research and ensure that any data that could identify them is kept secure and not disclosed without explicit consent.

Protection of Researcher and Research Community

Protection of researchers in management/behavioural science research means ensuring that researchers are not subjected to harm or negative consequences as a result of their work. This includes avoiding actions that may harm other researchers or undermine the reputation of their discipline, as well as anticipating and guarding against possible harmful consequences for team members. Researchers must also avoid actions that may have deleterious consequences for themselves, such as physical, psychological, or reputational harm. Research design should consider risks to researchers, as well as to participants, to ensure the safety of all involved in the research process.

*Table 15: Ethical Principles applied in this thesis. Sources used and adapted include the University of Gloucestershire's "Research Ethics: A Handbook of Principles and Procedures" (2021); Saunders et al. (2012); APA Ethical Principles of Psychologists and Code (2016)*

## **4.5.2. Ethical Principles Applied in this Thesis**

The following subsections will describe how each of the ethical principles outlined in Table 15 was applied and adhered to in this research.

### **4.5.2.1. Academic Integrity, Respect, and Objectivity**

To ensure academic integrity, respect, and objectivity, the participating companies were informed via email and in presentations including Q&A with the researcher of the purpose of the study, who will be undertaking it, the general information about the sampling frame and were updated on a regular basis of the progress of the research project.

The participants were also sent out the information material before participation and in the introductory text of the survey, they were given the information about the purpose of the study, the sampling frame, the university at which this research is being conducted as well as the contact details of the researcher as can be seen in the appendix. Further information was given to both the participating companies and the participants on how the data would be used and participants were assured that no individual data would be provided to their respective organisations.

#### **4.5.2.2. Beneficence and Nonmaleficence**

To ensure beneficence and nonmaleficence in this research, in the closing statement, the participants were provided information on how their participation will help contribute to knowledge in the field of organisational management literature as well as help businesses improve their innovation climate and lead people in a more individual and agile way. Additionally, as described in the previous sections, when designing the questionnaire, the feedback gathered in the cognitive interviews showed some cultural differences according to the openness of Germans towards questions pertaining to their sex as was originally included in the 16mrs. To avoid possible discomfort all items from the 16mrs related to the scale “sex” were deleted from the questionnaire before starting the pilot study. Participants were, further, provided with the name and email address of the researcher’s first supervisor should they have any concerns about how the survey was conducted.

#### **4.5.2.3. Protection of Participants**

There have been various measures taken to protect the participants in this study. As advised by Saunders et al. (2012), it is essential to safeguard participants’ privacy, confidentiality, and self-determination by being aware of cultural, individual and role differences. To ensure privacy, a coding system was introduced as described in more detail in sections 4.4.3. and 4.4.4.2. Further, they were assured full confidentiality of treatment of their individual responses and assured that only aggregated data would be used in

publication and communication with their respective organisation by the researcher the introductory text, the statement of agreement and the closing statement. The participants were further informed that their participation is voluntary and that there are no risks or consequences of participating. Only after actively confirming their voluntary participation, did they receive access to the actual questionnaire. Further, to ensure that no participants were excluded or felt discriminated against, the control variable “gender” included the non-binary option “diverse” as previously discussed.

#### **4.5.2.4. Protection of Research Data**

Researchers have a responsibility not only to protect research participants but also to ensure the anonymity and confidentiality of the organisations that provide data. To this end, participating companies were provided with a document outlining the data collection process, which specified that only aggregated company data would be used for a benchmark study and that participating companies would remain anonymous. The companies were assigned numbers from one to eight, and only the respective company the data was being presented to, was shown using its name, while in the thesis they are referred to by their respective numbers to ensure anonymity. Furthermore, access to the data was limited to the research team of the University of Gloucestershire, including the researcher and their two supervisors. To comply with GDPR requirements, a document was sent to all participating companies detailing how data would be handled and the measures in place to ensure confidentiality, such as the use of a web-based

software that was specifically developed for universities and research institutes and is ISO27001 certified. Additionally, the software does not show or save IP addresses of participants. All documents can be found in the appendix, labelled as Appendix O.

#### **4.5.2.5. Protection of Researcher and Research Community**

According to the ethical principles outlined in this section, it is also important to protect the safety of the researcher as well as avoid undermining other researchers and their disciplines (Saunders et al., 2012). To ensure safety while conducting internet-mediated research, the researcher used a university email address instead of a personal one.

To ensure the integrity and credibility of the research community, steps are taken to prevent misinterpretation of the theoretical framework and research outcomes. This is accomplished by presenting the research proposal and findings at multiple conferences and colloquia, taking into account peer feedback. The research outcomes are communicated truthfully and transparently while preserving the anonymity of participants and the confidentiality of the data.

In conclusion, the study demonstrates a rigorous and well-designed approach to ensure optimal results. By situating the research within the post-positivist tradition, utilising a carefully crafted survey, conducting thorough pre-testing and translation, and implementing good sampling and data collection procedures, the study upholds a high standard of methodological robustness. Ethical considerations were also thoughtfully addressed

throughout the research process. Moving forward to the next chapter on data analysis, the meticulous design choices made in this study establish a strong foundation for further validation. The upcoming chapter will focus on data preparation and screening, as well as the assessment of validity and reliability of the measurement instruments. Descriptive analysis and hypothesis testing will further reinforce the study's rigor and contribute valuable insights.

## **Chapter Five: Data Analysis**

### **5.1. Introduction**

The following chapter presents the findings of the study and starts by discussing the process of data preparation and analysis. It first presents the response rate and demographics and continues with the procedure of data cleaning and screening including missing data and multivariate assumptions such as outliers, normality, and linearity. Next, the chapter outlines the validity and reliability for all constructs performed using confirmatory factor analysis and the resulting reassessment of certain scales. Finally, it reviews the analyses conducted to test the hypotheses and model fit using Structural Equation Modelling (SEM).

### **5.2. Response Rate**

From the eight participating companies, their respective managers identified a total of 1,024 knowledge workers who are involved in some capacity of the innovation process, which included various departments such as Research and Development, Technology, IT, Quality Management, HR, and Product Management. These employees were invited via email to take part in the survey on motivation and organisational climate via “Online Surveys” (formerly BOS) between November 1<sup>st</sup> 2020 and July 31<sup>st</sup> 2021. 584 employees completed the survey, which resulted in a response rate of 57%.

Baseline characteristic	Employees		Supervisors	
	n	%	n	%
Total	584	100	110	100
Gender				
Female	113	19.35	11	10.00
Male	470	80.48	99	90.00
Diverse	1	0.17	0	0
Age				
18-25	32	5.48	0	0
26-35	212	36.30	10	9.09
36-45	145	24.83	37	33.64
46-55	135	23.12	55	50.00
>56	60	10.27	8	7.27
Tenure in company				
<1 year	23	3.94	4	3.64
1-5 years	184	31.50	9	8.18
6-10 years	119	20.38	20	18.18
>10 years	258	44.18	77	70.00
Tenure leadership position				
<1 year			4	3.64
1-5 years			31	28.18
6-10 years			30	27.27
>11 years			45	40.91

Table 16: Demographic Statistics of participants in both data sets before cleaning

The proposed adequacy levels of return rates differ depending on the researcher suggested. While Baruch and Holtom (2008) propose the average

response rate in organisational research to be 52.7%, Sekaran and Bougie (2016) suggest an adequate return rate of 30% for online surveys. Taking either threshold into account, a response rate of 57%, as achieved in this research, is considered both acceptable and exceeding the general average.

To test the hypotheses and find correlations between motivation, organisational climate, and innovative work behaviour, which are not solely based on employees' self-assessments but rather on their supervisors' evaluation of their innovativeness, a second data set was collected as discussed in section 4.4. After a first screening and cleaning of data was conducted, as will be described in the next chapter, requests for completion of IWB surveys and codes of 546 employees were sent to their respective supervisors via email, resulting in a response rate of 77% with 421 returned surveys by 110 supervisors.

Table 16 shows the participants' profiles before data cleaning from both data sets.

As there is a rather big discrepancy in the gender variable, the participating companies were asked to provide an overview of how many male/female/diverse employees were asked to fill in the survey, to assess non-response bias. Response bias would be present if the participants' demographics differed significantly from the non-respondents' as it would limit the generalisation of the sample to the population. Four companies have provided information on how many male and female participants they have asked to fill in the survey showing that 82 per cent of distributed questionnaires were given to male employees. The underlying reason for this

is that it is mainly male employees working in manufacturing and software businesses, particularly in departments that are closely related to innovation, such as product development and engineering. It is, therefore, safe to assume that there is no response bias present in this study.

### **5.3. Data Preparation and Screening**

An essential part of multivariate analysis is the process of screening, cleaning, and preparing the data intended for analysis. According to Hair et al. (2019), the biggest advantages of thoroughly examining the data before applying any multivariate technique are the critical insights a researcher gains into the characteristics of the data. First, the screening process allows the researcher to gain deeper knowledge of variable interrelationships and can thus help refine the model and offer a better understanding to help interpret the results reasonably. Second, it ensures that the higher demands set by multivariate techniques in terms of complexity and data quality are met.

As the research at hand presents a rather sophisticated model and uses more complex multivariate techniques such as Confirmatory Factor analysis and Structural Equation Modelling, the data has undergone a rigorous process of examination. Since SEM cannot be performed with missing values present, the data was first checked for both missing values as well as univariate and multivariate outliers and cleaned. Following the preliminary cleaning process, the data was prepared for further analysis by recoding reverse-coded items and constructing standardised scales from the mean of the respective items.

Finally, the data's fit with the multivariate assumptions was further examined for normality, linearity, and the absence of multicollinearity and singularity. The following sections will show the analysis and results of the data preparation process.

### 5.3.1. Missing Data and Matched Responses

The purpose of analysing and cleaning missing data is not only to make sure that further analysis is possible by imputing missing values but also to identify possible patterns and relationships that show systematic error in the data collection process or shed light on specific data omitted that can affect the generalisability of the results or show an even deeper understanding of the data (Hair et al., 2019).

Missing data problems can be classified into three categories as proposed by Rubin (1976). His *missing data model* forms the basis of the analysis of missing data to date. If there is no connection whatsoever between the cause of the missing data and the observed variables, then the data is considered to be missing completely at random (MCAR). A broader class of missing data is data that is missing at random (MAR). This refers to cases in which the probability of data missing is related to the value of another variable, e.g. women being more likely to not report their age than men. The third type is data which is not missing at random (MNAR). It is the most problematic one as it can generally not be detected empirically and can only be analysed subjectively through the researcher's observations (Hair et al., 2019). An example of MNAR would be if only people with higher weight would not report

their weight and thus all the observed values for weight would be biased downwards due to missing high values from the dataset.

Hair et al. (2019) proposes a four-step process for dealing with missing data which suggests first determining whether the missing data at hand is ignorable and to further establishing the extent of missing data. Based on this analysis, it should be determined whether deleting cases or even whole variables may be necessary or if, based on the randomness of missing data as discussed, imputation may be the right approach to dealing with missing data.

Following this process, 3 cases had to be deleted from the first data set as one case was missing 17% of data and the other 2 cases, although missing less than 5% of data overall per case, had to be removed as the items missing were all from one scale. With the other cases from data set one, sixteen items were missing overall. As they were single items in multiple items scales, following the recommendation of Newman (2009, 2014) based on Roth, Switzer, and Switzer (1999), the mean of the subset of scale items with available responses of that person was calculated in order to replace the missing item value with the individual's personal scale score. This method of calculating the mean across available items does not technically involve any imputation as it is not replacing missing values with a guess but rather the accurate calculation of individual scale means (Newman, 2014, p. 393).

Data set two had no missing values but the final step of the process in this research was to match the answers of the employees from data set one to the answers of the supervisors from data set two. As each employee received

a personal code they were supposed to use on their survey and the supervisors had the same codes for their respective staff members, the matching of data took place by matching the codes. As not all supervisors had answered the survey on each employee and some survey participants from both data sets had used the wrong coding, a total of 208 from the original 584 cases from the employee survey had to be deleted. Before a final matched data set and its demographics could be presented and used for analysis, the matched data set had to be checked for outliers.

### **5.3.2. Outliers**

Outliers are extreme values that are anomalies as they lie outside of what is considered “normal” within a specific data set (Hair et al., 2019). As outliers affect the mean, the standard deviation and can lead to skewed data (Aguinis, Edwards, and Bradley, 2017), it is important to not only check for outliers but also analyse them in order to see whether it is an error in the data or rather a contextual reason and see if this is an important aspect that needs to be kept in the data or may heavily skew it. This means that researchers must always be aware of and define the context to determine what is to be considered “normal” within their respective research (Hair et al., 2019).

Generally, there is a distinction between univariate and multivariate outliers. While univariate outliers typically contain only one extreme value that lies outside the norm, multivariate outliers are those that contain extreme values on a number of variables of the case (Tabachnick and Fidell, 2018).

When working with Likert scales, as this research does, it is perfectly acceptable and common for participants to have very high or low levels of motivation or rate their perception of the organisational climate or innovative work behaviour as extreme and thus provide ratings at the lower and upper levels of the given Likert scales. When using univariate statistical tests such as z-scores and graphic exploration tools such as box plots, these values could potentially be identified as outliers but would not be seen as such contextually. Nevertheless, as a multitude of univariate outliers for one particular variable could provide insights into previously unknown aspects of the research or even anomalies, univariate analysis was undertaken. As recommended by various researchers (e.g. Hair et al., 2019; Tabachnick and Fidell, 2018) both a statistical test in form of z-score analysis and a graphical approach in form of the boxplot method was chosen. The boxplots which showed some outliers were examined in detail but did not show any signs of being abnormal but were rather cases of extreme responses as expected on a Likert scale and were thus not removed from the data set.

Following this, the analytical identification was conducted by calculating the z-scores of all variables and checking for values greater than 3.29 or smaller than -3.29, which could potentially be considered outliers as recommended by Tabachnick and Fidell (2018). The majority of the variables showed no z-scores outside the range of 3.29 and -3.29. Only the variable "Autonomy" showed one z-score smaller than -3.29 and the variable "*Curiosity*" showed four z-scores lower than -3.29. These were cases which scored a mean on *Curiosity* between 2.00 and 2.67 on the Likert Scale and were identified as outliers because most participants in this study displayed a higher *Curiosity*

motive. This is to be expected, however, as *Curiosity* as an end motive is often a driver for people to go into jobs that deal with new ideas and innovative problem solutions and a higher mean of *Curiosity* is generally expected among knowledge workers. Further, as these extreme cases represent less than 0.15% of the overall data set, they fall well within the acceptable range and require no transformation.

As univariate outliers are typically not abnormalities but cases of extreme values when working with Likert scales, it is essential to also identify and analyse multivariate outliers. To do this, first, the Mahalanobis distances were calculated and compared with a chi-square distribution with the same degrees of freedom (Leys et al., 2018) and cases with a resulting p1-value between  $<0.005$  and  $<.001$  were suspected to be critical outliers (Tabachnick and Fidell, 2018). A total of six cases were found to be potential critical outliers with four cases having a value of  $p \leq <0.001$  and two with a value of  $p <0.005$ . These detected cases were inspected for unusual response patterns such as careless or unengaged responses which occur if a participant answers with the same value on every item or uses a predetermined response pattern without any consideration of the actual content of the item. When identified, it is crucial to remove such cases from the data set. If these cases are not addressed, they may distort the results and potentially undermine the overall reliability of the research. Upon close examination, one of the multivariate outliers detected a case in which the participant chose the same value across all questions from all motivation scales and whose response in the comment section of the survey indicated his unwillingness to answer the questions on that part of the survey. As he

only answered the questions on his company's organisational climate accurately, and the fundamental motives are a crucial part of the research, this case was excluded. This results in the following demographic statistics of participants, after data cleaning and screening.

Baseline characteristic	Employees		Supervisors	
	n	%	n	%
Total	372	100	110	100
Gender				
Female	72	19.35	11	10.00
Male	299	80.38	99	90.00
Diverse	1	0.27	0	0
Age				
18-25	17	4.57	0	0
26-35	144	38.71	10	9.09
36-45	85	22.85	37	33.64
46-55	91	24.46	55	50.00
>56	35	9.41	8	7.27
Tenure in company				
<1 year	18	4.84	4	3.64
1-5 years	128	34.41	9	8.18
6-10 years	77	20.70	20	18.18
>10 years	149	40.05	77	70.00
Tenure leadership position				
<1 year			4	3.64
1-5 years			31	28.18
6-10 years			30	27.27
>11 years			45	40.91

Table 17: Demographic Statistics of participants in both data sets after cleaning and matching

### 5.3.3. Normality

Normality is “the most fundamental assumption in multivariate analysis” (Hair et al., 2019, p. 94) and the premise of normal distribution for any individual variable is deemed essential. Hair et al. (2019) further stress the importance of normal distribution by saying that “if the variation of the normal distribution is sufficiently large, all resulting statistical tests are invalid, because normality is required to use the F and t statistics” (p. 94).

Descriptive Statistics	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Curiosity	372	5.0502	.70031	-.868	.126	1.276	.252
Dominance	372	3.7025	.96319	-.270	.126	-.250	.252
Participation	372	4.0806	.85172	-.429	.126	-.154	.252
Safety	372	3.9418	.98926	-.354	.126	-.407	.252
Structure	372	4.1595	.96523	-.349	.126	-.312	.252
OC_Reflexivity	372	2.6742	.52933	-.356	.126	.188	.252
OC_Formalisation	372	2.5683	.50246	.049	.126	-.254	.252
OC_Autonomy	372	2.9242	.49597	-.373	.126	.215	.252
IWB	372	3.2847	.81297	-.415	.126	-.066	.252
Valid N (listwise)	372						

Table 18: Results of the tests for normality

While testing for outliers, as discussed in the previous subchapter, can show first insights into the distribution of data, it is recommended to further

statistically assess normality for more accurate results (Hair et al., 2019; Kline, 2015; Tabachnick and Fidell, 2018). Typically, normal distribution is measured using indicators of kurtosis (peakedness or flatness of the distribution) and skewness (balance of the distribution). While there is general consensus on the importance of having normally distributed data, the tolerance levels of skew and kurtosis differ among researchers.

While the strictest thresholds suggest that Skewness values outside the range of -1 to +1 and Kurtosis values of -3 and +3 are to be considered problematic (Hair et al., 2019), more liberal thresholds consider all values of Skewness between the range of -3 and +3 and Kurtosis of -8 and +8 to be acceptable (Kline, 2015). As can be seen in Table 18, the values of all variables measured in this research fall well within the acceptable levels of even the strictest thresholds.

#### **5.3.4. Linearity and Multicollinearity**

The final step taken in preparing and screening the data of this research for further analysis is testing whether multicollinearity is present. Multicollinearity shows to which extent the different independent variables actually account for the same variable in a dependent variable. If some of the independent variables are too similar, then the variance they explain in the dependent variable is likely to overlap. This means that one or more variables may be redundant as they are not adding value, which in turn can lead to an unnecessarily complex model and an inflated R-squared (Hair et al., 2019). This would be highly undesirable as it would negatively affect the statistical

significance of further tests of correlation, whether it's multiple regression or Structural Equation Modelling (Tabachnick and Fidell, 2018; Weston and Gore, 2006).

The test for collinearity can be done using different methods. First, it is possible to calculate the Pearson correlation coefficient by creating a bivariate correlation plot and then check for bivariate correlations higher than  $r=.85$  to detect the correlation between two independent variables (Weston and Gore, 2006).

In the research at hand, the test for bivariate collinearity was conducted first using the original variables resulting in no bivariate correlations of  $r>.85$  with the highest values displayed being a negative correlation between the variables "Tradition" and "Innovation and Flexibility" at  $-.708$  and "Reflexivity" and "Innovation and Flexibility" at  $.670$  as can be seen in the table in Appendix A. As both the scales "Tradition" and "Innovation and Flexibility" were deleted following Factor Analysis as will be discussed in section 5.4.2.2. the test for bivariate collinearity was rerun using the variables used in the final model.

As the Pearson correlation matrix in Table 19 indicates, no values above the threshold of  $r=.85$  could be detected.

Variable	1	2	3	4	5	6	7	8
1. Curiosity	—							

2. Dominance	.160**	—						
3. Participation	.191**	.088	—					
4. Safety	-.101	.097	0.76	—				
5. Structure	.033	.098	.091	.324**	—			
6. OC_Reflexivity	-0.25	.045	.157**	.067	.132*	—		
7. OC_Autonomy	.095	-.074	-.065	-.005	-.017	-.216**	—	
8. OC_Formalisation	-.094	0.12	.117*	.117*	.166**	.110*	-.400**	—

Table 19: Pearson Correlation Matrix

\*\*Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Further, to identify whether there is multicollinearity present between one independent variable and a group of other variables and thus test the impact of collinearity, the Value Inflation Factor (VIF) can be calculated. Small values of VIF suggest low correlation among variables, although the thresholds suggested as problematic vary between researchers (Hair et al., 2019). While some suggest that multicollinearity may be excluded only at very low levels of <2.5 (Johnston, Jones and Manley, 2018), others placed the value of collinearity issues at >5 (James et al., 2013) and even as high as >10 (Vittinghoff et al., 2004).

Variable	Collinearity Tolerance*	Statistics VIF
Curiosity	.894	1.118

Dominance	.943	1.060
Safety	.864	1.157
Structure	.855	1.170
Participation	.908	1.101
OC_Reflexivity	.597	1.676
OC_Autonomy	.733	1.365
OC_Formalisation	.769	1.300

*Table 20: Collinearity Tolerance and Value Inflation Factor*

\*acceptable level of tolerance is anything  $>.10$  (Hair et al., 2019)

When calculating the VIF scores with the original variables, the test showed slightly inflated VIF levels, when taking the most conservative threshold into account with the highest VIF value at 2.69 (see Appendix B). Taking only the variables into consideration which were used in the final model, all VIF scores were way below even the most conservative threshold of  $<2.5$  with the highest VIF score at 1.676, as can be seen in Table 20, which also displays the tolerance levels ( $1/VIF$ ). Therefore, based on the above analyses, it is clear that the current data is safe from multicollinearity and singularity problems, and no further investigation is needed.

## 5.4. Reliability and Validity

Before testing the hypotheses and interpreting the research results, it is of the utmost importance to first ensure the reliability and validity of the measurement instruments used (Hair et al., 2019; Henseler, 2015). The following subsections aim to present the assessment of the scales used in

this research by means of statistical analysis, resulting in the formation of a new scale and the subsequent further assessments of the reliability, convergent and discriminant validity of all scales used in the final model.

### **5.4.1. Reliability**

As no concept can be measured perfectly and measurement error is always present to some extent, it is important to assess the reliability of constructs to ensure the rigour of the research results obtained by subsequent analysis. Hair et al. (2019) explain that generally “reliability is inversely related to measurement error” (p. 786). This means that while measurement error is, of course, present, higher reliability indicates lower measurement errors.

Reliability reflects internal consistency and is tested by calculating how highly the indicators of one construct are interrelated. To test each construct’s internal consistency reliability, research in social sciences typically uses Cronbach’s Alpha (Kline, 2015). The lower limit generally agreed upon in research for Cronbach’s Alpha is a minimum of  $>.7$ , although  $>.6$  is considered acceptable (Hair et al., 2019; Zikmund et al., 2013).

Cronbach’s Alpha scores were calculated for all scales used in this research using IBM SPSS Version 27 and the results can be seen in Table 21. Except for one scale, the motivational scale “Social Participation”, which showed a score of .66, all values exceed the .70 minimum threshold, indicating good internal consistency of the scales.

While Cronbach’s Alpha is the most traditional and still most widely used form of measuring internal consistency, it does not weigh the individual indicators

in the calculations and, therefore, shows a positive correlation between the number of items used in a scale and the value calculated. This leads to issues with scales both with large and with small numbers of items as large item scales tend to show an inflated Alpha score while short scales often have difficulties reaching the minimum threshold of .7 (Hair et al., 2019; MacKenzie, Podsakoff, and Podsakoff, 2011). Given the fact that all but one motivational scale reached the minimum required Alphas score despite the fact that these are very short scales with only three items, and even the lowest score was very close at .66, this indicates a very good internal consistency. This is further supported by the excellent composite reliability scores of  $>.78$  of the scales, as can be seen in Table 21.

Composite reliability, unlike Cronbach's Alpha, weights the individual indicators based on their loadings and does not assume equally weighted loadings. It is therefore considered more suitable as a measure of reliability than the Alpha scores, particularly in SEM (Bacon, 1995; Hair et al., 2019; Jöreskog, 1971; Raykov, 2004). It further is not only used to test the reliability of a scale but is also used as a measure of convergent validity, as will be explained in more detail in Chapter 5.4.2.2.

### **5.4.2. Construct Validity**

An essential step before testing the hypotheses and the model is establishing construct validity, which means assessing and measuring how accurately the variables at hand represent the theoretical construct. To establish construct validity, it is generally recommended to first check for face and content

validity, preferably before data collection and to then measure the convergent validity and discriminant validity (Zikmund et al., 2013). While face and construct validity are assessed qualitatively, to establish convergent and discriminant validity, use of factor analysis is required. All components of construct validity have been carefully assessed in this research in order to ensure the accuracy of measurement and good model fit, as will be discussed in the subsequent sections.

#### **5.4.2.1. Face and Content Validity**

To ensure that the individual items used in a scale belong together and include theoretical and practical considerations associated with the construct they are measuring, researchers need to assess the face and content validity of the scales they use. Face validity is the most basic form of validity as it only assesses whether the scale appears to measure the concept it intends to, while content validity refers to whether the items used to form the scale measure the entire concept the researcher aims to capture (Serakan and Bougie, 2016; Zikmund et al., 2013). Both face and content validity are not assessed objectively by means of statistical analysis, but rather subjectively by experts, pre-tests (Hair et al., 2019), or literature review (Bell et al., 2022) to ensure that the items truly match the theoretical concept and practical implications.

During the research the verification of face and content validity has been conducted repeatedly, from critical literature review to discussions with academic experts and participants in both the pre-pilot and the pilot as well

as with translators and reviewers during the translation process as can be seen in Chapter Four. Further, as part of the convergent and discriminant validity testing, as will be discussed in the next sections, factor analysis was undertaken followed by more discussions on the face and content validity when the first factor analysis resulted in loadings of two constructs on the same factor.

#### **5.4.2.2. Convergent Validity**

Convergent Validity establishes to which degree the items of one construct converge or share high correlations and thus if they effectively measure the construct expected from the theoretical foundation (Zikmund et al., 2013). As recommended by Hair et al. (2019) and various other researchers (Birks, 2006; Fornell and Larcker, 1981; Malhotra and Zikmund et al., 2013) convergent validity will be measured based on the following three elements: the value of factor loadings, the value of AVE (average of variance extracted), and the value of composite reliability.

To establish convergent validity, factor analysis was performed using oblique rotation which allows for intercorrelation between components due to the nature of organisation climate measures, which tend to have a certain level of intercorrelation.

As the dataset at hand is considered a large dataset with >150 cases, following the recommendation of IBM SPSS Statistics, Promax rotation was used as it can be calculated more quickly than a direct oblimin rotation and is therefore useful for large datasets. The eleven original constructs were forced

to load on eleven factors and the results of the initial pattern matrixes both based on Eigenvalue  $>1$  and when forced to load on 11 factors can be seen in Appendixes D and E respectively. Some of the factors from the Organisational Climate Measure such as items from the scales “Innovation and Flexibility” and “Tradition” were loading highly on the same factors. These items were assessed further in terms of face validity and found not to have any content validity which would provide enough basis to add the items to the scales some of the items showed high factor loadings it. They were, therefore, excluded from further analysis and the subsequent model.

Following this, a new factor analysis was conducted with promax and forced to load on the remaining 9 factors (see Appendix F). As evident from Table 21, the majority of factors load at  $>.70$ , indicating their satisfactory strength in the factor analysis. Conversely, factor loadings below  $.50$  are generally considered to lack practical significance. However, according to Hair et al. (2019), in the context of this research where the sample size exceeds 350, factor loadings above  $.30$  can be considered significant. As the factor loading of “OC\_Form\_5” is only slightly below  $.50$  with a factor of  $.49$ , the sample size is sufficient for the loading to be considered significant, and because the Cronbach’s Alpha of this scale would have dropped considerably from  $.73$  to  $.68$  had this item been deleted, as can be seen in Appendix C, the decision was made to not drop this item but proceed with the analysis including “\_Form\_5”.

As can be seen in Appendix F, there were some cross-loadings of two factors, but as their secondary loadings were distant enough at  $>.200$  to be considered unproblematic (Hair et al., 2019), all items were kept in the scales.

Another criterion used to establish convergent validity is the average variance extracted (AVE). Generally, an acceptable score for the AVE is 0.50 or higher, which indicates that on average the construct explains 50 per cent or more of the variance of its indicators. Two of the nine constructs in this research fall slightly below the .50 cut off mark ranging between 45% and 49%. The AVE is considered to be a rather conservative estimate of validity and according to Fornell and Larcker (1981), even if the AVE does not meet the recommended level of .50, if the composite reliability score (CR) exceeds .60, validity of the construct can still be assumed.

Composite Reliability is the final criterion that needs to be taken into consideration when assessing convergent validity as well as a construct's reliability, as a high CR suggests that all factors consistently display the same latent construct. A high CR would be considered any value  $>.70$ , which would suggest good convergent validity, while values between .60 and .70 would be considered acceptable if the convergent validity is indicated by the other criteria laid out in this chapter (Hair et al., 2019). As can be seen from Table 21, all CR scores of the constructs used, exceed the .70 value comfortably and it can therefore be concluded that all constructs used in this research demonstrate high convergent validity.

<b>Construct</b>	<b>Items</b>	<b>Factor Loading</b>	<b>AVE</b>	<b>CR</b>	<b>Cronbach's <math>\alpha</math></b>
<b>Curiosity</b>	Curiosity_1	.764	<b>.60</b>	<b>.82</b>	<b>.70</b>
	Curiosity_2	.742			
	Curiosity_3	.816			
<b>Dominance</b>	Dominance_1	.763	<b>.63</b>	<b>.84</b>	<b>.74</b>
	Dominance_2	.780			
	Dominance_3	.842			
<b>Safety</b>	Safety_1	.773	<b>.62</b>	<b>.83</b>	<b>.76</b>
	Safety_2	.826			
	Safety_3	.757			
<b>Structure</b>	Structure_1	.844	<b>.65</b>	<b>.85</b>	<b>.74</b>
	Structure_2	.818			
	Structure_3	.758			
<b>Social Participation</b>	Participation_1	.720	<b>.57</b>	<b>.80</b>	<b>.66</b>
	Participation_2	.843			
	Participation_3	.693			
<b>OC_Autonomy</b>	OC_Autonomy_1	.682	<b>.50</b>	<b>.83</b>	<b>.75</b>
	OC_Autonomy_2	.775			
	OC_Autonomy_3	.611			
	OC_Autonomy_4	.746			
	OC_Autonomy_5	.701			
<b>OC_Formalisation</b>	OC_Form_1	.528	<b>.45</b>	<b>.80</b>	<b>.79</b>
	OC_Form_2	.708			
	OC_Form_3	.828			
	OC_Form_4	.724			
	OC_Form_5	.489			
<b>OC_Reflexivity</b>	OC_Reflex_1	.747	<b>.49</b>	<b>.83</b>	<b>.79</b>
	OC_Reflex_2	.754			
	OC_Reflex_3	.635			
	OC_Reflex_4	.721			
	OC_Reflex_5	.620			

<b>IWB</b>	IWB_1	.562			
	IWB_2	.858			
	IWB_3	.880			
	IWB_4	.880			
	IWB_5	.892			
	IWB_6	.837			
	IWB_7	.855			
	IWB_8	.873			
	IWB_9	.826			
	IWB_10	.837			
			<b>.70</b>	<b>.96</b>	<b>.95</b>

Table 21: Convergent Validity

### 5.4.2.3. Discriminant Validity

The final element measured to establish construct validity is the degree to which the concepts measured differ from each other. To ensure that every scale in the analysis is distinct from the other, discriminant validity needs to be established. This was done following the recommendations of Fornell and Larcker (1981) by comparing the AVE and the factor correlations. Discriminant validity is confirmed if the square root of the AVE is greater than any correlation with another factor establishing that the variance in the factor is explained by its own indicators rather than those of any other factor. As can be seen in Table 22, the square root of the AVE scores placed on the diagonal in brackets are greater than any correlation with another factor and thus discriminant validity has been demonstrated for all factors.

	1	2	3	4	5	6	7	8	9
1. Curiosity	(.775)								
2. Dominance	.160**	(.796)							

3. Participation	.191**	.088	(.755)					
4. Safety	-.101	.097	.076	(.786)				
5. Structure	.033	.098	.091	.324**	(.808)			
6. Reflexivity	-.025	.045	.157**	.067	.132*	(.698)		
8. Autonomy	.095	-.074	-.065	-.005	-.017	.216**	(.705)	
9. Formalisation	-.094	.012	.117*	.117*	.166**	.110*	-.400**	(.668)
10. IWB	.192**	.126*	.044	-.181**	-.171*	-.104*	.228**	-.301** (.835)

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

(square roots of AVE – diagonal elements in brackets and correlation coefficients)

*Table 22: Discriminant Validity*

## 5.5. Descriptive Analyses

Before testing the hypotheses and checking for model fit of the structural model, it is recommended to analyse the data to gain more insight into the relationships between variables which in turn can help during the refinement process of the model and the interpretation of the results (Hair et al., 2019). Descriptive analyses of the data was conducted through investigation of the participants' profiles as well as the main research concepts. Control variables chosen to be tested in this research include age, experience, and gender, industry, and company age.

### 5.5.1. Motivational Profiles

When looking at the mean scores for the end motives of the sample in this research as can be seen in Table 23 and comparing them to the mean scores of the end motives in other research (e.g. Döhrendahl et al. 2021; Reiss, 2004), there are some interesting differences to be seen.

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
Curiosity	372	2.00	6.00	5.0502	.70031
Dominance	372	1.00	6.00	3.7025	.96319
Safety	372	1.33	6.00	4.0806	.85172
Structure	372	1.00	6.00	3.9418	.98926
Participation	372	1.33	6.00	4.1595	.96523
Valid (listwise)	N 372				

Table 23: Descriptive Statistics - Motivational Profiles

The motive *Curiosity* in this research, with a mean of 5.05, shows a significantly higher value than the mean of curiosity in the general population samples, which has been determined to have a mean value of around 3.5.

Given the fact that the population in question here are knowledge workers, though, involved in mainly STEM (Science, Technology, Engineering and Mathematics) and other fields of innovative work, it is actually quite reasonable to assume a higher level of *Curiosity* among the sample.

### 5.5.2. Employee Age

Upon checking the control variables, both gender and experience showed no significant effect in the model, while age showed to have a significant effect on Innovative Work Behaviour. To explore this relationship further, a one-way ANOVA was conducted to compare the effect of the different age groups on Innovative Work Behaviour. There was a significant effect of age on Innovative Work Behaviour at the  $p < .05$  level [ $F(4, 367) = 4.51, p = .001$ ].

Because a significant result was found, to explore the effect within the age groups, a post hoc test was computed. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the age group 26-36 ( $M = 3.46, SD = .79$ ) was significantly different ( $p = .001$ ) than the age group  $>56$  ( $M = 2.87, SD = .78$ ). However, neither group differed significantly from the other age groups.

Taken together, these results suggest that age does indeed have an effect on how much Innovative Work Behaviour an employee displays. Specifically, results of this research suggest that people in the age bracket of 26-36 display the highest level of innovativeness while employees who are older than 56 display the lowest level of IWB.

### 5.5.3. Differences in Industries

All eight participating companies come from various fields yet belong to two different industries: six from manufacturing and two from software development. In business practice, the software development industry is

generally known for fast innovations and research by Andersson et al. (2021) indicated the importance of software development to innovation activities within companies of other industries as well. To find out if there are any differences between the two industries, first, a dummy variable was created dividing the participating companies into the two industries. Then independent-sample t-tests were conducted to compare organisational climate variables for the manufacturing and software development industries.

There was a significant difference in regards to the variable Formalisation in the scores for manufacturing ( $M=2.62$ ,  $SD=0.52$ ) and software development ( $M=2.44$ ,  $SD=0.44$ ) industries;  $t(370)=2.97$ ,  $p = 0.003$ . These results suggest that the organisational climate in manufacturing companies tends to have a higher level of formalisation and therefore the climate in software development companies seems to be perceived as less rigid in regard to rules in comparison. The other significant difference found, was in regards to a climate of Reflexivity in companies from the manufacturing ( $M=2.60$ ,  $SD=0.54$ ) and software development ( $M=2.87$ ,  $SD=0.46$ ) industries;  $t(370)= -4.43$ ,  $p = 0.000$ . These findings imply that the organisational climate in software development companies tends to be more reflective and feedback-driven than manufacturing companies.

The only climate variable that did not show any significant differences with a p-value of  $>0.05$  was autonomy. This suggests that there is no difference between the industries in how much autonomy employees in the respective companies are given.

#### 5.5.4. Differences in Company Age

Another interesting aspect that differentiates the participating companies is their age. While five of the eight companies were founded in the last 45 years, three of them belong to a group of companies founded over 130 years ago and are well-known traditional enterprises in Germany. To see whether the company age and possibly the tradition that might go hand in hand with it, have any effect on the organisational climate in the companies, further independent sample t-tests have been conducted using a dummy variable created to reflect the two groups: companies <45 years of age and >130 years of age.

The results of the t-tests suggest that there is a significant difference in regards to Formalisation in the scores for companies >130 years of age ( $M=2.63$ ,  $SD=0.50$ ) and <45 years of age ( $M=2.49$ ,  $SD=0.49$ );  $t(370)=2.52$ ,  $p = 0.012$ . These results suggest that the organisational climate in older more traditional companies tends to have a higher level of strict rules and guidelines. There was, further, a significant difference concerning the climate of reflexivity between older ( $M=2.62$ ,  $SD=0.53$ ) and younger ( $M=2.75$ ,  $SD=0.53$ ) companies;  $t(370)= -2.29$ ,  $p = 0.023$  suggests that younger companies foster a climate with more reflexivity compared to more traditional enterprises.

Just like the previous t-tests with industries, the only climate variable that did not show any significant differences with a p-value of  $>0.05$  was autonomy. This indicated that the age of the company does not influence how much autonomy employees in the respective companies are given.

## 5.6. Structural Equation Modelling and Hypothesis Testing

One major difference between Structural Equation Modelling (SEM) and other multivariate techniques is that SEM has the ability to express dependence relationships among independent and dependent variables as it estimates a series of separate, but interdependent, multiple regression equations simultaneously and then translates the proposed relationships into a series of structural equations for each dependent variable (Hair et al., 2019: p. 607). Put simply, SEM gives researchers the opportunity to conduct a single analysis for multi-variate and multi-equation problems.

Other advantages of working with SEM, are, on the one hand, the ability to capture unobserved concepts via latent variables and on the other, the technique used to capture measurement errors. SEM accounts for measurement errors better than linear regression by making an estimate of the relationship if there was no measurement error based on the regression coefficient. This ensures an even higher reliability and more correct estimate of the relationship between variables that other multi-variate techniques tend to underestimate (Hair et. al, 2019; Schumacker and Lomax, 2012).

The following subsections will discuss the model fit measures of the measurement model as derived from the factor analysis presented earlier. It will show the process of the creation of the Structural Equation Model through

imputation. It will further explore the model fit of the structural model and finally discuss the hypotheses testing.

### **5.6.1 Goodness of Fit of Measurement Model**

Following the factor analysis in SPSS as presented in section 5.4.2.2., a measurement path model was created using IBM Amos 27.

Before creating and interpreting a structural model, it is important to first test the validity and model-fit of the measurement model (Hu and Bentler, 1999; Kenny, 2020). Creating a measurement model in Amos, as shown in Figure 8 can be done using the pattern matrix created in SPSS as presented in chapter 5.4.2.2. and displayed in Appendix F. It's important to include all variables that will be used in the structural model to ensure the goodness of model fit and the discriminant validity is shown correctly.

Common mistakes researchers need to avoid, include measuring the single constructs instead of the full measurement model and being driven by data rather than theory (Hair et al., 2019; Kline, 2015; Schumacker and Lomax, 20). This means that while the goodness of fit of a model, both measurement and structural, is very important, it needs to reflect the measurement theory and only be adjusted to reflect logical theoretical implications and not just to gain a better model fit for the sake of better indices.

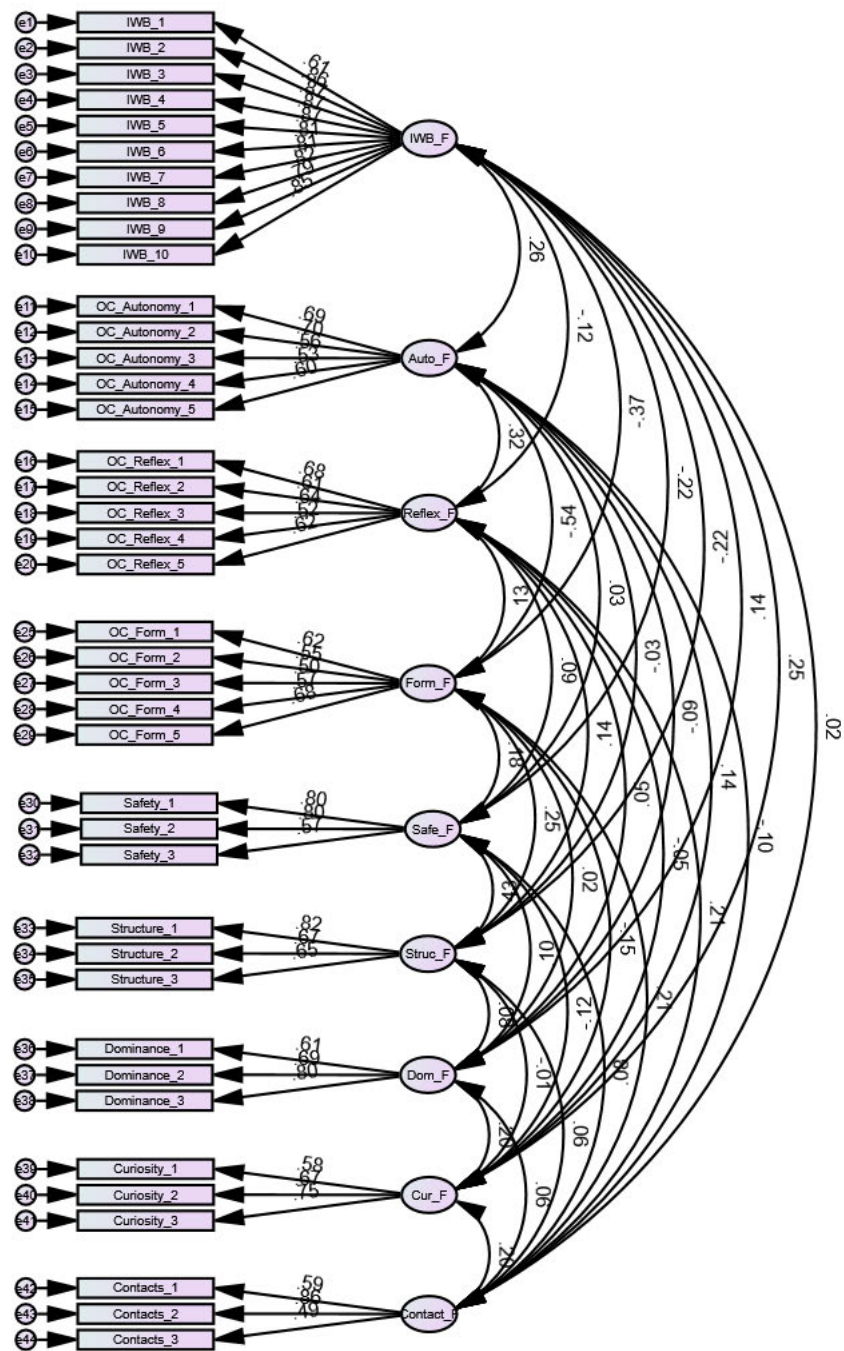


Figure 8: CFA Measurement Model

Model fit is assessed using both absolute measures and comparative measures. Absolute measures of fit are stable when it comes to the complexity of the model or sample size. While the most accepted absolute

measure, the SRMR, is based on the difference between the observed and predicted models, just like the Chi square, it offers a bigger advantage in use. Unlike the Chi square, which is a reasonable measure of fit for models with a sample size of 75-200 (Kenny, 2020), the SRMR is robust to model complexity, sample size and data complexity and is therefore a universal measure of model fit. Another absolute measure that is very common and offers the advantage of being very sensitive to models with few degrees of freedom is RMSEA, which should always be reported in conjunction with the PClose (Gaskin and Lim, 2016). Relative measures of fit, such as the CFI, compares the fit of the proposed model to one in which all variables are assumed to be uncorrelated, a so called "null model". The model-fit of the measurement model in this research has achieved excellent model-fit according to the cut-off criteria of Hu and Bentler (1999), with almost all indices, as can be seen in Table 24<sup>18</sup>, apart from CFI which was deemed acceptable at 0.914.

Although some of the AVE scores of the CFA were below .5<sup>19</sup> which can be contributed to the rather short scales, since the CR of all variables in the CFA exceeds .60, convergent validity can be assumed (Fornell and Larcker, 1981).

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<sup>18</sup> created using Gaskin, J. & Lim, J. (2016), "Model Fit Measures", AMOS Plugin. Gaskination's StatWiki.

<sup>19</sup> The full validity analysis of the CFA from Amos can be seen in Appendix K.

Measure	Estimate	Threshold	Interpretation
CMIN	1228.400	--	--
DF	704.000	--	--
CMIN/DF	1.745	Between 1 and 3	Excellent
CFI	0.914	>0.95	Acceptable
SRMR	0.056	<0.08	Excellent
RMSEA	0.045	<0.06	Excellent
PClose	0.981	>0.05	Excellent

Table 24: Model-Fit Indices for Measurement Model

To ensure discriminant validity of the measurement model, when working in SEM, it is recommended to use the Henseler et al. (2015) method of calculating the heterotrait-monotrait ratio (HTMT) of correlations. The HTMT criterion estimates the true correlation between two constructs if they were perfectly measured. Henseler et al. (2015) have identified a threshold of .90 as the maximum for constructs that are similar. A score below .85 is considered a stricter threshold to show discriminant validity.

As can be seen in Table 25., the HTMT analysis of the measurement model has shown all values to be below .85 and thus discriminant validity can be assumed.

	IWB	Auto	Reflex	Form	Safe	Struc	Dom	Cur	Part
IWB									
Auto	0.269								
Reflex	0.119	0.299							
Form	0.362	0.540	0.141						
Safe	0.213	0.004	0.090	0.159					
Struc	0.211	0.018	0.163	0.226	0.433				
Dom	0.153	0.098	0.058	0.016	0.125	0.128			
Cur	0.233	0.130	0.030	0.133	0.135	0.038	0.233		
Part	0.053	0.095	0.222	0.173	0.108	0.125	0.124	0.277	

Table 25: HTMT Analysis

As can be seen in Figure 8, depicting the CFA path model, all factors load  $>.50$ , apart from “Social Participation\_3”, which loads at 0.49. As was stated earlier, according to Hair et al. (2019), factor loadings of  $>.30$  can be considered significant if the sample size exceeds 350, as it does in this research. As the factor loading of “Social\_Participation\_3” is only slightly below  $.50$  with a factor of  $.49$ , the sample size is sufficient for the loading to be considered significant, and the scale only consists of three factors, the decision was made to leave this factor as part of the construct.

### 5.6.2. Specification of Structural Model

Due to the added complexity of latent variables because of the multiplicative process, latent variable models are often too complex to be computed correctly in AMOS. It is therefore common practice to transition from a latent measurement model to a non-latent structural model using imputed factor scores. Imputing the factors is a very important step in this process because imputed factor scores are much more precise than mean factor scores, as they account for the weights and error of the different measures as well as the covariance between factors while means alone do not account for any of those aspects.

Using the imputed factor scores, a structural model was specified following the theoretical framework presented in chapters two and three. As two of the organisational climate variables “tradition” and “innovation and flexibility” have been removed, the initial model had to be adjusted to properly reflect this change resulting in the following structural model (see Figure 9). Further, the control variable “Age” was added to the model because it was found to have a significant effect in the ANOVA tests as described in section 5.5.2.

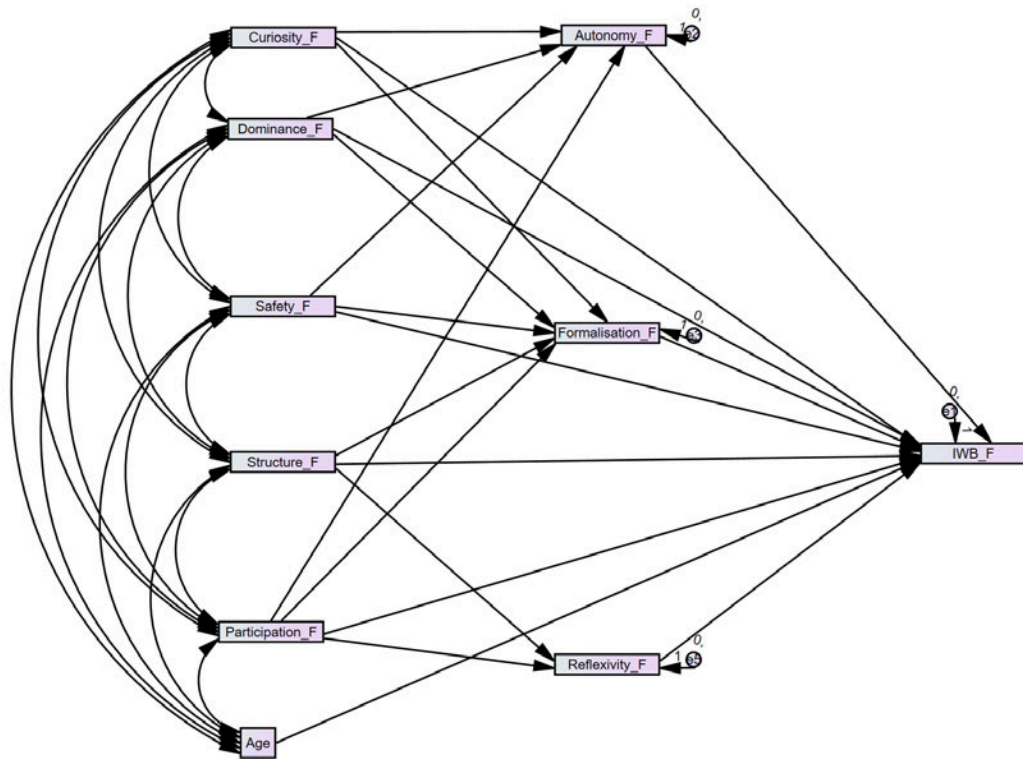


Figure 9: Structural Model

### 5.6.2.1. Goodness of Fit

The practice of testing for goodness of fit is typically an iterative process predicated upon the cyclical evaluation and comparison of competing models (Schumacker and Lomax, 2012). This practice, termed alternative model testing, is integral to the SEM analysis, offering researchers an opportunity to probe multiple theoretical suppositions and identify the most statistically robust and substantively meaningful model (Kline, 2015).

As discussed in section 5.6.1., model-fit is assessed using both absolute measures and comparative measures. A theoretical model is often the starting point, derived from an a priori understanding of the constructs of interest and substantiated by extant research. Nevertheless, this initial model

may not correspond perfectly to the empirical data, as revealed by fit indices such as the chi-square statistic (CMIN), the Comparative Fit Index (CFI), the Standardised Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). In the context of this study, the preliminary model as presented in Figure 9, showcased inadequate fit indices at CMIN/DF=31.951, CFI=0.600, SRMR=0.099, RMSEA=0.289.

When a discrepancy arises between the theoretical model and the observed data, as revealed by inadequate fit indices, it is necessary to adjust the model for a better fit. This process involves the use of modification indices (MI), which provide estimates of how much the model's fit would improve if certain parameters were changed (Schumacker and Lomax, 2012). However, it is important that these adjustments are not just based on these statistical suggestions but are also theoretically plausible. Making changes based only on statistical indicators without a theoretical rationale could lead to overfitting. Overfitting means the model might fit this particular sample very well, but it might not generalise to other samples or the broader population.

In this study, the MI indicated several potential covariances among the residuals of the constructs. The maximum MI value emerged for a covariance between the residuals of the autonomy and formalisation variables, both of which fall under the broad organisational climate construct. Drawing from the Competing Values Framework as discussed in detail in sections 2.3.2., 2.3.3. and 4.3.3., it was understood that these constructs could reflect similar or opposing domains within the organisational climate, which spans internal and external focuses, as well as control and flexible orientations (Patterson et al., 2015). This theoretical underpinning permitted the correlation among the

latent factors, providing a solid ground for incorporating the covariance between all three climate variables used in this model. As suggested in the SEM literature (Kline, 2015; Schumacker and Lomax, 2012), modifications of models should be carried out incrementally starting with the MI carrying the potentially highest effect and then testing the model fit again before applying further refinements. Incorporating this covariance between autonomy and formalisation in the model led to an improved, yet still unsatisfactory fit with  $CMIN/DF=23.964$ ,  $CFI=0.733$ ,  $SRMR=0.071$ ,  $RMSEA=0.249$ .

In the continuing course of SEM model refinement, the MI suggested a covariance between autonomy and reflexivity. Given the well-documented interaction between climate dimensions in organisational settings (Patterson et al., 2015), the justification for this modification was theoretically sound. With the integration of this covariance, the model demonstrated excellent fit:  $CMIN/DF=1.947$ ,  $CFI=0.990$ ,  $SRMR=0.035$ ,  $RMSEA=0.051$ .

The final stage of model refinement entailed the introduction of a covariance between formalisation and reflexivity, reinforcing the notion of the interrelatedness of organisational climate dimensions. The final model tested in this research accounted for correlations among all three mediation variables. The model achieved excellent fit based on the cut-off criteria set by Hu and Bentler (1999). This is evident in Table 26. Consequently, no further modifications were required. As climate dimensions are usually closely connected, especially if they support the same quadrant according to the Competing Values Model as discussed in section 2.3., all climate variables are assumed to have a certain correlation.

The path diagram of the model with the standardised estimates can be seen in Figure 10. All path diagrams of the alternative models and the tables indicating their model fit are shown in Appendix L.

<b>Measure</b>	<b>Estimate</b>	<b>Threshold</b>	<b>Interpretation</b>
CMIN	10.000	--	--
DF	7.000	--	--
CMIN/DF	1.429	Between 1 and 3	Excellent
CFI	0.996	>0.95	Excellent
SRMR	0.026	<0.08	Excellent
RMSEA	0.034	<0.06	Excellent
PClose	0.675	>0.05	Excellent

*Table 26: Goodness of Fit for structural model*

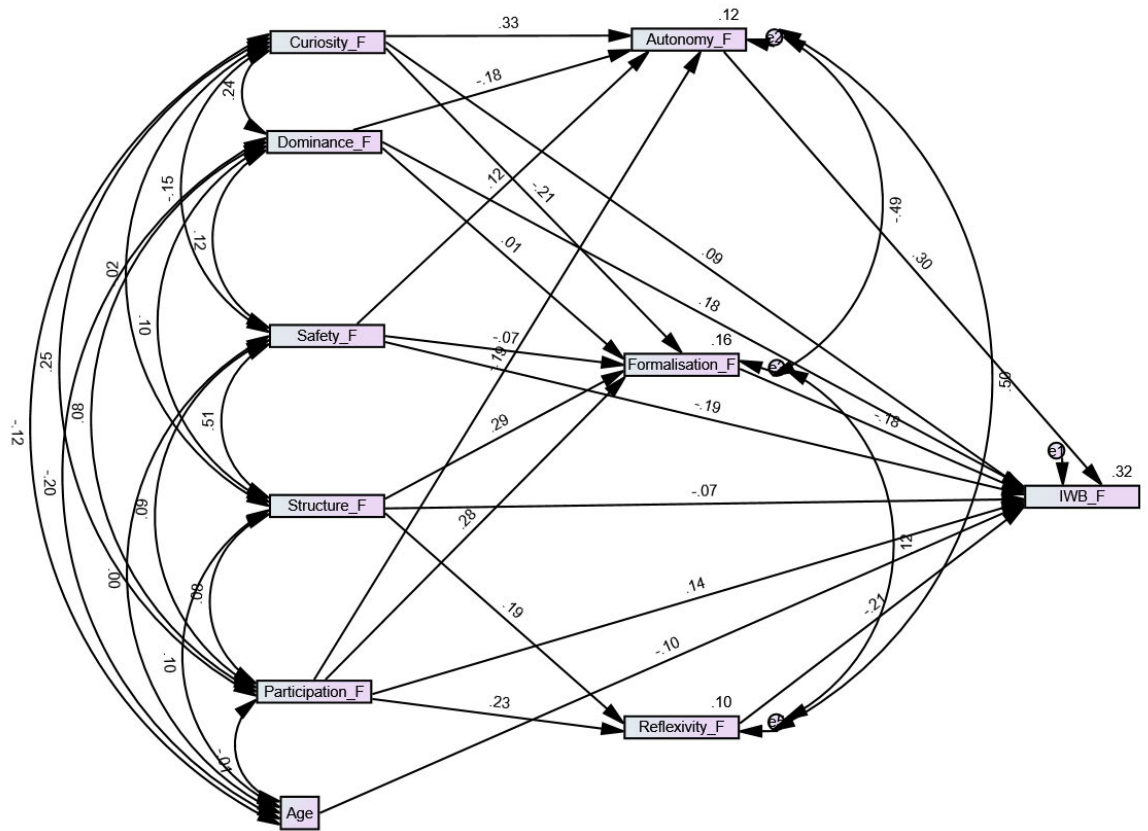


Figure 10: SEM results for the model with standardised estimates

The R square of .32, indicated that the model can explain 32% of the variance of IWB, forming a solid basis to proceed with hypothesis testing.

In sum, the SEM alternative model testing process was characterised by a balance between statistical considerations and theoretical grounding, culminating in a model that provides an in-depth understanding of the relationships among autonomy, formalisation, and reflexivity within organisations. This process adheres to the best practices in SEM, thereby enhancing the rigor and validity of the findings.

### 5.6.3. Hypotheses Testing

The most common and cited approach, with more than seventy thousand citations to date (Memon et al., 2018) to mediation is the Baron and Kenny causal-steps approach. The four-step approach of Baron and Kenny (1986) suggests first testing for a direct effect between the Independent Variable (IV) and the Dependent Variable (DV). Should there be no direct effect, no further analysis should be undertaken. In the second step, researchers are prompted to test for a direct effect between the IV and the Mediating Variable (MV) followed by the third step of testing the effect of the MV on the DV. Finally, the fourth step is used to establish that the MV completely mediated the relationship between the IV and the DV, while there should be no more direct effect of the IV on the DV with the MV present.

While some researchers still use this four-step approach, Baron Kenny's approach has been extensively discredited by mediation literature in recent years because of its severe limitations (Aguinis et al., 2016; Green et al., 2016; Guide and Ketokivi, 2015; Hayes, 2009; Rucker et al., 2011). The main limitations, as summarised by Memon et al. (2018), include a low level of statistical power, a lack of direct testing of a specific indirect effect, and finally no quantification of the mediation effect.

One of the most crucial issues with the Baron and Kenny causal-steps approach is the condition that there needs to be a direct effect between the IV and DV without a mediator present. This practice leads researchers to examine models that are not consistent with theory, violating the basic principle of parsimony (Aguinis et al., 2016). It further has led to various

mediating relationships being rejected, ending research prematurely and thus even potentially leading to false conclusions. Therefore, “using Baron and Kenny’s approach might produce misleading results, refute potentially significant theoretical relationships, and in turn damage future theory building” (Rungtusanatham et al., 2014, p. 131).

Preacher and Hayes (2008) recommend bootstrapping the sampling distribution of the indirect effect while also evaluating bias-corrected confidence intervals. Following this recommendation, the hypothesis testing was done as follows.

Using AMOS 27 the effects of the IVs on the DV were tested to check for the hypothesised direct effects without the mediator variables present. Then, using the “Specific Indirect Effects” estimand, the mediation model, as presented in Figures 8 and 9, was bootstrapped to 2000, and using the Gaskin, James and Lim (2020) “Indirect Effects” AMOS Plugin, the specific indirect effects were tested. The results of the hypothesis testing can be seen in Table 27.

Hypothesis	Direct effect without mediator	Total effect with all mediators	Indirect effect	result
H1: A high level of <i>Curiosity</i> motivation has a positive effect on Innovative Work Behaviour.	.235 ***			supported
H2: A high level of <i>Dominance</i> motivation has a positive effect on Innovative Work Behaviour.	.116 *			supported

H3: A high level of <i>Safety</i> motivation has a negative effect on Innovative Work Behaviour.	<b>-.133 *</b>			supported
H4: A high level of <i>Structure</i> motivation has a negative effect on Innovative Work Behaviour.	<b>-.174 **</b>			supported
H5: A high level of <i>Social Participation</i> motivation has a positive effect on Innovative Work Behaviour.	<b>-.017</b>			rejected
H6: A high level of Autonomy has a positive effect on Innovative Work Behaviour.	<b>.215 **</b>			supported
H7: Autonomy mediates the relationship between <i>Curiosity</i> motivation and Innovative Work Behaviour.	.235 ***	.088	<b>.101***</b>	supported
H8: Autonomy mediates the relationship between <i>Dominance</i> motivation and IWB.	.116 *	.182 ***	<b>-.054***</b>	supported
H9: Autonomy mediates the relationship between <i>Safety</i> motivation and IWB.	-.133 *	-.195 ***	<b>.035**</b>	supported
H10: Autonomy mediates the relationship between <i>Social Participation</i> motivation and IWB.	-.017	.140 **	<b>-.057***</b>	supported
H11: A high level of reflexivity has a positive effect on Innovative Work Behaviour.	<b>-.155 **</b>			rejected (opposite direction)
H12: Reflexivity mediates the relationship between <i>Structure</i> motivation and IWB.	-.174 **	-.067	<b>-.040***</b>	supported
H13: Reflexivity mediates the relationship between <i>Social Participation</i> motivation and IWB.	-.017	.140 **	<b>-.049***</b>	supported

H14: A high level of formalisation has a negative effect on Innovative Work Behaviour.	<b>-.266 ***</b>			supported
H15: Formalisation mediates the relationship between <i>Curiosity</i> motivation and IWB.	.235 ***	.088	<b>.037***</b>	supported
H16: Formalisation mediates the relationship between <i>Dominance</i> motivation and IWB.	.116 *	.182 ***	<b>-.002</b>	rejected
H17: Formalisation mediates the relationship between <i>Safety</i> motivation and IWB.	-.133 *	-.195 ***	<b>.013</b>	rejected
H18: Formalisation mediates the relationship between <i>Structure</i> motivation and IWB.	-.174 **	-.067	<b>-.051**</b>	supported
H19: Formalisation mediates the relationship between <i>Social Participation</i> motivation and IWB	-.017	.140 **	<b>-.049***</b>	supported

Table 27 - Results of Hypothesis Testing

\*\*\* p < 0.001, \*\* p < 0.010, \* p < 0.050

**Autonomy and IWB:** The direct effect of Autonomy on IWB was significant and positive (.215, p < 0.01), indicating a direct positive relationship as expected.

**Reflexivity and IWB:** An unexpected turn is observed in the relationship between Reflexivity and Innovative Work Behaviour (IWB). Contrary to the initial hypothesis, which predicted a positive effect of Reflexivity on IWB, a significant negative effect has been found (-.155, p < 0.01). This indicates that an increase in Reflexivity is associated with a decrease in IWB.

This surprising result challenges the original hypothesis and suggests that the dynamics between Reflexivity and IWB are more complex than initially assumed. It appears that higher levels of Reflexivity may not always encourage IWB but rather hinder it.

The reasons behind this unexpected finding, its implications for the research at hand, and the potential role of cultural context will be explored in more detail in the following chapter. This deeper analysis is expected to provide a better understanding of the relationship between Reflexivity and IWB in the German private sector.

**Formalisation and IWB:** The direct effect of Formalisation on IWB was significant and negative (-.266,  $p < 0.001$ ), indicating a direct negative relationship as expected.

**Curiosity Motivation and Innovative Work Behaviour (IWB):** The direct effect of *Curiosity* motivation on IWB was significant and positive (.235,  $p < 0.001$ ). When Autonomy and Formalisation were introduced as mediators, the indirect effects were also significant (.101,  $p < 0.001$  and .037,  $p < 0.001$  respectively). This suggests that Autonomy and Formalisation partially mediate the relationship between *Curiosity* motivation and IWB.

**Dominance Motivation and IWB:** The direct effect of *Dominance* motivation on IWB was significant and positive (.116,  $p < 0.05$ ). When Formalisation was introduced as a mediator, the indirect effect was not significant, indicating that

Formalisation does not mediate this relationship. However, when Autonomy was introduced as a mediator, the indirect effect was significant and negative (-.054,  $p < 0.001$ ), suggesting a suppressor effect. This is rather surprising as the expected mediation effect was positive and given that both *Dominance* and Autonomy have been shown to positively directly affect Innovative Work Behaviour, this particular mediation effect will be given careful consideration in the discussion chapter following.

**Safety Motivation and IWB:** The direct effect of *Safety* motivation on IWB was significant and negative (-.133,  $p < 0.05$ ). When Autonomy and Formalisation were introduced as mediators, the indirect effects were significant and positive (.035,  $p < 0.01$ ) and non-significant respectively. This suggests that Autonomy partially mediates the relationship between *Safety* motivation and IWB, while Formalisation does not. This was unexpected given the significant negative direct effects of both *Safety* and Formalisation on Innovative Work Behaviour. This suggests that while employees motivated by *Safety* may seek to avoid risks, they do not necessarily do so through adherence to rules and bureaucracy. The interpretation of the results will be discussed in more detail in section 6.2.3.3.

**Structure Motivation and IWB:** The direct effect of *Structure* motivation on IWB was significant and negative (-.174,  $p < 0.01$ ). When Reflexivity and Formalisation were introduced as mediators, the indirect effects were significant and negative (-.040,  $p < 0.001$  and -.051,  $p < 0.01$  respectively),

suggesting that both Reflexivity and Formalisation partially mediate the relationship between *Structure* motivation and IWB.

***Social Participation* Motivation and IWB:** The direct effect of *Social Participation* motivation on IWB was not significant. However, when Autonomy, Reflexivity, and Formalisation were introduced as mediators, the indirect effects were significant and negative (-.057,  $p < 0.001$ ; -.049,  $p < 0.001$ ; and -.049,  $p < 0.001$  respectively), suggesting that they fully mediate the relationship between Social Participation motivation and IWB.

This full mediation implies that the influence of *Social Participation* motivation on IWB is entirely through its impact on Autonomy, Reflexivity, and Formalisation. In other words, *Social Participation* motivation does not directly affect IWB, but rather, it does so indirectly by affecting these mediators. The negative indirect effects suggest that an increase in *Social Participation* motivation corresponds with a decrease in Autonomy, and an increase in Reflexivity and Formalisation respectively, which in turn negatively impacts IWB.

This finding provides a deeper understanding of the dynamics at play. It suggests that companies with a higher number of employees with high *Social Participation* motivation have organisational climates with lower levels of Autonomy, and higher levels of Reflexivity and Formalisation, which could potentially hinder their innovative work behaviour. Alternatively, it could be that in environments where *Social Participation* is highly valued, there may be less emphasis or value placed on Autonomy, and more on Reflexivity, and

Formalisation, which could also negatively impact Innovative Work Behaviour.

The significance of this full mediation lies in its ability to uncover the underlying mechanisms that explain the observed relationships among these variables. It underscores the importance of considering these mediating factors when seeking to enhance IWB in an organisational context. The surprising finding of full mediation in three cases and its significance for the study and in the context of this research will be discussed in more detail in Chapter Six.

In summary, the results suggest that the relationships between various motivations and IWB are complex and often mediated by factors such as Autonomy, Reflexivity, and Formalisation. The nature of these mediation effects varies, with some relationships being partially mediated and others being fully mediated. The complete results tables including the estimates and C.R. scores can be found in Appendix M.

The results of the hypothesis testing and their potential implications will be discussed Chapter Six. It further discusses these results in terms of their support or contradiction of previous research, the contribution to research and the implications they may hold for both theory and practice.

In conclusion, this chapter has provided a comprehensive analysis of the collected data, encompassing various crucial steps in data preparation and screening. Missing data, response matching, outliers, normality, linearity, and multicollinearity were carefully addressed to ensure the integrity and reliability of the data. Additionally, measures were evaluated for reliability and

validity. In the course of this process, two mediating variables that loaded on the same factors were removed from the model to ensure convergent and discriminant validity.

Following this, the fit of the measurement and structural models was rigorously tested using structural equation modelling. The hypotheses were then examined, contributing to a deeper understanding of the relationships between variables.

Moving forward, the next chapter will build upon these findings, placing them within the cultural context of the German private sector. The theoretical and practical implications of the results will be explored, shedding light on their significance and potential applications. This chapter has laid a strong foundation for the subsequent discussion and interpretation of the study's outcomes.

## Chapter 6: Discussion

This chapter aims to discuss the findings presented in Chapter 5 as well as show how this study addresses the problems identified and fills the gaps in the literature as presented in Chapters Two and Three. It further aims to put the results into the context of the population. This chapter is structured thematically by showing the contribution to the theory of personality and motivation studies and innovation management first, organisational climate second and finally discussing the overall mediating effects found in the study. Each subsection will aim to highlight the practical implications of the overall research to show how businesses can build upon these findings.

### 6.1. Motivation and IWB

One of this research project's primary goals was to find out what drives people who drive innovation. Using the various available measures based on the Big Five trait approach to personality, previous research has shown mixed and inconclusive results when trying to connect personality and Innovative Work Behaviour particularly, and creativity and innovativeness in general, as discussed in more detail in section 2.2.4.

Reasons identified for this in the literature review included the rather narrow approach to personality the Big Five have and the assumption that innovativeness happens on a different level of personality than traits. This notion that innovativeness and creativity are caused by motivation rather than traits, was supported by both Amabile and Pratt's (2016) research as well as

Hammond et al. (2011) meta-analytical study. Their research indicated that when motivation was present, i.e. end-goals fulfilled, people would display higher levels of innovativeness. While this is a crucial insight, studies have yet to investigate the correlation between motivation as a level of personality and innovation. To bridge this gap and gain deeper insights into the personality drivers for innovation, this thesis has researched the correlation between end goals according to the multi-faceted approach to motivation based on the theory of 16 basic desires (Dörendahl, Greiff, and Niepel, 2021; Reiss and Havercamp, 1998) and Innovative Work Behaviour (de Jong and Den Hartog, 2010; Scott and Bruce, 1994).

### **6.1.1. Curiosity and IWB**

While no studies to date have researched the correlation between fundamental motives and Innovative Work Behaviour, various researchers have shown a connection between the active search for and alertness to opportunities (Baron, 2007), development of new knowledge and strategies (Janssen and Yperen, 2004) and open-mindedness in general, and innovation efforts (Ali, 2017; Antoncic et al., 2015; Hsieh et al., 2011; Madrid et al., 2014; Weele, 2013).

As people with a high level of *Curiosity* are driven by knowledge for the sake of knowledge and seeking challenges, it was hypothesised that a high level of *Curiosity* would lead to a high level of IWB. The hypothesis was confirmed, and *Curiosity* showed the highest association between fundamental motives and IWB.

Most prior research has sought to correlate personality on basis of traits, neglecting the psychological construct of fundamental motives as a different level of personality. While personality traits are observed patterns of human behaviour, they fail to explain the reasons for this behaviour (Bilsky and Schwartz, 1994; Döhrendahl et al., 2021), which is precisely what fundamental motives do. Gaining insights into the why sheds light on the personality in context and offers a much deeper and more reliable psychometric basis to predict behaviours.

The findings of this research support the notion that it is precisely the psychological construct of motivation that has the highest influence on IWB. The high correlation between the end motive *Curiosity* and IWB may in fact explain both the many correlation findings between open-mindedness and innovativeness (e.g. Ali, 2017; Antoncic et al., 2015; Hsieh et al., 2011; Weele, 2013) as well as the results of studies which refute any correlation (e.g. Gal, 2019; Woods et al., 2018).

When conducting the correlation analysis between the Big Five and the 16mrs, Döhrendahl et al. (2021) found that four fundamental motives correlated with the open-mindedness factor of the Big Five, with *Curiosity* showing the strongest correlation, *Idealism* a medium-sized correlation and *Morality* and *Autonomy* small correlations. It is possible that the studies that found open-mindedness to be an indicator of IWB actually had participants whose open-mindedness was predominantly caused by a high score in the end motive of *Curiosity*. Consequently, one explanation for those studies that showed no correlation between open-mindedness would be that there was a

higher number of participants with high levels of *Morality*, *Idealism*, and *Autonomy*, which caused their high scores in open-mindedness.

Another aspect that is crucial to consider when discussing fundamental motives is the setting and attaining of goals. Motives provide high validity when predicting behaviours as they include the environmental cues that activate the goal attainment triggered by the need to satisfy an end motive (Freund and Riediger, 2006). Defining problems and thus opportunities and gaining new knowledge are both aspects of the *Curiosity* motive as well as factors of IWB. Problem finding and idea generation as the two first phases of IWB are goals for innovativeness and at the same time cues that trigger the goal attainment aspect of the *Curiosity* motive.

A further aspect that needs to be considered when discussing the effect of the *Curiosity* motive on IWB in this study is the cultural context of this research. An important position within German culture and education is dedicated to critical thinking. The Humboldtian model of education, which has had a lasting impact on both German culture and the education system, is based on a holistic approach. Instead of being limited to purely technical competencies with a view toward the labour market, the Humboldtian system calls for education guided by humanistic ideas such as logic, reason, free thought, and critical thinking (Anderson, 2004). This focus is likely to support the way the *Curiosity* motive is translated into behaviour when it comes to openly discussing problems and offering solutions.

In conclusion, the strong correlation observed between the fundamental motive of *Curiosity* and employees' Innovative Work Behaviour (IWB)

confirms the crucial role of *Curiosity* in theory. While exploring innovation efforts within the German private sector was one of the main research objectives, it would be of great interest to further explore the connection between *Curiosity* and innovativeness beyond the cultural context.

The implications for practice are noteworthy as well, highlighting the importance of promoting *Curiosity* within the workforce to foster IWB. Organisations should consider employing individuals with a high motivation for *Curiosity* when seeking to drive innovation within specific teams or the company as a whole. Furthermore, it is essential to acknowledge and support individuals who identify problems, raise concerns, and propose novel approaches, as these behaviours are indicative of a strong *Curiosity* drive. By recognising the inherent value of *Curiosity* and providing the necessary support, organisations can harness the potential of their employees' natural curiosity to stimulate innovative thinking and problem-solving. Embracing *Curiosity* as an innate motivator for innovation holds significant promise for organisations, enabling them to enhance their problem-solving capabilities, adaptability, and generation of novel ideas. Therefore, it is imperative for organisations to cultivate an environment that recognises and nurtures the role of *Curiosity*, thus paving the way for long-term success in an ever-evolving business landscape.

### **6.1.2. Dominance and IWB**

From smartphones to electric vehicles and rapid developments in Artificial Intelligence, innovations have been changing our world at an unimaginable

speed. Adapting to changes and being part of the disruption is not just necessary for companies to get ahead of the competition, but it is in fact essential for a company's survival (O'Reilly and Tushman, 2013). Proactive employees play a crucial role in a company's strive for success and innovation as various studies show (Parker et al., 2006; Seibert et al., 2001; Van Dam, 2013). Proactive behaviour is generally defined as a tendency of people to act and influence their environments (Bateman and Crant, 1993; Crant, 2000). People who score high in the motive of *Dominance* are driven by the need to influence other people and processes and thus display proactive behaviours. For this reason, it was hypothesised that a high level of *Dominance* would lead to a high level of IWB. The hypothesis was confirmed, and *Dominance* showed a strong direct correlation with IWB.

As people who are motivated by *Dominance* like to influence people and situations, it is likely that their strength lies particularly in phases three and four of IWB, namely idea championing and implementation. In these phases, the idea generated is promoted within the organisation "by expressing enthusiasm and confidence about success, being persistent, and involving the right people" (Veenendaal and Bondarouk, 2015, p.141). A problem solution through a good idea can only turn into innovation if the idea is promoted and adopted and pushed through implementation even if there is criticism and resistance. This requires a strong drive to persuade people and influence outcomes. As persuasion and persistence are associated with people motivated by *Dominance*, their involvement is expected to happen in the later stages of the innovation process.

Although there has not been any research on the 16 fundamental motives and innovation before, there is a big body of literature that explores the implicit “power” and “achievement” motives from the Big Three (McClelland, 1978) and various innovation efforts as was explained in more detail in Chapters Two and Three. Various researchers have found a connection between the power and achievement motives and various forms of innovation efforts, reaching from creativity to entrepreneurship. As the *Dominance* motive showed a strong correlation with both the power and the achievement motives (Döhrendahl et al. 2021), the conclusion can be drawn that the findings are consistent with the literature.

It is further important to examine the context of the dominance motive in the industries and departments this study was conducted. This study's participating departments and companies were male-dominated manufacturing or software businesses. The definition of what constitutes male- or female-dominated varies according to different sources<sup>20</sup>. Overall, a male-dominated industry or occupation would be one with >75 per cent male employees.

All companies and departments that have participated in this study had >80 per cent male employees and thus can be referred to as male-dominated

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<sup>20</sup> The U.S. Department of Labor Women's Bureau (2014) defines male-dominated fields as industries where women comprise less than 25% of workforce, while Kreimer (1999) defines a segregation index formula which was used to define a “male-dominated” occupation when there is a percentage of 10 to 29.9 women in an organisation and “severely male-dominated” when the share of women is <10 per cent.

industries. The organisational culture shaped by masculinity is often characterised by something Berhal et al. (2018) refer to as the concept of “masculinity contests” which includes the display of dominance as one of its four dimensions. People who are driven by the *Dominance* motive when following their drive to persuade and influence others would naturally engage in a higher level of social dominance, particularly in a culture in which this is seen as desired behaviour. Being driven by the *Dominance* motive, thus, would also result in higher IWB in those organisational cultures. This is further supported by some of the comments the participants left at the end of the survey claiming that only a small number of people’s ideas are considered. This could indicate not only the importance of the *Dominance* motive and its direct influence on IWB but the way a “masculine” culture supports these behaviours.

To effectively translate these findings into practice, organisations should consider several key implications. One crucial aspect lies in talent acquisition and recruitment strategies. Prioritising individuals with a high motivation for *Dominance* during the hiring process can tap into their inherent qualities to influence people and processes. These employees are well-suited for championing innovative initiatives within the organisation, contributing to the overall innovativeness of the company.

Organisational culture within male-dominated industries or departments requires careful consideration. Recognising the cultural dynamics and norms that may shape behaviours associated with *Dominance* motivation is crucial. Striving to create an inclusive and balanced culture that welcomes diverse

perspectives and transcends gender biases fosters innovation while promoting inclusivity.

Training and development initiatives can further support the implications of this study. Offering programs and workshops that enhance skills related to persuasion, influence, and effective communication equips employees with tools and techniques to navigate challenges, address resistance, and engage stakeholders. This empowers and nurtures employees' *Dominance* motive, enhancing their ability to drive innovation and reinforcing its positive impact on Innovative Work Behaviour (IWB).

By aligning organisational practices with these insights, organisations can create an empowering and supportive environment for individuals driven by the *Dominance* motive, fostering a climate that nurtures innovation.

### **6.1.3. Safety and IWB**

Due to high investments in time, money, and effort in all stages of the Innovative process as well as sudden market disruptions and changes in an organisation's management, innovations are generally considered "high-risk" endeavours (Montani et al., 2014). Risk is inherent in both the development and implementation process. There is no guarantee that the new solutions proposed will achieve what they intend to and be successful (Scott and Bruce, 1994). According to Ryan and Deci (2000), employees often refuse to initiate ideas when they are afraid of failure. When people are motivated by *Safety*, they are driven by creating a life that is predictable, and secure. To achieve this, they tend to avoid risks and situations which involve uncertainty and fear.

However, Bommer and Jalajas (1999) among others found that the willingness to take risks was directly linked to an individual's tendency to innovate just as fear was found to have the opposite effect. On basis of these findings, the hypothesis was formed that people who are motivated by *Safety* display lower levels of IWB, which was confirmed in this study.

People who score low on the end motive of *Safety* often report that they do not consider themselves risk takers but rather do not necessarily see the risks involved in an endeavour or do not place a high level of importance on the risk aspect of a new task (Kemper et al., 2017). People who score low on the *Safety* motive often report this drive as excitement over a new challenge and a sense of adventure rather than risk-taking. As the innovation process requires rapid changes and is filled with challenges, seeing risks as positive ensures a high level of intrinsic motivation throughout all four stages of Innovative Work Behaviour.

The German private sector is dominated by family-owned businesses with over 90 per cent of companies being owned and typically also managed by families. They further account for 58 per cent of all jobs. While this is a great stabilising factor for the German economy, a potential issue in terms of innovation efforts is that family businesses tend to have a more hierarchical and traditional structure. Further, the fact that it is the family who owns and typically runs the business can be both its greatest asset and greatest liability. As management carries full responsibility for the success of the company, it also assumes all the risks. According to the "Federal Ministry of Economic Affairs and Climate Action", German family-owned businesses favour continuity and long-term success and are highly responsible. While this is a

great factor for safety, it may not support high-risk endeavours which are often necessary for radical and even some incremental innovations. Further, it may lead to a culture in which there is more resistance towards risks and change and which may require employees to push against these obstacles and actively take on challenges. This hints at the possibility that people who score low on the motive *Safety* and thus display such behaviours naturally are perceived as more innovative in this cultural context but also might have to deal with more resistance.

Another interesting aspect that was previously discussed in section 2.1.3.3. of this thesis, is managerial and psychological empowerment. Various studies (e.g. Alisher et al., 2019; Bin Saeed et al., 2019; Javed et al., 2019; Knol and van Linge, 2009; Luoh, Tsaur, and Tang, 2014) found support for the direct and indirect relationship between empowerment and innovative behaviour. It is important to note that Stryker and Burke (2000) found that employees who want to take on more challenges and responsibilities typically view managerial empowerment as positive. So not only do people with a low *Safety* motive show a higher level of IWB, they may also be more receptive to leadership that fosters autonomy, empowerment, and innovation efforts.

The findings of this study hold important practical implications for organisations, particularly those operating in family-owned businesses with a hierarchical and traditional structure, where there may be a higher number of employees motivated by *Safety*. Understanding the role of *Safety* motivation in influencing employees' willingness to take risks and engage in innovative behaviours is crucial for creating an environment that supports and

encourages innovation. The following practical implications can be drawn from these findings:

Firstly, organisations should recognise the potential barriers that a strong *Safety* motive can present to innovation efforts. Family-owned businesses, which dominate the German private sector, often prioritise stability and long-term success due to their responsibility for the company's future. However, this emphasis on safety and risk avoidance may hinder the pursuit of high-risk endeavours required for radical and even incremental innovations. To overcome these barriers, organisations should proactively address the cultural inclination towards risk aversion and promote a more open and supportive attitude towards innovation. This can be achieved through initiatives such as fostering a culture of psychological safety, providing training and resources to manage and mitigate risks effectively, and encouraging employees to view risks as opportunities for growth and learning even if they may be motivated by *Safety*. By reframing the role of challenges and showing that the risks taken are controlled, it could help *Safety* motivated employees feel safer within the organisation despite its focus on innovation.

Additionally, organisations should create avenues for employees to share and explore new ideas without fear of failure. Recognising that individuals with a high *Safety* motive may hesitate to initiate ideas when they are afraid of failure, organisations can implement mechanisms such as idea generation platforms, innovation labs, or designated time for experimentation. These initiatives provide employees with a safe and supportive environment to test and refine their innovative ideas, fostering a culture that encourages creativity and risk-taking.

In conclusion, organisations can promote innovative work behaviour by addressing the challenges posed by the *Safety* motive. By creating a culture that values risk-taking, empowering employees, providing a safe space for idea generation, and fostering inclusivity, organisations can nurture a thriving innovation ecosystem. Embracing these practical implications will enable organisations to leverage the inherent motivations of employees, drive creativity, and achieve sustainable innovation outcomes.

#### **6.1.4. Structure and IWB**

The uncertainty around innovation processes that requires a more risk-friendly attitude and a drive towards new challenges also requires a high level of flexibility. Finding new solutions and implementing these, whether it's new products and services for the market or changes in the work processes within an organisation, exceeds the routine task demands of daily business. Innovative Work Behaviour is dynamic in nature and requires quick adjustments to regular and frequent changes and problems (Bilal et al., 2019; De Jong and Den Hartog, 2010). Finding new ways to respond to rapid changes not only requires a curious, proactive, and daring personality but also a certain flexibility when dealing with uncertainty and change. As the innovative process is centred around uncertainty and ambiguity, structured and standardised processes and routine tasks may be detrimental to fast responses towards fast market changes. In line with these reasons, Montani (2004) argued that flexibility would promote the search for alternative ways and stimulate innovative behaviour. As people motivated by the basic desire

for *Structure* are motivated by organising and living and working in an environment that is ordered and consistent, the hypothesis was formed that a high level of *Structure* motivation would lead to a lower level of IWB. The hypothesis was confirmed, and *Structure* showed to have a strong negative direct effect on IWB.

As no previous research has been conducted on fundamental motives and Innovative Work Behaviour, this finding contributes an interesting original aspect to the innovation literature.

It is further very intriguing given the context of a cultural phenomenon referred to as “German Ordnung” (Hammerich and Lewis, 2016; Lewis, 2018). The term “Ordnung” which roughly translates to structure or order in English, has a central cultural and socio-linguistic meaning in Germany. From its use to express that everything is all right (“in Ordnung”) to various proverbs such as “Ordnung ist das halbe Leben.”, which literally translates to “order is half the life” and is used to express the importance of structure, the German cultural aspect of “Ordnung” is crucial also in business life (Cramer, 2015; Lewis, 2018). In the context of this thesis, it is, therefore, important to stress that structure is not just a fundamental motive inherent to individuals but also a cultural value of high importance in Germany. People who score low on the motive *Structure* find satisfaction in flexibility and spontaneity. They are driven by the need to act impromptu and find quick solutions for problems which arise.

While this is a great driver for Innovative Work Behaviour, it may not be perceived as positive within German culture. People who score low on the

motive *Structure* may be discouraged to satisfy this motive throughout their upbringing and careers which in turn can be one of the reasons Germany is facing the growing problems in innovation rates due to a lack of dynamics in the market (Fraunhofer Innovation Index, 2023). This is in line with Hammerich and Lewis (2016) claim that national cultures can actually support or derail a company strategy.

Further, when cultural values are contrary to a person's end motive, it may lower the individual's level of intrinsic motivation which in turn leads to lower creativity (Amabile and Pratt, 2016). So, if a person has a naturally low drive for *Structure*, they may try to adjust their behaviour to reflect the national and organisational cultural value of "order" and thus not live up to their full potential.

In light of the findings regarding the *Structure* motive and its negative impact on Innovative Work Behaviour (IWB), organisations should strive for a more balanced approach to this fundamental motive. While the cultural value of "Ordnung" in Germany promotes efficiency and quality, an overemphasis on structure hinders innovation as can be seen from these findings. Therefore, it is crucial for organisations to recognise the need for a more nuanced recruitment strategy that encompasses individuals with diverse motivational profiles. This would help foster a workforce that combines structured employees who excel in maintaining efficiency and quality with individuals who exhibit a greater inclination towards flexibility and agility. Moreover, to overcome the potential barriers imposed by an excessive focus on structure, organisations should consider revisiting their processes and practices to allow for more room for creativity, adaptability, and experimentation. By

striking a balance between structure and flexibility, organisations can create an environment that encourages innovative thinking, promotes adaptive responses to market changes, and ultimately unlocks the full potential of their workforce.

### **6.1.5. Social Participation and IWB**

As discussed in chapters two and three of the thesis, during the stage of idea championing of IWB, it is essential to seek support from both internal and external sources in order to secure support or funding for implementation. Previous research has indicated that individuals with extensive connections outside of the organisation may be more likely to engage in innovative work behaviours due to exposure to a diverse range of ideas and viewpoints that can stimulate creativity (de Jong and Den Hartog, 2010; Kanter, 1988; Kimberly and Evanisko, 1981; Perry-Smith and Shelly, 2003). The importance of networks in facilitating idea exploration and generation has also been supported by a number of studies (e.g. Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014).

The concept of *Social Participation*, as defined by Döhrendahl et al. (2021) and Reiss (2004), suggests that individuals with a strong intrinsic motivation for *Social Participation* tend to engage in a variety of social interactions (Brandstätter et al., 2013; Kämper, Döhrendahl, and Greiff, 2017; Murray, 1938; Neel et al., 2015; Reiss, 2004, 2008; Reiss and Haverkamp, 1998; Sokolowski and Heckhausen, 2010). They are driven by the need to connect with other people and have many social encounters. Thus, based on these

previous findings, it was hypothesised that a high level of *Social Participation* would result in a high level of Innovative Work Behaviour. The hypothesis was rejected and no direct correlation between the end motive *Social Participation* and Innovative Work Behaviour was found.

A possible explanation for this may be found in what is known as the German “Vereinskultur”, which can be translated to “German club culture”. According to the German Federal Association for Associations and Volunteers<sup>21</sup>, there are over 620,000 clubs and associations in Germany with a total number of over 50 million members. The concept of “Vereinskultur” is a central aspect of German cultural life and has a long history in Germany, with the first modern clubs emerging in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries. The club culture aspect in Germany is closely related to the cultural aspect of “Ordnung” as discussed in the previous section as it provides an organised space and framework for people who want to engage in various activities. While the “Vereinskultur” remains an integral part of German culture and society, it may also pose a challenge to innovative work behaviour within organisations. As people who are driven by *Social Participation* are motivated by making new contacts and socialising, that motivation itself does not directly lead to innovative behaviour unless there is an organised form of innovation culture. It seems that networks that are specifically designed to facilitate the exchange of ideas and knowledge, such as innovation networks or

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<sup>21</sup> Bundesverband der Vereine und des Ehrenamtes e.v.  
(<https://bundesverband.bvve.de/vereine-in-deutschland>)

knowledge-sharing communities, are more likely to lead to innovative work behaviour within the German culture among people driven by the fundamental motive for *Social Participation*.

The direct effects of fundamental motives on Innovative Work Behaviour offer valuable insights into individual motivators. However, when examining the specific case of *Social Participation*, it becomes apparent that motivation alone may not be sufficient to drive higher levels of IWB. The intrinsic drive for *Social Participation*, characterised by a strong desire for social interactions and making new contacts, does not necessarily directly lead to innovative behaviour in the absence of an organised innovation culture. To better harness the potential of the Social Participation motive, networks explicitly designed to facilitate idea exchange and knowledge sharing, such as innovation networks or knowledge-sharing communities, are more likely to encourage innovative work behaviour within the German culture.

These findings highlight the significance of the organisational climate as a mediating factor in the relationship between motivation and IWB. Understanding the interplay between fundamental motives and the organisational climate is crucial for a comprehensive understanding of the complex mechanisms underlying IWB. Therefore, the subsequent section and its relevant subsections will examine organisational climate and its mediating effects.

## 6.2. Climate as a Direct and Mediating Variable

A key factor that can impact innovation within an organisation is organisational climate, which refers to the psychological perception of the shared routines, values, and norms of the workplace. Organisational climate has been shown to be related to a range of important outcomes, including job satisfaction, motivation, commitment, innovation, and creative performance (e.g. Amabile, 1998, Kanter, 1983; Leonard and Swap, 1999; McLean, 2005; Patterson et al., 2005).

Organisational climate plays a crucial role in shaping individual attitudes and behaviours. At the same time, as organisational climate is the psychological perception of the culture, it is also shaped by the individuals' personalities and thus motives. It is, therefore, important to consider the relationship between organisational climate and innovative work behaviour from a broader perspective, rather than focusing solely on the influence of climate on innovation. To fully understand the complex relationship between organisational climate, intrinsic motivation, and innovative work behaviour, it is necessary to examine the mediating effect organisational climate has on the relationship between multi-faceted intrinsic motivation and innovative work behaviour. This approach allows us to gain a more comprehensive understanding of the role of organisational climate in shaping individual attitudes and behaviours related to innovation.

### 6.2.1. Autonomy and IWB

Freedom and autonomy for employees to explore and decide, have consistently been identified as important factors in organisational climate related to innovation output and innovative work behaviour. Amabile et al. (1996) identified autonomy for employees to find their own ways of achieving goals as one of the six indicators for a high-creativity climate and Krause (2004) has identified autonomy as the most influential factor in supporting idea generation and testing of ideas. In a study conducted using a conjoint experiment with 1,180 employees, Theurer, Tumasjan and Welpel (2018) found that employee IWB was significantly affected by all dimensions of autonomy. These previous findings highlight the importance of providing employees with autonomy and freedom in the innovation process, as it can significantly impact their ability to generate and develop creative ideas. By allowing employees to have control over their work processes and goals, organisations can create an environment that supports and encourages idea generation and testing, which can ultimately lead to improved innovation outcomes.

Similarly, according to Forrester (2000), traditional organisational practices that result in feelings of powerlessness among employees can have negative impacts on their productivity and creative potential. When employees feel powerless, they may be less able to engage fully in their work and may be less motivated to contribute their creative ideas and suggestions. This can lead to operational ineffectiveness and inhibit employee creativity. Based on these findings, the organisational climate dimension autonomy was hypothesised to positively affect Innovative Work Behaviour. The hypothesis

was confirmed, and autonomy showed a significant positive effect on Innovative Work Behaviour which corresponds to the existing body of literature.

While the direct effect of the climate on innovation is very important, it is even more interesting for the research at hand to see how organisational climate mediates the relationship between end motives and Innovative Work Behaviour. According to McLean et al. (2014), an environment of freedom and autonomy is likely to enhance the intrinsic motivation of employees, which has been identified as a key factor in promoting creativity in organisations. This conclusion was based on an analysis of previous research and examples of market innovations. The meta-study suggests that by allowing employees to have control over their work processes and goals, organisations can tap into their intrinsic motivation and encourage them to be more creative and innovative in their approach to problem-solving.

An important question that arises when examining the relationship between autonomy and various end motives is whether the effect of autonomy applies in the same way across different end motives and whether it always mediates the relationship between autonomy and end motives in a positive manner. The following sections will explore this question and discuss the potential implications for the understanding of how autonomy may mediate the impact different end motives have on IWB.

By examining these issues in more depth, the following sections aim to contribute to a more nuanced understanding of the complex relationship between autonomy and various end motives.

### 6.2.1.1. Autonomy as a Mediator of Curiosity and IWB

A climate of autonomy in which employees are given the independence to make their own decisions and are not tightly controlled by their supervisors gives individuals a higher level of freedom to create their own job roles. Employees with a high level of *Curiosity* are driven by the search for continuous improvement and the need to explore knowledge deeper. According to Swaroop and Dixit (2018), the extent to which an individual has control over the tasks and decisions, thus perceiving a climate of autonomy in his organisation, plays a crucial role in their engagement in challenging and complex tasks and thus their ability to act on the motivation for *Curiosity*. Based on these premises, it was hypothesised that a climate of autonomy will mediate the relationship between *Curiosity* and Innovative Work Behaviour. This hypothesis was supported, and autonomy was shown to have a positive mediating effect on the relationship between *Curiosity* and IWB. By being given the autonomy to create their job roles, people who have a high level of *Curiosity* may allocate more time and resources to explore problems and create new ideas on how to solve these issues. This corresponds to the current body of literature which shows that autonomy in the workplace is especially beneficial for employees who perform complex tasks (Kanat-Maymon and Reizer, 2017; Mutonyi et al., 2022) as is the case in both the population of the study and corresponds to the goal theory for individuals driven by *Curiosity*.

Further, when taking into consideration the aspect of the Humboldtian model of education in Germany and the resulting culture of critical thinking as discussed in section 6.1.1., it is important to note that a climate of autonomy in an organisation gives room for individuals to display critical thinking. This freedom a climate of autonomy gives employees to challenge the status quo and ask critical questions can increase the level of intrinsic motivation of *Curiosity*-driven employees. It provides employees motivated by *Curiosity* with the freedom to investigate and analyse existing processes, services, and products to identify weaknesses and communicate these openly. As continuous challenging of existing measures can be perceived as exhausting by other colleagues, particularly the ones who score low on the *Curiosity* motive and who are therefore motivated by routine tasks rather than new insights, establishing a climate of autonomy can be of the utmost importance for *Curiosity*-driven employees.

However, the mediating effect also shows that *Curiosity* as a fundamental motive can influence the climate of autonomy within an organisation. Individuals with a high level of *Curiosity* possess an innate drive to seek continuous improvement and explore knowledge in-depth. Their motivation to explore new ideas and challenge existing practices can foster a climate of autonomy in which employees are given the freedom and independence to make their own decisions. When organisations recognise and encourage the curiosity of their employees, they are more likely to create an environment that values autonomy and empowers individuals to take ownership of their job roles.

The relationship between *Curiosity* and the climate of autonomy is reciprocal and mutually reinforcing. *Curiosity*-driven individuals actively seek out opportunities to exercise their autonomy, as it enables them to explore problems, generate innovative ideas, and implement creative solutions. On the other hand, a climate of autonomy provides the necessary space and support for *Curiosity*-motivated employees to thrive. By granting employees the autonomy to shape their work, organisations foster an atmosphere that encourages curiosity, exploration, and experimentation.

#### **6.2.1.2. Autonomy as a Mediator of Dominance and IWB**

The importance of having proactive employees involved in the innovation process has not only been shown in previous research (see Kim et al., 2009; Park and Sung, 2018; Parker, 1998; Parker et al., 2006; Seibert et al., 2001; Van Dam, 2013) and discussed in more detail in sections 3.1.2. and 6.1.2., but the fundamental motive *Dominance*, which is assumed to be a driver for proactive behaviour was shown to have a direct effect on Innovative Work Behaviour in this research. Although there is a high demand for proactive involvement in the innovation process in organisations due to the rapid changes and volatility of the current economic climate, in traditional organisations with a strong top-down hierarchy, employees are not usually expected to take initiative (Park and Jo, 2017). However, according to research conducted by Parker et al. (2006) using a sample of wire makers in the UK, it was discovered that certain environmental factors, including job autonomy and trust among co-workers, were linked to proactive behaviour.

Based on these premises, the hypothesis was formed that the positive relationship between *Dominance* and IWB would be mediated by organisational autonomy. While the mediation hypothesis was confirmed, *Dominance* was shown to have a strong negative effect on a climate for autonomy and the mediating effect was negative rather than positive.

One possible explanation for this unexpected result is that while employees with a high level of *Dominance* show strong persuasive abilities, they are much more visible in organisational climates with lower levels of autonomy. When an organisation is characterised by a climate of autonomy in which most employees feel they have the freedom to take their own decisions and not ask for permission to try out new processes or implement new ideas, there is no need for strong persuasive or influential behaviour. In these climates, as this research shows, people with a high level of *Dominance* may even be perceived as less innovative.

This would also correspond to the comments at the end of the survey conducted for this thesis alluding to issues that only a limited number of people within the company are heard and seen in their ideas. This indicated that in more hierarchical cultures with a climate of low autonomy, a need for more dominant and proactive behaviour is created. Similarly, in more progressive organisational cultures where employees are generally given more autonomy, a high drive for *Dominance* is detrimental to Innovative Work Behaviour. This sheds a brand-new perspective on the mediation aspect of autonomy and gives deeper insights into how a climate dimension with a generally positive effect on innovativeness may in fact explain negative effects as well. This is particularly striking as it shows the importance of

having a more nuanced look at the complex relationship between intrinsic motivation, climate, and Innovative Work Behaviour and how surprising the effects may be when looked at in more depth and detail. While these findings show important and original insights for theory, they also bear great significance for practice.

Although the fundamental motive for *Dominance* has shown to have a generally positive direct effect on innovative work behaviour on the level of the individual, it is important to consider its cumulative effect on the climate of autonomy. The presence of highly *Dominance*-driven individuals within a team or department can potentially hinder the establishment of a climate characterised by autonomy and independence. These individuals may exert a dominant influence over others, creating a dynamic that restricts the freedom and decision-making capabilities of their colleagues.

To ensure the fostering of an innovative work environment, it becomes crucial for leadership to manage and balance the influence of *Dominance*-driven employees within teams. Leaders should be attentive to the potential negative consequences of a culture that suppresses autonomy and creativity. By actively addressing the interplay between *Dominance*, autonomy, and Innovative Work Behaviour, leaders can promote a climate that encourages autonomy, fosters creativity, and maximises the potential for innovation. This understanding underscores the importance of leadership practices that recognise and leverage the diverse motivations and strengths of individuals within teams, while also cultivating an environment that values autonomy, collaboration, and the freedom to explore new possibilities.

### 6.2.1.3. Autonomy as a Mediator of Safety and IWB

People motivated by a high level of *Safety* strive for a predictable and secure life which does not pose too many unexpected challenges (Döhrendahl et al. 2021; Reiss and Haverkamp, 1998). As the innovation process is one characterised by uncertainty, risks, and setbacks, it was no surprise to see that there was a significant negative direct effect of the *Safety* motive on Innovative Work Behaviour. Similarly, when given the freedom to make their own decisions and operate autonomously in the workplace, it was assumed that people who score high on the end motive *Safety* would choose this freedom to follow their natural motivation and avoid the risks connected to the innovation process. Thus, it was hypothesised that autonomy would mediate the relationship between *Safety* and Innovative Work Behaviour. While a mediation effect could be found and the hypothesis was therefore supported, the mediating effect of autonomy was positive rather than negative as originally expected.

One possible explanation for this surprising result could lie in the notion of psychological safety. Psychological safety refers to the perception of being able to express oneself freely and voice opinions and ideas without fear of negative consequences. While there are many different ways that psychological safety was conceptualised over time (Edmondson, 1999; Kahn, 1990; Schein and Bennis, 1965), all research on psychological safety, regardless of the level of analysis or the time period being studied, had one notion in common: that the concept of psychological safety refers to creating a work environment in which individuals feel comfortable expressing their ideas and opinions without fear of negative consequences. Edmondson and

Lei (2014) highlight the importance of minimising interpersonal risk in the workplace and state that psychological safety enables individuals to contribute willingly to the collective goals of the organisation. In their meta-analytical study drawing on 136 independent samples representing over 22,000 individuals, Frazier et al. (2017) found a significant and positive relationship between autonomy as a predictor of psychological safety. Similarly, Ziqing et al. (2022) show that organisational climate causes psychological safety which in turn is a determinant of Innovative Work Behaviour. While a psychologically safe workplace may be beneficial to all employees (Morrison, 2011), those driven by the end motive *Safety* may, in fact, need an even higher level of psychological safety and therefore autonomy to voice their opinions and ideas. When individuals feel threatened and insecure psychologically, they tend to exhibit defensive tendencies and are in turn less likely to exhibit innovative behaviours (Ziqing et al., 2022). Employees with a high need for *Safety* tend to feel threatened more easily so creating a climate which fosters psychological safety, as autonomy does, might be the key to giving those employees room to display IWB. By fostering a climate of psychological safety, where employees feel comfortable and supported in sharing their opinions and taking calculated risks, organisations can unlock the innovative potential of individuals driven by the *Safety* motive. This can be achieved through practices such as promoting open communication channels, providing platforms for idea-sharing and collaboration, and establishing a culture that values diverse perspectives and constructive feedback. In addition, leadership styles and practices should also consider the needs and motivations of employees with a high level of

*Safety*. Leaders can support these individuals by providing clear guidelines and support mechanisms that alleviate their concerns and enhance their sense of security. By balancing the need for predictability and stability with opportunities for autonomy and creative problem-solving, leaders can create an environment that encourages both safety and innovation. Furthermore, offering training and development programs that focus on risk assessment, resilience, and adaptability can help individuals with a high *Safety* motive develop the confidence and skills necessary to navigate the uncertainties of the innovation process.

#### **6.2.1.4. Autonomy as a Mediator of Social Participation and IWB**

According to De Jong and den Hartog (2010), external work contacts and social networks are crucial for innovative work behaviour (IWB). When individuals possess a high level of intrinsic motivation for *Social Participation*, they tend to desire numerous connections within and outside of the workplace. In an organisational climate characterised by autonomy, which promotes transparency and information flow, it is likely that the ideas generated using input and inspiration from external contacts will be more closely aligned with the needs of the organisation. Additionally, this type of climate may facilitate the creation of fluid relationships between departments and functions, potentially fostering open innovation within the organisation (Leonard and Swap, 1999). Based on these considerations, the hypothesis was formed that a climate of autonomy will act as a mediator between *Social Participation* and Innovative Work Behaviour. Although a positive relationship

was expected, the effect found showed that autonomy negatively mediates the relationship between *Social Participation* and Innovative Work Behaviour. In the current context, the results suggest a perfect or full mediation effect, which implies that the effect of a motivation for *Social Participation* on Innovative Work Behaviour is fully transmitted through autonomy.

As having a high number of employees driven by *Social Participation* actually creates a climate with a lower level of autonomy, one possible explanation for the unexpected mediation might again lie in the German cultural context. People motivated by *Social Participation* are driven by the need to meet new people, small talk, connect, make new friends, and exchange information. As discussed earlier, the notion of the German “Vereinskultur”, often leads to an organisational culture in which employees rely on the social exchange to be organised officially rather than done spontaneously. It is not as common in German cultures to meet your colleagues outside of work, invite them to your homes, but the social exchange at work is then often limited to work topics marking a clear distinction between business and personal life (Köhler and Götz, 2015; Thesing, 2016). This could lead to an increased level of exchange about one’s day-to-day work which creates the psychological perception among colleagues, particularly those without the end motive *Social Participation*, that there is in fact a lower level of autonomy in the company. While people driven by *Social Participation*, especially if they are in leadership positions, might consider this exchange just friendly banter used to satisfy their end motive, others who do not score high in this motive, may feel that this is caused by a lack of trust and thus perceive their work environment as one of lower autonomy. From a theoretical perspective, this finding adds

weight to the intricate role of autonomy within the organisation and further explains the complex dynamics between social participation, autonomy, and innovative work behaviour.

From a practical standpoint, this result underscores the necessity for managers to strategically foster autonomy within the organisation, especially in culturally sensitive contexts like Germany. Given the mediating role of autonomy, managers aiming to leverage social participation for enhancing innovative work behaviour need to be acutely aware of how their actions may affect perceptions of autonomy within the organisation.

Another possible explanation for this phenomenon in this study may lie in the time this research was conducted. The ongoing COVID-19 pandemic has necessitated remote work for a significant proportion of knowledge workers surveyed here. This shift to remote work may have had unintended impacts on employee motivation and perceptions of the organisational climate. This is also shown in a recent study by Evans et al. (2021), showing that remote work had a negative effect on the motivation and performance of extroverted employees due to the lack of social contact. Looking at the results of this study, individuals driven by *Social Participation* may have increased the frequency of meetings in order to satisfy their desire for social contact. However, this increase in meetings may have had a converse effect on employees who do not prioritise social interaction, potentially leading to perceptions of reduced autonomy and decreased trust within the organisation. This assumption is corroborated by the comments left at the end of the survey in which many participants who scored low on the *Social Participation* motive claim that they feel too little trust and freedom was given

to them when working from home. This aspect of frequency of meetings and how these are conducted and perceived also greatly affected the climate dimension reflexivity, which will be discussed in more detail in the following sections including the practical implications resulting from these findings.

### **6.2.2. Reflexivity and IWB**

Reflexivity, which forms one climate dimension of the open systems model, as discussed in sections 2.3.2., 2.3.4.4., 3.2.2. and 4.3.3. of this thesis, refers to a climate within an organisation that is characterised by frequent communication among team members about strategies, goals, and methods. It includes discussions on how to modify these in response to a changing environment and is generally seen as a good indicator of innovativeness in companies (Farnese, Fida, and Livi, 2016; Patterson et al., 2005; Schippers, West and Dawson, 2012).

It is further assumed that a climate of reflexivity fosters learning in organisations necessary for questioning and adapting routines and processes when new challenges arise (Farnese, Fida, and Livi, 2016; Oh and Lee, 2022). Based on these considerations, the hypothesis was developed that reflexivity will have a direct positive effect on Innovative Work Behaviour. The hypothesis was rejected, and reflexivity even showed to have a significantly negative effect on IWB.

The most feasible explanation for this finding, which is inconsistent with the current body of innovation literature, lies in the cultural context of German enterprises. Most studies conducted to date which have shown reflexivity to

be an indicator of innovativeness were conducted in the UK, the US, Italy, and Korea. After the presentation of the results of this research to the participating companies, there was a general consensus that the way reflection is lived in everyday business in their respective enterprises was through long and rather unstructured meetings that were not geared towards innovation efforts. Further, many leaders, as well as employees, uttered their concerns that their way of living reflexivity and meeting culture was rather negative. When reflecting upon mistakes made and necessary changes, the focus was laid on the past, adverse consequences, and a rather pessimistic outlook towards future endeavours. Another aspect of the meeting culture in their companies that might contribute to a negative form of reflexivity was raised in the comments of the survey suggesting that there is a high number of meetings held which are not geared towards innovation and in fact have no obvious goal at all. It was further mentioned by various participants that their methods and strategies were regularly discussed but without consideration of how it impacted their company's innovativeness.

These findings are consistent with several studies found in sociological and psychological research on German meeting cultures. Studies on German teams have shown that the problem analysis process is a key feature of German meeting culture (Schroll-Machl, 1996, 2008). These teams tend to place a strong emphasis on gathering detailed information and data and often do not clarify their goals until they have obtained enough information about the problem at hand. This approach is in contrast to the trial-and-error method commonly employed by teams in the United States (Stewart and Bennett, 1991), in which the overall goal is identified, and various solutions are

proposed according to Lehmann-Willenbrock, Allen, and Meinecke (2014). In their research comparing the meeting cultures of Germany and the US, they confirmed the previous studies and found that in their analysis of 5,188 meeting behaviours with 125 individuals, there were 80.37 problem-focused statements per hour on average in German teams compared to only 36.66 statements in the US teams.

Another problematic aspect of communication (Kauffeld and Lehmann-Willenbrock, 2012; Lehmann-Willenbrock, Allen, and Meinecke, 2014) is summarised as dysfunctional behaviour and includes “meeting behaviours such as complaining, seeking someone to blame, or trying to end the discussion early” (Lehmann-Willenbrock, Allen, and Meinecke, 2014, p. 6). This type of dysfunctional behaviour often occurs in patterns and according to Kauffeld and Lehmann-Willenbrock (2012), a typical team meeting in a German organisation has an average of 52 complaining statements and only two positive action planning statements. Such counteractive behaviours may be the root cause of why a climate of reflexivity in the current state in German enterprises may show such a negative direct and mediating effects on the Innovative Work Behaviour of the employees as will be discussed in the following two subsections.

The findings regarding the negative effect of reflexivity on Innovative Work Behaviour have important practical implications for organisations. They suggest that simply promoting a climate of frequent communication and reflection may not be sufficient to foster innovation in the German context. Instead, organisations need to carefully consider the quality and purpose of their meetings. A meeting culture that emphasises efficiency and positivity

should be implemented, where the chair of the meeting plays a crucial role in guiding discussions towards solution-oriented approaches. This may involve structuring meetings around innovation goals, focusing on future-oriented discussions, and discouraging dysfunctional behaviours such as blaming or complaining. By cultivating a meeting culture that supports innovation and encourages constructive dialogue, organisations can create an atmosphere that enhances Innovative Work Behaviour and promotes a positive impact on overall organisational performance.

#### **6.2.2.1. Reflexivity as a Mediator of Structure and IWB**

People motivated by a high level of *Structure* are driven by a desire to strategise, organise, and avoid unexpected changes in plans. Meeting frequently to discuss strategies and goals and reflect upon possible changes could provide people motivated by *Structure* with the necessary framework and thus safety to engage in Innovative Work Behaviour more easily as it would create some order into an otherwise unpredictable and chaotic process that innovation typically tends to be. For this reason, the hypothesis was proposed that reflexivity would mediate the relationship between *Structure* and IWB. The hypothesis was supported, and a mediation effect was shown to be significant. The assumption based on previous literature was made that the negative relationship between *Structure* and IWB would be mediated positively by reflexivity, but the opposite was the case. This negative effect can most likely be attributed to the very strong negative effect reflexivity has been shown to have on IWB in this study as discussed in the previous section.

A high level of *Structure* motivated employees in a company leads to a higher perception of reflexivity climate as they desire more exchange, planning and strategising. But given the current cultural context of how meeting culture and thus reflexivity is lived in German enterprises fostering adverse effects on innovativeness through cycles of dysfunctional meetings (Kauffeld and Lehmann-Willenbrock, 2012; Lehmann-Willenbrock, Allen, and Meinecke, 2014) behaviours, it comes as no surprise that the mediation effect here is negative. Especially with *Structure* motivated employees, who show low Innovative Work Behaviour generally, as was discussed in section 6.1.4., a climate of true reflexivity geared towards innovation may actually help ease them into the innovation process and help foster the learning process necessary to contribute more to IWB.

#### **6.2.2.2. Reflexivity as a Mediator of Social Participation and IWB**

People motivated by *Social Participation* are driven by the desire to meet new people, have frequent meetings with friends and colleagues, have small talk and exchange information. Having a high number of employees with the end motive of *Social Participation* has been found to lead to a high level of reflexivity climate in this study. This was expected as a climate of reflexivity corresponds to the drive of people motivated by *Social Participation* for frequent social encounters and exchange. However, as both networks and reflexivity climate were shown to be important elements for innovativeness in various previous studies (e.g. Cross, 2010; De Jong and Den Hartog, 2010; Farnese, Fida, and Livi, 2016; Partanen et al., 2014; Schippers, West and

Dawson, 2012), it was hypothesised that reflexivity would mediate the effect *Social Participation* has on Innovative Work Behaviour. *Social Participation* itself showed no direct effect on IWB, but there was a full mediation effect through reflexivity. However, instead of being positive, as originally assumed, the mediation effect was negative. Again, the reason for this, as discussed in the previous two sections, is most feasibly explained by the German cultural context and the connected dysfunctional meeting behaviour. As people motivated by *Social Participation* are driven by the need to connect to others, they are more likely to schedule more meetings, attend these and be in even more intense exchanges with their colleagues than people who do not score high on this end motive. However, when this exchange is not geared towards innovation but on the contrary is detrimental to it, it comes as no surprise that reflexivity in this context actually shows a negative mediating effect on the relationship between *Social Participation* and Innovative Work Behaviour. The reason for this may in fact lie in a lack of process constraints in meetings. While constraints in form of rules and bureaucracy often show a negative influence on innovativeness in companies, as will be discussed in more detail in the following section, some process constraints can in fact be beneficial. Guidelines for interacting with peers and structure for collaboration such as processes for brainstorming and goal setting in meetings have been found to increase knowledge sharing and trust among team members (Acar, 2019; Brattström, Löfsten, and Richtnér, 2012). Studies in these fields have found that using explicit rules and standard procedures in product and service development can improve communication and coordination across tasks. Particularly, when put into the context of German culture and its core of

“German Ordnung” as discussed in 6.1.4., a more structured and positive approach to reflexivity in German organisations might be able to utilise the natural drivers of *Social Participation* and direct them in a more positive way towards a higher innovation output. As discussed at the end of section 6.2.2., this could be reached by fostering a meeting culture oriented towards solution outcomes. It is essential to create an environment where reflection focuses on future improvements, learning from mistakes, and exploring innovative ideas. By shifting the meeting culture towards constructive and forward-thinking discussions, organisations can harness the potential of reflexivity to drive innovative work behaviour and adaptability in the face of challenges.

### **6.2.3. Formalisation and IWB**

While having some rules regarding how meetings are held and led might help direct a climate of reflexivity towards innovation (Hirst, van Knippenberg, Zhou, Quintane, and Zhou, 2015), one important question that is often raised in both practice and research is how many rules are one too many. Various researchers have shown that moderate levels of constraints regarding time and resources, particularly when framed as a challenge might be motivating and help foster more creativity from employees (Acar, 2019; Baker and Nelson, 2005; Baer and Oldham, 2006; Mehta and Zhu, 2016; Ohly and Fritz, 2010; Scopelliti et al., 2014). The issues seem to arise when the constraints impinge upon personal and process autonomy within the company. Having a high level of bureaucracy and process regulations has been found to impede both the autonomy and creativity of employees and thus have a highly

negative influence on various innovation efforts (Cooper, 1999; Galunic and Eisenhardt, 2001; Gaspary, Moura, and Wegner, 2020; Kanter, 1983; Nayir, Tamm, and Durmusoglu, 2014). Similarly, highly innovative companies such as Netflix and Spotify, have created organisational cultures of “no rules” in which a climate of autonomy is given the highest priority instead of a culture which emphasises following established processes (Mankins and Garton, 2017; McCord, 2014) and a top-down hierarchy. As a climate of formalisation, as defined in this thesis, mirrors a culture of strict rule adherence, the hypothesis was formed that a climate of formalisation will have a negative direct effect on the Innovative Work Behaviour of employees, which was confirmed. As this is consistent with the current body of literature, this aspect was not surprising, however, seems to carry a specific significance in the context of German politics and economy.

According to data obtained from the German federal government in February 2023, the number of specific provisions in German laws and regulations was 79,935 in 2010 and went up to 93,328 by 2022. This is the number of specific provisions on the federal level. However, in addition to this, each German state has its own legislature in fields that are under the jurisdiction of the states, such as education, job qualifications, transportation, etc. as well as regulations set in place by the European Union. The number of individual regulations by which a German person is legally bound is currently estimated to be as high as 160,000. Each year around 500 laws are passed by the German federal government, compared to around 300 in the US, and approximately 150 in Switzerland, which has been rated the number one most

innovative country on the innovation index each consecutive year for more than a decade now.

The level of formalisation influences businesses directly as the regulatory environment and compliance costs in Germany can make it challenging for businesses to invest in new technologies or take risks. These compliance costs can increase the financial burden on firms and make it more difficult for them to pursue innovative endeavours. Further, the strict labour laws in Germany can make it difficult for businesses to adapt to changing market conditions or pursue new opportunities, thereby negatively impacting their innovativeness.

The bureaucratic nature of the German system can impede the process of innovation by making it difficult for businesses to navigate the administrative and legal systems, leading to delays and additional barriers. This was also reflected in the comments given by the leadership teams of the various participating companies during the presentation of results. They claimed that their own high level of formalisation in the company was caused by the regulations imposed on them by the government.

However, the underlying cultural aspects should also be looked at in more detail as they may explain why the high level of formalisation even exists on the government level in the first place and why it may even be desired by some employees in the companies. To explore this further, formalisation as a mediator of the relationship between the individual end motives and IWB will be looked at and discussed in more detail in the following subsections.

### 6.2.3.1. Formalisation as a Mediator of Curiosity and IWB

People motivated by *Curiosity* are driven by the desire to explore new knowledge and dive deeper into the theory of things. As was established in this thesis a high level of *Curiosity* leads to a higher Innovative Work Behaviour as the employees tend to spot problems faster, always try to find new ways of doing things, and are interested in continuous improvement. Corresponding to creativity literature (Amabile and Pratt, 2016; Damanpour, 1991), a climate for rules and constraints inhibits an individual's autonomy and therefore also creativity. This has a direct negative effect on their Innovative Work Behaviour as shown in this thesis. As previously discussed in section 6.2.1.1. of this thesis, individuals who possess a strong inclination towards *Curiosity* require autonomy to effectively express their innovative capabilities. As it was shown that a high proportion of *Curiosity*-driven employees within an organisation lead to the cultivation of an autonomous organisational climate, it was therefore, in contrast, hypothesised that *Curiosity* will lead to a lower formalisation climate. As a lower formalisation was assumed and later shown to lead to a higher Innovative Work Behaviour, it was hypothesised that formalisation will mediate the relationship between *Curiosity* and IWB. The hypothesis was confirmed, and a mediation effect was shown. The effect was significant but rather small which is not surprising given the fact that formalisation has a negative effect on IWB and *Curiosity* leads to a lower level of formalisation in a company. Despite this, the effect was still slightly positive. One of the possible explanations for the positive mediating effect is that the relationship between *Curiosity* and IWB happens despite a climate of formalisation rather than because of it. But when

presenting the results to the participating companies, some attendees in various meetings who score high on the motive *Curiosity* raised another aspect that can offer a plausible explanation for this phenomenon, independent of each other. They said that while formalisation is not motivating for them and their own motivation leads to a climate of lower formalisation, working in an organisation characterised by high rule adherence gives them an opportunity to spot problems more easily than in climates where processes and regulations are not as tightly defined. They indicated that while they prefer to work without strict rules, utilising clearly defined processes can help them identify areas for improvement and potential for innovation. This explanation for a positive mediation effect is particularly feasible when considering both the aspects of critical thinking and problem-focused communication prevalent in German businesses as discussed in sections 6.1.1. and 6.2.2.

The findings highlighting the mediating role of formalisation in the relationship between *Curiosity* and innovative work behaviour have important practical implications. Organisations should carefully consider the balance between formalisation and autonomy, especially when fostering a climate conducive to IWB. While excessive formalisation can restrict individual autonomy and creativity, a certain level of formalisation can provide a structured framework for employees to identify and address challenges more effectively. Organisations can aim to strike a balance by defining clear processes and regulations that guide employees while still allowing room for exploration and problem-solving. Additionally, leaders and managers can encourage a culture of continuous improvement and learning within a formalised structure,

empowering *Curiosity*-driven employees to leverage the defined processes as tools for identifying areas for innovation. By embracing the potential benefits of formalisation while valuing autonomy and *Curiosity*, organisations can create an environment that supports innovative work behaviour and encourages employees to leverage their natural *Curiosity* motive to drive positive change.

#### **6.2.3.2. Formalisation as a mediator of Dominance and IWB**

People motivated by *Dominance* are driven by the desire to influence people and situations and the motive was shown to be closely related to both the Power motive and the Achievement motive (Döhrendahl et al., 2021). Research has shown a positive correlation between the achievement motive and entrepreneurial behaviour (Collins, Hanges, and Locke, 2004; Stewart and Roth, 2007) as well as between trait dominance and risk-taking behaviour (Demaree et al., 2009). An explanation offered for this is that achievement-motivated individuals prefer entrepreneurship as they are more likely to accept the challenge and uncertainty while trying to avoid the formalisation that comes with employment (Stewart and Roth, 2007). Similarly, *Dominance*-motivated individuals are more likely to look for challenges, deviating from established protocols and procedures in order to generate novel and creative solutions. Moreover, individuals driven by *Dominance* are less likely to be constrained by formal rules and regulations, which can foster an environment that is conducive to innovation. They may also be more

comfortable making decisions quickly, which can help to move projects forward and avoid delays caused by excessive bureaucracy.

Based on the premise, the hypothesis was formed that formalisation would show a mediating effect on the relationship between *Dominance* and IWB. The hypothesis was rejected, and no mediating effect could be found. One possible explanation is that while achievement-motivated, and thus presumably also *Dominance*-motivated, individuals do prefer environments with lower formalisation and more often turn towards entrepreneurship (Stewart and Roth, 2007), when working as employees in companies, they do not necessarily have the influence on existing rules and hierarchies. Given their natural inclination towards challenges and fast decisions, it is possible that they see the formalisation climate of their respective company not as a barrier but rather as a challenge to overcome. Either way, a climate of strict rule adherence acts as a neutralising factor on the otherwise positive direct relationship *Dominance* has with IWB. It would be interesting to see if the results would have been the same given a different power position in the companies. If *Dominance*-motivated leaders rather than knowledge workers had been the subject of study, it could have given further insight into whether their motivation paired with institutional power would have affected a climate of formalisation and given more room to display higher Innovative Work Behaviour.

### 6.2.3.3. Formalisation as a mediator of Safety and IWB

Research has shown that individuals with a high level of *Safety* motivation tend to prioritise predictability and security in their lives, avoiding situations that may present unexpected challenges (Döhrendahl et al., 2021; Reiss and Havercamp, 1998). Given that the innovation process is inherently characterised by uncertainty, risk, and potential setbacks, it is not surprising to find a significant negative direct relationship between the *Safety* motive and Innovative Work Behaviour. These findings suggest that individuals with a high level of *Safety* motivation may be less likely to engage in behaviours associated with innovation, as they may perceive them as too risky or uncertain. Uncertainty avoidance is not only a driver for *Safety*-motivated individuals but has been defined by Hofstede (2001) as one of the strong markers of German culture. One way of avoiding uncertainty is by creating rules and procedures resulting in a formalisation climate. Based on these findings, the hypothesis was proposed that a climate of Formalisation will mediate the negative relationship between *Safety* and Innovative Work Behaviour. The hypothesis was rejected, and no mediation effect was found. This was rather surprising given the strong negative direct effects of both *Safety* and Formalisation on Innovative Work Behaviour. Interestingly, a high level of *Safety* motivation is not shown to lead to a high level of Formalisation. So, while *Safety* motivated employees may be driven by risk avoidance, they may not do so through rules and bureaucracy. When working in an organisation characterised by a high level of Formalisation though, the negative direct effect of *Safety* on IWB was neutralised. This could be an indication that a climate of clear rules, processes and order may provide

knowledge workers motivated by *Safety* with a more secure and clear framework in which at least they do not hinder the innovation process by questioning the risks taken and acting even more cautiously. This would also be supported by the notion that a climate of formalisation can contribute to uncertainty avoidance by providing clear expectations and boundaries for behaviour and a sense of consistency in how rules are enforced. This in turn can help *Safety*-motivated employees feel more secure and enhance their psychological well-being and thus neutralising the negative effect of *Safety* motivation on IWB.

The findings regarding the mediating role of formalisation in the relationship between the fundamental motive for *Safety* and innovative work behaviour have both theoretical and practical implications. The results challenge the common assumption that *Safety*-motivated individuals would seek formalisation as a means of risk avoidance. Instead, the research reveals that *Safety*-motivated employees may not necessarily drive the formalisation climate themselves. However, when operating within an organisation characterised by a high level of formalisation, the negative direct effect of *Safety* motivation on innovative work behaviour is neutralised. This suggests that a climate of clear rules, processes, and order can provide a sense of security and clarity for *Safety*-motivated individuals, allowing them to operate within a structured framework without hindering the innovation process.

From a practical standpoint, organisations should recognise the potential benefits of a formalisation climate for *Safety*-motivated employees. Implementing clear rules, procedures, and consistent enforcement can help provide a sense of certainty, reduce perceived risks, and enhance the

psychological well-being of *Safety*-motivated employees. However, organisations should also strike a balance by promoting an environment that encourages creative thinking, exploration, and calculated risk-taking, ensuring that formalisation does not become overly restrictive or stifling to innovation efforts.

#### **6.2.3.4. Formalisation as a Mediator of Structure and IWB**

The only aspects of the innovation process that are certain are uncertainty and ambiguity. Therefore, it was not surprising to find that a climate of formalisation in the form of rule adherence and bureaucracy can hinder employees' ability to respond quickly to market changes and to display innovative behaviour. As individuals motivated by the need for *Structure* are driven by a desire for order and consistency in their personal and professional surroundings, the findings in the thesis also supported the previously hypothesised negative effect of *Structure* on IWB. Looking at each of these variables as strong indicators of low Innovative Work Behaviour among knowledge workers, it was hypothesised that a climate of formalisation would mediate the negative relationship between *Structure* and IWB. The hypothesis was supported, and formalisation was found to negatively mediate this relationship. The results, while not surprising, as consistent with the literature presented in section 3.2.3.4., are particularly interesting when being looked at within the cultural context of German enterprises. According to Hofstede (2001), Germany has a culture that is characterised by small "power distance" and strong "uncertainty avoidance". A culture with low power

distance is defined as a culture with a relatively equal distribution of power and decision-making authority. In such cultures, organisations tend to have flatter organisational structures and more democratic decision-making processes. While this can be helpful to create a climate of autonomy, it may lead to issues with accountability. Particularly, when, as is the case of Germany, the culture has high uncertainty avoidance. Uncertainty avoidance refers to how a culture handles unpredictability in the future. It reflects the level of anxiety people feel in uncertain situations and the ways in which a culture deals with this anxiety through norms, values, and institutions. So, a culture which rejects authority through hierarchy but still aims to avoid uncertainty through norms is likely to compensate for this by relying on expertise and laws. Hofstede uses additional evidence from Germany's legislative system to reinforce the findings from his survey data. He observes that Germany has a more complex legal system, which he attributes to the need for detailed laws to mitigate uncertainty (Cramer, 2015; Hofstede, 2001). These aspects are all reflected in the phenomenon of "German Ordnung" as discussed in more detail in section 6.1.4. and they offer one possible explanation for the extensive legal system and the high number of regulations issued by the German government every year. The factor of uncertainty avoidance is also reflected in the comments left in the survey of this thesis which claimed that one of the main reasons for a lack of innovative efforts in the company was in fact not a lack of ideas but rather an attitude that was too careful and too focused on following the market and their competitors. Overall, many participants noted that they felt that a risk-taking attitude was missing in their respective company and the overall approach

was geared too much towards uncertainty avoidance through rules. Interestingly though, during the presentation of the results with one participating company, which had invited all employees who had participated in this study to attend the presentation, many actually felt the need to share that they thought the formalisation was the right way to go even if it hinders innovation. Their desire for structure and rules was met by this form of organisational culture and provided stability and safety which in turn gave them job satisfaction. So, while the natural inclination through the basic desire for *Structure* certainly plays a crucial role in the establishment of a highly formalised culture, it's important to note that the aspect of socialisation in a culture defined through order and rules may play an equally important role in this development.

#### **6.2.3.5. Formalisation as a Mediator of Social Participation and IWB**

A drive for *Social Participation* motivates people to seek new connections, meet people and show interest in them. While this inclination often translates into networking and networks in turn are an essential part of the idea championing stage of Innovative Work Behaviour (Cross, 2010; Dougherty and Hardy, 1996; Partanen et al., 2014), this thesis showed that there was no direct effect of *Social Participation* on Innovative Work Behaviour. Based on these findings, it was inferred that individuals motivated by *Social Participation* may not necessarily exhibit innovative behaviour unless there is a structured culture of innovation present. To foster IWB among these employees, particularly within the context of German culture, as discussed in

more detail in section 6.2.2.2., it would be beneficial to establish networks or communities that are specifically geared towards facilitating the exchange of ideas.

The effect of formalisation on the IWB of knowledge workers has been established in various ways in the previous sections and its overall negative effect on innovativeness was shown. Previous studies show that a climate of high formalisation often prevents spontaneous interactions and idea-sharing which is an essential part of all stages of IWB (Acar, 2019; Schilling, 2005). As it was also shown that formalisation has a negative effect on intrinsic motivation (Liu et al., 2016; Shalley et al., 2004), the hypothesis was posited that formalisation would mediate the relationship between *Social Participation* and Innovative Work Behaviour. The hypothesis was confirmed, and formalisation showed to negatively mediate this relationship. While the negative mediation effect is not surprising as it is consistent with the literature, the fact that a high level of *Social Participation* has caused a higher level of formalisation climate was, in fact, rather unexpected. A feasible explanation for this, however, is that this may be yet another effect the COVID-19 pandemic has had. Due to the increase in remote work and thus decrease in spontaneous interactions with colleagues, employees with a high level of *Social Participation* had to schedule more formal meetings to satisfy the missing frequency of communication with peers. As was discussed in section 6.2.1.4. of this thesis, this increase in meetings may have led to a perception of reduced autonomy among other colleagues but also of increased formalisation. Particularly if *Social Participation*-motivated leaders have scheduled more meetings, they may have, unintentionally and due to the

circumstances, restricted interaction through the formalisation of social exchange, which was shown to impair employees' creativity and motivation (Liu et al., 2016; Shalley et al., 2004). Taking into consideration the meeting culture prevalent in German companies, as discussed in more detail in section 6.2.2. provides another aspect of why a high level of *Social Participation*, particularly when working remotely, may lead to a higher level of formalisation.

Practically, the full mediation effect highlights the necessity for organisations to thoughtfully calibrate their level of formalisation. This is particularly vital when seeking to transform *Social Participation* into Innovative Work Behaviour. High levels of formalisation may unintentionally inhibit the conversion of *Social Participation* into Innovative Work Behaviour by curtailing the spontaneity crucial for innovation. Therefore, the research highlights the need for a strategic approach to formalisation, especially under remote working conditions where spontaneous exchanges are less feasible.

In concluding this chapter, the findings of this research have been thoroughly discussed within the specific context of the German private sector, revealing valuable insights for both theory and practice. The sections presented in this chapter have collectively contributed to the originality of this research, uncovering novel perspectives and shedding light on the intricate relationships between various motives and innovative work behaviour.

In the upcoming concluding chapter, the project as a whole will be reviewed, emphasising its originality and significance. The consolidation of the findings will highlight their theoretical and practical implications. Additionally, attention

will be given to addressing the limitations of the study and providing suggestions for future research, thereby reinforcing the importance of this research in advancing our understanding of motivational dynamics and fostering innovation in organisations.

## Chapter Seven: Conclusion

What drives employees and organisations that drive innovation in Germany? To answer this core question, this thesis has created a model of the relationship between fundamental motives, Innovative Work Behaviour and organisational climate based on an extensive literature review. The model and hypotheses developed were examined and tested through surveys with both employees and their supervisors in 8 organisations from the private sector in Germany. Two data sets were collected and analysed to gain a comprehensive and objective view of an employee's self-reported intrinsic motivation and their supervisor-reported Innovative Work Behaviour. As employees do not work alone and detached but are rather part of the living organism of organisations, it was deemed imperative to also survey their perception of the organisational climate and test various climate variables as potential mediators in the model. The data was analysed using Structural Equation Modelling (SEM) and the results were discussed and placed into the context of the German private sector in the previous chapter.

The following chapter aims to provide a conclusion to the thesis by looking at how the research aim and the research objectives were reached. It will further discuss the contribution made to theory and practice and show how the findings bridge knowledge gaps in personality and innovation management theory. While the study was very extensive, it is important to also look at the limitations it holds and show the immense potential identified for further research.

## 7.1. Theoretical Implications

This research has taken substantive strides in advancing our understanding of 'personality for innovation', contributing novel and original insights in the arena of personality and motivation studies. By investigating the connections between fundamental motives and innovative work behaviour, it moves beyond traditional frameworks such as the Big Five and Big Three, instead offering a more nuanced exploration of the factors that motivate innovative behaviour.

A particularly noteworthy aspect of this research lies in its original exploration of the role of fundamental motives, as described in Reiss' multi-faceted theory. Until now, no study has been able to bridge the gap between these motives and organisational behaviours or climate factors, including innovative work behaviour. This unique contribution adds to our knowledge of the intricacies of motivation, viewing it not as a singular concept, but as a multi-faceted construct that forms an integral part of personality and greatly impacts behaviour within an organisational context.

Recognising motivation as a multi-faceted entity opens exciting new avenues to understanding the relationship between personality and behaviour in general. This perspective on motivation, which is indeed aligned with the recent theoretical propositions of Dunlop (2015) and Fajkowska (2018), contributes to a more sophisticated conversation on personality and innovation.

Despite these advances, this research also highlights the need for further examination in different cultural and organisational settings to validate the

findings and further our understanding of how intrinsic motivation fuels innovation. This call for future research recognises that the journey to fully comprehend the connections between personality, motivation, and innovative behaviour is an ongoing one.

Beyond individual inclinations, this research emphasises the importance of organisational climate in fostering innovative work behaviour. By examining the direct effects and mediating role of organisational climate variables, this study offers a comprehensive understanding of the contextual factors influencing innovation within organisations. These findings challenge previous studies that solely focused on organisational climate as a direct predictor, highlighting its crucial role as a mediator between personality and innovative work behaviour. While acknowledging the limitations, including the potential influence of the COVID-19 pandemic on organisational climate, the implications drawn from this study offer valuable insights for recruitment, team development, and leadership practices aimed at cultivating an environment conducive to innovation.

In conclusion, the theoretical implications presented in this section contribute original knowledge to improve the understanding of motivational dynamics and innovation in organisations. By exploring the influence of fundamental motives and organisational climate on innovative work behaviour, this research expands upon existing knowledge and fills important gaps in the literature. The insights gained from this study lay the foundation for further research, enhancing our understanding of the complex relationship between individual characteristics, organisational context, and innovative work behaviour.

### 7.1.1. Personality and Motivation Studies

The preceding chapters have demonstrated that intrinsic motivation is a valuable predictor of innovative work behaviour. However, despite widespread agreement on this point, the definition of a personality for innovation remains elusive, and existing studies using the Five-Factor Model of personality have yielded mixed results. The aim of this research was to address this gap by exploring the relationship between fundamental motives and innovative work behaviour and thereby answering the call for a more fine-grained view of personality drivers on IWB compared to the Big Five (Postigo et al., 2021). The results were striking: four of the five fundamental motives hypothesised to have a direct effect on innovative work behaviour were indeed found to have a direct effect, with statistically significant and large effect sizes.

By moving beyond the comparatively broad approach of established frameworks like the Big Five or Big Three, this research offers an original perspective on the personality for innovation and opens up new views on fundamental motives as an underlying level of personality as a potential predictor of behaviour. It champions the power of *Curiosity* and *Dominance* as strong predictors of Innovative Work Behaviour (IWB), underlining the importance of understanding individuals' innate drives to fully grasp their potential for innovation.

The primary contribution of this study lies in its emphasis on the role of fundamental motives in shaping IWB. *Curiosity*, with its high correlation to IWB, has emerged as a pivotal motive. It confirms the proposition that individuals driven by a desire for knowledge and challenges are the ones that fuel innovation. Equally influential is the *Dominance* motive, highlighting that a strong drive to influence people and situations can be instrumental in promoting and implementing innovative ideas within an organisation.

However, the findings also offer a compelling observation by highlighting how cultural underpinnings can subtly shape the manifestation of these fundamental motives. Specifically, the way German societal values including the Humboldtian model of education and “Vereinskultur” or club culture resonate with certain fundamental motives like *Curiosity* and *Social Participation* is noteworthy. This implies that even a strong inherent motivation can manifest differently depending upon the cultural context, which has crucial implications for fostering innovation.

Additionally, this research brings into sharp focus the impact of the *Structure* motive, revealing its negative influence on IWB. Given the German cultural value of “Ordnung”, or order, those who find satisfaction in flexibility and spontaneity, rather than strict structure, may naturally excel in innovation, yet may face cultural pushbacks.

Surprisingly, the research challenges previously held assumptions about the role of social participation in fostering innovation. It underscores that the mere drive to socialise might not lead directly to innovative behaviour, but rather

the innovative culture within social networks or structured spaces is what fuels innovative work behaviour.

These results not only make a significant contribution to the literature on personality and innovation but also provide a new perspective for behavioural studies more broadly, particularly in light of the three-level perspective proposed by Dunlop (2015) and Fajkowska (2018).

Nevertheless, this research is only a first step towards establishing a conclusive theory of personality for innovation. Further research is necessary to assess whether fundamental motives exhibit similar direct effects across diverse cultural and organisational contexts. Such research could also provide valuable insights into the potential of intrinsic motivation to promote innovative work behaviour in different contexts.

In conclusion, this study provides compelling evidence that fundamental motives are a valuable predictor of innovative work behaviour. By illuminating the relationship between intrinsic motivation and innovative work behaviour, this study opens new avenues of inquiry for researchers interested in understanding the role of personality in innovative work behaviour. Ultimately, the insights gained from this research could be used to develop interventions and strategies to promote innovative work behaviour in organisations and other settings. It is worth noting that the practical implications of this research were presented to the participating companies, and the response was overwhelmingly positive. Some companies have already started to pay closer attention to end motives in their recruitment and team development efforts. This indicates that the findings of this research have the potential to create

tangible benefits for organisations seeking to foster innovation in their workplace.

In summary, this research provides a valuable contribution to the literature on personality and innovation, by highlighting the importance of fundamental motives in predicting innovative work behaviour. By incorporating these insights into recruitment, team development, and leadership development practices, organisations can create a workplace culture that fosters innovation and creativity, leading to improved performance and competitive advantage.

### **7.1.2. Organisational Climate**

While the concept of a personality for innovation is intriguing, it is essential to adopt a more comprehensive and nuanced approach to understand the complexities of innovation in organisations. This involves considering a range of variables that can influence innovative work behaviour (IWB). As discussed in Chapters One, Two, and Three, organisational climate (OC) is a critical factor that affects IWB, alongside intrinsic motivation and other variables.

To respond to Shanker et al.'s (2017) call for a more multi-faceted approach to innovation, this research examined the role of three<sup>22</sup> organisational climate variables as direct predictors and mediating variables of IWB. The

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<sup>22</sup> Originally, five organisational climate variables were hypothesised to mediate the relationship between fundamental motives and innovative work behaviour, however, two, namely "Tradition" and "Innovation and Flexibility" had to be excluded from the model and thus testing as they showed heavy cross-loadings during factor analysis.

findings demonstrated that all three organisational climate variables tested had strong direct effects on IWB.

In the current research, autonomy's role as a determinant for Innovative Work Behaviour (IWB) is further supported. Confirming findings from prior studies (Amabile et al., 1996; Krause, 2004; Theurer, Tumasjan and Welppe, 2018), the evidence suggests that freedom and autonomy in the workplace significantly impact IWB. This consistency strengthens the theoretical foundation that autonomy is paramount for innovation, especially within organisational settings.

Interestingly, this research found a negative relationship between reflexivity and IWB, contrasting sharply with earlier findings (Farnese, Fida, and Livi, 2016; Patterson et al., 2005; Schippers, West, and Dawson, 2012). This discrepancy introduces an intriguing aspect to the innovation literature, suggesting that cultural and contextual factors, like the nature of meetings in German enterprises, can alter expected outcomes. As a theoretical contribution, it opens avenues for examining how specific organisational practices, influenced by broader cultural contexts, can modify established theoretical constructs.

The observed relationship between a climate of formalisation and IWB was expected and aligned with prevailing knowledge. Yet, when contextualised within the extensive regulatory framework in Germany, the findings acquire added depth. The data suggests that a dense legal and regulatory environment might constrict innovative behaviours. By drawing a line between national-level regulations and firm-level behaviours, this study

introduces a layer of complexity to the theoretical understanding of how external constraints might influence internal organisational processes.

By placing a particular emphasis on German culture, this research provides valuable insights into the interplay between fundamental motives, organisational climate, and innovative work behaviour. The findings underscore the significant influence of German meeting culture on the relationship between organisational climate variables and IWB. This highlights the importance of considering cultural factors when studying innovation dynamics within organisations, as they can significantly shape employees' perceptions and behaviours. The emphasis on German culture provides a nuanced perspective on the complexities of innovation processes and underscores the need for culturally sensitive approaches to foster a climate conducive to innovative work behaviour.

#### **7.1.2.1. Organisational Climate as a mediator between Fundamental Motives and IWB**

The mediating variables exhibited strong efficacy, as evidenced by the support for nine out of eleven hypotheses of mediation. Their inclusion in the model significantly increased the proportion of variance of innovative work behaviour (IWB) explained, rising from .19 to .32. These findings carry substantial theoretical and practical implications, underscoring the importance of the mediating variables in shaping and influencing IWB dynamics. From a theoretical perspective, the findings suggest that a more comprehensive approach to studying innovation in organisations, which

includes personality and organisational climate, is essential. While prior studies have primarily focused on organisational climate as a direct predictor variable, this research demonstrates the critical role of organisational climate as a mediating variable in the relationship between personality and IWB.

The investigation into how organisational climate variables, such as autonomy, reflexivity, and formalisation mediate the relationship between fundamental motives and innovative work behaviour (IWB) has revealed significant insights that contribute uniquely to innovation management theory. The study's findings surrounding *Curiosity*, autonomy, and IWB challenge the conventional understanding. It demonstrates that an autonomous climate isn't just an enhancer for innovation but can be shaped by individuals' intrinsic motivations, like *Curiosity*. The findings have shown that a higher number of employees motivated by *Curiosity* also leads to a climate characterised by autonomy which in turn leads to a higher level of Innovative Work Behaviour. This lends depth to the understanding of how individual motivations and organisational structures interact, providing a richer comprehension of their bidirectional relationship.

Furthermore, the findings on the mediating factor of autonomy on the relationship between a drive for *Dominance* and IWB offers a fresh perspective that dominant behaviours can sometimes be counterproductive in specific contexts, especially in highly autonomous settings. This is an original contribution for organisational theory, pointing to the need for more tailored strategies for *Dominance* motivated individuals in autonomous settings.

Surprisingly, the research has also indicated that *Safety* motivation, often perceived as counterproductive to innovation, can lead to higher levels of autonomy and therefore lead to greater innovative behaviours. This novel understanding bridges the gap between psychological safety and innovative work behaviour, providing a fresh perspective on how traditionally risk-averse individuals can become innovators within the right environment.

The unexpected link between *Social Participation*, autonomy, and IWB provides new insights into social dynamics within organisations. The research highlights a unique scenario where a higher number of employees motivated by *Social Participation* might lead to less organisational autonomy, especially in contexts like Germany. This finding challenges conventional views and suggests a more nuanced understanding of how social dynamics affect organisational behaviour.

In the context of individual motives and innovative work behaviour (IWB), the role of reflexivity as a mediator stands out for its complexity and significance. For individuals inclined towards *Structure* and *Social Participation* both, a positive influence of reflexivity on their innovation tendencies was initially anticipated. Yet, the data suggests an inverse relationship: while *Structure* and *Social Participation* do influence the reflexivity climate, the overall effect on IWB, mediated through reflexivity, is negative. This counterintuitive relationship can be attributed to certain cultural nuances within German workplaces, potentially leading to suboptimal meeting behaviours that reduce the innovative outcomes for those motivated by *Social Participation* or *Structure*. A central contribution of this research is the identification of cultural influences on reflexivity practices. By highlighting

the distinctiveness of German workplace culture and its effect on reflexivity, this research underscores the necessity of considering cultural nuances when studying organisational behaviours. It brings to the forefront the importance of constructive and forward-thinking reflexivity practices that prioritise learning and innovation.

The research undertaken on the interplay of intrinsic motivations, formalisation, and Innovative Work Behaviour (IWB) offers notable theoretical advancements in the realm of innovation management.

Firstly, the study reaffirms the theoretical stance on the relationship between *Curiosity* and IWB. While it was expected that a *Curiosity*-driven mindset would naturally favour less formalisation, the research unveiled a more intricate interplay. Even in formalised environments, *Curiosity* has a way of fostering IWB. This suggests that intrinsic motivation, such as *Curiosity*, may manifest its impact on IWB regardless of the structural confines. In examining the motive for *Structure* and its relationship with IWB, the research reinforces existing literature. As expected, a desire for consistency and order, fundamental to *Structure*-motivated individuals, adversely impacts IWB. However, this relationship becomes particularly relevant when viewed through the lens of cultural specificities, such as the unique attributes of German enterprises.

In contrast, the absence of any discernible mediating effect between *Dominance* and IWB challenges prior assumptions. *Dominance* motivation didn't demonstrate an expected inverse relationship with formalised environments. This calls for a re-examination of how *Dominance*-motivated

individuals operate within structured corporate contexts, hinting at possible adaptations or other influencing variables not previously considered.

A significant theoretical departure emerges in the context of *Safety*-motivated individuals. Contrary to theoretical assumptions that, in a broader context, associate *Safety* with a drive for formalised environments, the research presents a more layered understanding. *Safety* motivation in itself does not inherently seek formalisation. Yet, when these individuals operate within highly formalised settings, their otherwise negative impact on IWB is mitigated. This introduces an original perspective - that while *Safety*-motivated individuals search for certainty, they do not do this through rules and regulations and thus not create a climate of formalisation which is turn was shown to inhibit IWB.

Lastly, the relationship between *Social Participation* and formalisation provides a fresh perspective on organisational dynamics in a post-pandemic world. The unforeseen link of high *Social Participation* to increased formalisation potentially illustrates the pandemic's transformative effect on workplace interactions. *Social Participation*-motivated individuals, in their pursuit of engagement, might inadvertently drive formalisation, especially in the context of remote work.

In sum, this research journey enriches innovation management theory by both reinforcing some traditional viewpoints and, more importantly, introducing unexpected, nuanced understandings of motivation, organisational structure, and their collective impact on innovative work behaviour.

While the addition of Organisational Climate (OC) to the model provides invaluable insights into the predictors of Innovative Work Behaviour (IWB) in organisations, it also opens questions on how generalisable the model provided in this thesis really is. As climate is the psychological perception of the culture by the employees, this is not only influenced by relatively stable factors such as personality but also by outward influencing factors such as the political situation, national cultural context, and leadership practices within the company.

Furthermore, as the research was conducted during the COVID-19 pandemic, it is important to realise that this may be a limiting factor on the generalisability of the results as the working environment during the pandemic changed drastically for many employees and had a high influence on the way their organisational culture was lived and thus the climate perceived. Therefore, caution must be taken when applying these findings to organisations operating in different contexts, particularly those that have been significantly affected by the pandemic.

Nonetheless, this research provides important knowledge to the field of innovation management theory and shows that a more comprehensive and wide view, which includes both personality and OC, is indeed necessary as proposed by Shanker et al. (2017). The results highlight the importance of considering employee perceptions of their organisational climate, as it has been shown to be a significant predictor of IWB. This knowledge can be useful for organisations in recruitment, team development, and leadership as they can pay attention to the end motivators of their employees and how they may influence IWB.

The findings also have practical implications for the development of innovative work behaviour training programs, which can be tailored to the specific organisational climate variables identified as predictors of IWB in this study. By focusing on these variables, organisations can create a more conducive climate for innovation, which in turn can lead to increased innovation outcomes.

In conclusion, it has provided important insights into the role of organisational climate as a mediator of the relationship between end motivators and IWB. Further research is needed to fully understand the complex nature of innovativeness in organisations, particularly in light of the changing work environment due to the COVID-19 pandemic. Nonetheless, the findings of this study offer valuable contributions to the literature on innovation management theory and provide practical implications for organisations seeking to foster a culture of innovation.

### **7.3. Practical Implications**

In addition to the substantial contribution to the literature that this research provides, as outlined in the previous sections, there are significant implications for the German private sector that can be drawn from this study.

Recognising the significance of motives and their bearing on behaviours is crucial, especially during the recruitment process, when steering an organisation towards innovation. Beyond merely targeting candidates with pronounced *Curiosity* and *Dominance* drives and less inclination for *Safety* and *Structure*, the broader organisational framework

should encourage and sustain these motives. For instance, those driven by *Curiosity* should be granted the autonomy to pinpoint issues, vocalise concerns, and put forth innovative solutions. At an institutional level, endorsing initiatives like hackathons, critical thinking workshops, and brainstorming sessions can offer platforms for these individuals to express their insights and critiques freely. By rolling out programs and workshops centred on enhancing persuasion, influence, and effective communication skills, employees are better equipped to tackle obstacles, counter opposition, and captivate stakeholders. Such initiatives amplify employees' *Dominance* motive, elevating their capability to spearhead innovation and accentuating its positive influence on Innovative Work Behaviour (IWB).

Family-owned businesses are the backbone of the German economy, accounting for 90 per cent of all private companies in Germany. While this is a factor responsible for great stability in the German markets, it can also hinder the innovation process, as traditional family-owned businesses tend to invest less in innovation due to parsimony and are generally more risk-averse than companies which are not run by families (Naldi et al., 2007; Rondi et al., 2019). It is therefore important for businesses to take into consideration the impact of employees' intrinsic motives on their innovative work behaviour (IWB) when recruiting, and to make sure not to have too many individuals motivated by *Safety* in the organisation, as it can lead to an overall lower level of IWB. However, as the model has shown in this research, the *Safety* motive is positively mediated by a climate of autonomy, which in itself has a great positive direct effect on IWB. Therefore, companies, and particularly family-owned businesses, need to create a culture that contributes to a climate of

autonomy, which will enable employees to feel empowered and more innovative in their work. This can potentially be achieved by promoting psychological safety and framing risks as growth opportunities, even for those with a *Safety* drive. By altering perceptions of challenges and emphasising managed risks, a comfort level can be maintained within innovative structures. It's pivotal for companies to provide avenues for idea sharing without the fear of failure. Introducing platforms like idea incubation hubs or dedicated exploration periods can mitigate concerns. In essence, addressing the *Safety* motive while fostering a risk-taking environment and providing spaces for ideation can spark a vibrant innovation ecosystem.

As can be seen with the mediation effect autonomy has on the relationship between the drive for *Safety* and IWB, the influence of organisational climate to foster innovation efforts within a company especially in the interplay between motives cannot be stressed enough.

While recognising the underlying motives that drive prospective employees offers potential advantages during the hiring process, this can present challenges in practice. Constraints, ranging from a lack of qualified talent with the desired motives to restrictions placed by worker councils on the use of psychometric evaluations, can complicate matters. Thus, the pronounced direct and mediating effects observed from the three organisational climate variables in this study underscore their pivotal role and relevance for organisations.

Paying close attention to leadership practices that cultivate an environment that gives employees decision making powers and gives them

the freedom to explore new possibilities is important to foster a climate of autonomy which shows such strong direct effect on IWB and indirect effect on the interplay between fundamental motives and IWB.

A surprising and important discovery made in this research is the role of reflexivity in the German private sector. Contrary to current research, reflexivity was found to have both a direct negative effect on innovative work behaviour and to mediate the relationship between the motives of *Structure* and *Social Participation* and innovative work behaviour negatively. The reason for this finding is likely due to the way reflexivity is practiced through a toxic meeting culture in most organisations. Meetings that are inefficient, negative and lack solution orientation can have a harmful effect on the level of innovative work behaviour of employees. Therefore, it is crucial to improve the quality of meetings in organisations by creating a positive, solution-oriented, and efficient meeting culture. This can be done by implementing measures such as training leaders in proactive and positive meeting facilitation methods, limiting the number of participants, and creating clear agendas and goals for meetings.

Another essential insight from this research is the negative influence of formalisation on innovativeness. The results indicate that the higher the degree of formalisation in an organisation, the lower the level of innovative work behaviour among its employees. The finding is particularly significant, as it suggests that government regulations that impose a high level of formalisation on organisations may hinder their innovation efforts. Upon being presented with the results, participating organisations explained how such regulations limited their options to promote and stimulate innovation within

the organisation. They stated that the high climate of formalisation is not desired nor promoted by the organisation itself, but rather imposed on them by the government. These findings highlight the need for policymakers to consider the impact of regulations and formalisation on organisational innovativeness and work with organisations to create a supportive environment that fosters innovation. These findings could be key factors explaining why Germany, despite the massive annual investments of around 170 billion euros per annum from the private sector, has seen a steady decline in the overall ranking of innovativeness by the Innovation Index 2023.

In summary, this research has important practical implications for the German private sector. To encourage innovation and improve innovative work behaviour, organisations need to create a positive, solution-oriented, and efficient meeting culture. They should also be mindful of the motives of their employees when recruiting them and work to foster a climate of autonomy. Policymakers need to consider the impact of regulations and formalisation on organisational innovativeness and work with organisations to create a supportive environment that promotes innovation. These insights have the potential to transform how businesses in Germany approach innovation and contribute to a more innovative and prosperous economy. However, it is also important to note the limitations of the research as well as the avenues found for further research.

## 7.4. Limitations and future research

While the research question was aimed at finding out what drives individuals and organisations that drive innovative work behaviour in the German private sector and that question was answered with astonishing insights, the cultural context of the German private sector may in fact also be seen as a limitation. The cultural context of the German private sector may hinder the generalisation of the proposed model to other cultural contexts. Therefore, to create a more comprehensive and globally applicable model, future studies should investigate various cultures and compare innovation scores on the Global Innovation Index with employees' innovative work behaviour ratings and their companies' innovation output and success in the market.

Further, while this study was very extensive with 584 participants from eight organisations from various fields, due to the COVID-19 pandemic, there were no companies from the retail sector willing to partake. Gaining the perspective of the retail sector may have further broadened the perspective and given even more insights.

Finally, while IWB was shown to work best as a one-factor concept despite theoretically being a multi-stage process, great insights could be gained from investigating the multi-stage process of Innovation to see how the different motives and climate variables influence the collaboration within each stage of the process.

The insights gained from this research have contributed greatly to the literature in personality and innovation management studies and organisational management theory. They further provide valuable insights for

businesses to enhance their innovation efforts. However, the findings have also shown that pursuing the path towards understanding the complex phenomenon of innovative work behaviour is best taken via the still so unexplored avenue of multifaceted motivation and best understood when done so in comprehensive models encapsulating both the level of the individual and the organisation. The following research agenda aspires to forward this exploration and address new questions this research has revealed.

While traits are observable patterns of behaviour, they do not necessarily provide insight into the underlying motivations for that behaviour (Bilsky and Schwartz, 1994; Döhrendahl et al., 2021). This research has shown the effect fundamental motives can have on IWB. Understanding these underlying motivations offers a more comprehensive and accurate perspective on personality and can significantly aid in predicting behaviour in general.

It seems prudent that the next step in organisational behaviour research should focus on fundamental motives. This would foster a more refined approach to motivation and personality, as called for by other researchers (Postigo et al., 2021; Shanker et al., 2017). However, a challenge arises in the current landscape of research tools. There is no available tool for research with more than three items per motive. The reliance on short scales, while efficient, might introduce potential measurement errors. While short scales are efficient, they can sometimes compromise reliability. If the alpha scores are low with a short scale, there's limited flexibility to remove items to improve reliability, given that three items are generally considered

the minimum for the measurement of one dimension (Kline, 2015). This underscores the need for more items to ensure a robust measurement.

The 16mrs (Dörendahl et al. 2021) was only validated in German. While suitable for this study, a more international approach would benefit from a tool validated in English. The logical progression would be the development of a comprehensive scale, validated in English, that explores the assessment of motives in more detail. Such a tool could enhance the precision of research findings and bridge the gap between theoretical constructs and their practical implications. It would also pave the way for researching the effect of fundamental motives on other organisational constructs relevant for companies' innovation efforts, such as adaptability to change, knowledge sharing, or Organizational Citizenship Behaviour (OCB).

Given the cultural specificity of this study, rooted in the German private sector, questions arise about the global applicability of the model proposed. Using a longer scale, validated in English, would facilitate testing the model across diverse cultural contexts. That subsequent research could determine which aspects of the model are universally applicable and which are culturally driven. Additionally, the results could be compared with the global innovation index to identify key cultural factors influencing international organisations.

One of the key drivers for innovation within organisations has been identified as “human capital” (Rammer et al., 2022). However, research on the various aspects defining human capital and influencing factors remains limited (AlEssa and Durungbo, 2021; Bos-Nehles et al., 2017). A subsequent research step could compare the IWB scores of a company with measurable

innovation output scores, such as their number of patents or turnover made through innovation. Additionally, as organisational climate has been shown to have both a direct and indirect influence on IWB in this research, it would be logical to investigate factors leading to an organisational climate for innovation. Previous studies, like Afsar and Umrani (2019), have indicated a connection between leadership and organisational climate. Given the findings of this research on the complex interplay of fundamental motives, IWB, and organisational climate, new perspectives could emerge by examining the interrelation of different leadership styles and organisational measures, especially when viewed through the lens of employees driven by diverse fundamental motives. Research in this area, especially when not limited to the German private sector, might shed light on the surprising negative effect found of reflexivity on IWB in this research. It could also reveal which cultural, organisational, and leadership measures might lead to a more positive effect of high reflexivity on IWB. A closer examination of this area could provide insights into how leadership, company rules, and innovative actions are interconnected, offering companies a guide to fostering a conducive environment for innovation.

Based on the identified limitations and opportunities for further research, it is clear that there is still much to be explored and understood about the multifaceted nature of innovative work behaviour, particularly in relation to different cultural contexts and the different perspectives of innovation management. As such, this study provides a strong foundation for future research to build upon, offering a promising avenue for continued exploration and advancement in the field of innovation management.

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# Appendix

## Appendix A: Multicollinearity – Pearson Correlation

		Correlations										
		Curiosity	Dominance	Participation	Safety	Structure	OC_Formalization	Inno_Flex	OC_Reflexivity	Tradition	OC_Autonomy	
Curiosity	Pearson Correlation	--										
	N	372										
Dominance	Pearson Correlation	.160**	--									
	Sig. (2-tailed)	.002										
Participation	Pearson Correlation	.191**	.088	--								
	Sig. (2-tailed)	.000	.088									
Safety	Pearson Correlation	-.101	.097	.076	--							
	Sig. (2-tailed)	.051	.062	.144								
Structure	Pearson Correlation	.033	.098	.091	.324**	--						
	Sig. (2-tailed)	.522	.059	.079	.000							
OC_Formalization	Pearson Correlation	-.094	.012	.117*	.117*	.166**	--					
	Sig. (2-tailed)	.072	.823	.024	.024	.001						
Inno_Flex	Pearson Correlation	.012	-.022	.170**	.051	.139**	-.004	--				
	Sig. (2-tailed)	.818	.674	.001	.329	.007	.942					
OC_Reflexivity	Pearson Correlation	-.025	.045	.157**	.067	.132*	.110*	.670**	--			
	Sig. (2-tailed)	.636	.389	.002	.195	.011	.034	.000				
Tradition	Pearson Correlation	.045	.010	-.027	.056	-.081	.138**	-.708**	-.598**	--		
	Sig. (2-tailed)	.388	.847	.607	.283	.121	.008	.000	.000			
OC_Autonomy	Pearson Correlation	.095	-.074	-.065	-.005	-.017	-.400**	.372**	.216**	-.393**	--	
	Sig. (2-tailed)	.066	.156	.214	.924	.748	.000	.000	.000	.000		
	N	372	372	372	372	372	372	372	372	372	372	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

## Appendix B: VIF

		Coefficients <sup>a</sup>					Collinearity Statistics	
Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.815	.689		4.085	.000		
	Curiosity	.119	.058	.103	2.059	.040	.890	1.123
	Dominance	.120	.041	.142	2.924	.004	.940	1.064
	Safety	-.107	.042	-.131	-2.553	.011	.849	1.178
	Structure	-.083	.043	-.099	-1.940	.053	.851	1.175
	Participation	.085	.048	.089	1.779	.076	.888	1.127
	OC_Formalization	-.303	.088	-.187	-3.451	.001	.753	1.328
	Inno_Flex	-.140	.128	-.084	-1.091	.276	.372	2.690
	OC_Reflexivity	-.069	.103	-.045	-.671	.503	.491	2.037
	Tradition	.060	.108	.040	.551	.582	.419	2.387
OC_Autonomy	.352	.094	.214	3.731	.000	.671	1.489	

a. Dependent Variable: IWB

## Appendix C: Reliability Statistics

### 1. Curiosity:

#### Reliability Statistics

Cronbach's Alpha	N of Items
.703	3

### 2. Dominance

#### Reliability Statistics

Cronbach's Alpha	N of Items
.740	3

### 3. Safety

#### Reliability Statistics

Cronbach's Alpha	N of Items
.761	3

### 4. Structure

#### Reliability Statistics

Cronbach's Alpha	N of Items
.739	3

### 5. Social Participation

#### Reliability Statistics

Cronbach's Alpha	N of Items
.658	3

6. OC\_Autonomy

**Reliability Statistics**

Cronbach's Alpha	N of Items
.751	5

7. OC\_Formalisation

**Reliability Statistics**

Cronbach's Alpha	N of Items
.728	5

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OC_Form_1	10.03	4.307	.481	.684
OC_Form_2	10.31	4.297	.487	.681
OC_Form_3	10.38	4.421	.466	.690
OC_Form_4	10.16	4.227	.501	.676
OC_Form_5	10.48	4.320	.502	.676

8. OC\_Reflexivity

**Reliability Statistics**

Cronbach's Alpha	N of Items
.754	5

9. OC\_Inno\_Flex

**Reliability Statistics**

Cronbach's Alpha	N of Items
.772	6

10. OC\_Tradition

**Reliability Statistics**

Cronbach's Alpha	N of Items
.717	4

11. IWB

**Reliability Statistics**

Cronbach's Alpha	N of Items
.952	10

12. OC\_Reflexivity with Inno\_6 added

**Reliability Statistics**

Cronbach's Alpha	N of Items
.789	6

Appendix D: Factor Analysis – Pattern Matrix 1 - promax, based on Eigenvalue >1

**Pattern Matrix<sup>a</sup>**

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Contacts_1	.034	.084	-.080	.027	-.206	.057	.094	.047	.171	.727	-.163
Contacts_2	-.008	-.133	-.016	.068	-.003	-.052	.109	-.044	-.027	.855	.006
Contacts_3	.011	.056	-.017	-.102	.292	.052	-.075	-.021	-.038	.687	-.015
Curiosity_1	-.038	.051	-.046	.032	-.008	.066	.076	-.025	.786	-.019	-.050
Curiosity_2	-.041	-.040	.015	-.103	-.025	-.042	-.062	.170	.723	.094	.196
Curiosity_3	.036	-.122	.126	.082	-.082	.012	-.079	-.041	.801	.007	.101
Dominance_1	.040	-.032	-.033	.036	.131	.118	.243	.722	.003	-.070	-.164
Dominance_2	.012	.058	-.043	-.011	-.090	-.041	-.166	.797	.098	.077	.024
Dominance_3	-.010	-.045	-.032	-.060	.143	-.051	-.002	.845	-.023	-.040	.070
Structure_1	-.037	-.006	.015	.047	.001	.873	-.101	-.015	-.080	.018	-.102
Structure_2	-.019	.020	.062	-.090	.039	.836	-.019	.077	.056	.065	-.235
Structure_3	.097	.107	-.118	.028	.074	.768	.014	-.061	.080	-.061	.000
Safety_1	-.060	-.087	.147	.041	.776	.142	.100	-.027	.000	.043	.005
Safety_2	-.048	.066	.133	-.012	.817	.014	-.026	.034	.002	.065	.110
Safety_3	.062	.022	-.038	-.016	.751	-.036	.027	.152	-.100	-.051	.116
OC_Autonomy_1	.075	.004	.689	.032	.145	.014	.040	-.044	.130	-.061	.045
OC_Autonomy_2	-.005	.207	.754	.148	.026	-.115	-.140	.081	.034	-.065	.052
OC_Autonomy_3	-.016	-.226	.703	-.076	.008	.110	-.035	-.040	.017	-.075	.135
OC_Autonomy_4	-.014	-.007	.709	.049	-.035	-.086	.035	.058	-.035	.031	-.401
OC_Autonomy_5	.012	-.103	.748	-.097	.167	-.002	-.078	-.167	-.007	.042	-.073
OC_Form_1	-.058	-.134	-.063	.536	.038	.074	.074	.143	-.071	.007	.196
OC_Form_2	-.060	-.088	-.005	.700	-.107	-.019	.176	.037	.000	-.019	-.084
OC_Form_3	.062	.163	.081	.830	.144	-.061	-.004	-.070	.155	-.049	-.220
OC_Form_4	.013	.006	.041	.726	-.108	.027	-.040	-.091	-.037	.040	.048
OC_Form_5	-.012	-.021	-.267	.486	.203	-.021	-.072	.004	-.105	.090	.096
OC_Reflex_1	.007	-.014	-.139	-.023	.036	-.055	.782	.027	.015	.020	.211
OC_Reflex_2	-.039	.329	-.161	.037	-.017	.040	.196	-.019	.094	-.089	.495
OC_Reflex_3	-.019	.078	.215	-.016	-.049	.017	.382	.032	-.074	.052	.276
OC_Reflex_4	.058	.118	.022	-.064	.155	-.205	.127	-.021	.092	-.067	.704
OC_Reflex_5	.014	-.025	-.045	.143	.045	-.041	.822	.019	-.037	.060	-.027
OC_Inno_1	.011	.262	-.109	-.099	.174	-.062	.345	-.211	.087	.133	.222
OC_Inno_2	.003	.948	-.068	.077	.045	.048	-.250	.034	-.023	.001	.084
OC_Inno_3	.007	.835	-.053	.039	.038	.034	-.077	-.002	.019	.035	.090
OC_Inno_4	.015	.142	.483	.002	-.073	-.033	-.082	.039	-.161	.116	.298
OC_Inno_5	-.020	.272	.207	.137	-.156	.092	.127	-.038	.016	-.030	.304
OC_Inno_6	-.052	.257	.305	-.042	.039	-.007	-.008	.066	.030	.121	.352
OC_Trad_1	.057	-.421	-.153	.116	.005	.020	-.308	-.029	-.008	.062	.270
OC_Trad_2	.017	-.795	.139	.108	.038	-.029	-.068	-.003	.051	.085	-.024
OC_Trad_3	-.029	-.539	-.097	.014	.037	.024	-.147	.060	.098	.002	.017
OC_Trad_4	-.010	-.074	-.267	.012	.201	-.191	-.281	-.076	.114	.007	-.219
IWB_1	.576	.095	.102	-.004	-.051	-.053	.017	.078	-.038	.110	-.209
IWB_2	.858	-.016	.024	-.031	.052	-.004	.007	.039	.008	-.022	-.019
IWB_3	.877	-.050	.043	.017	.067	.005	.058	.017	.048	-.041	.023
IWB_4	.874	-.059	.021	-.010	.031	.012	.085	.007	.060	-.060	.067
IWB_5	.888	-.068	.022	.040	.010	.032	.069	-.022	.028	.009	-.006
IWB_6	.842	.059	-.069	.010	-.083	-.060	.001	.037	-.095	.072	-.050
IWB_7	.853	-.002	-.066	-.004	-.058	-.031	-.034	-.004	-.128	.088	-.005
IWB_8	.877	.004	-.072	-.046	-.010	.076	-.013	-.080	.009	-.015	.080
IWB_9	.829	.040	.049	.022	.007	.053	-.134	-.027	-.025	-.023	.024
IWB_10	.838	.011	.029	-.011	-.031	-.016	-.032	.022	.074	-.050	.098

Extraction Method: Principal Component Analysis.  
Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Appendix E: Pattern Matrix – promax, forced number of factors (11)

**Pattern Matrix<sup>a</sup>**

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Contacts_1	.034	.084	-.080	.027	-.206	.057	.094	.047	.171	.727	-.163
Contacts_2	-.008	-.133	-.016	.068	-.003	-.052	.109	-.044	-.027	.855	.006
Contacts_3	.011	.056	-.017	-.102	.292	.052	-.075	-.021	-.038	.687	-.015
Curiosity_1	-.038	.051	-.046	.032	-.008	.066	.076	-.025	.786	-.019	-.050
Curiosity_2	-.041	-.040	.015	-.103	-.025	-.042	-.062	.170	.723	.094	.196
Curiosity_3	.036	-.122	.126	.082	-.082	.012	-.079	-.041	.801	.007	.101
Dominance_1	.040	-.032	-.033	.036	.131	.118	.243	.722	.003	-.070	-.164
Dominance_2	.012	.058	-.043	-.011	-.090	-.041	-.166	.797	.098	.077	.024
Dominance_3	-.010	-.045	-.032	-.060	.143	-.051	-.002	.845	-.023	-.040	.070
Structure_1	-.037	-.006	.015	.047	.001	.873	-.101	-.015	-.080	.018	-.102
Structure_2	-.019	.020	.062	-.090	.039	.836	-.019	.077	.056	.065	-.235
Structure_3	.097	.107	-.118	.028	.074	.768	.014	-.061	.080	-.061	.000
Safety_1	-.060	-.087	.147	.041	.776	.142	.100	-.027	.000	.043	.005
Safety_2	-.048	.066	.133	-.012	.817	.014	-.026	.034	.002	.065	.110
Safety_3	.062	.022	-.038	-.016	.751	-.036	.027	.152	-.100	-.051	.116
OC_Autonomy_1	.075	.004	.689	.032	.145	.014	.040	-.044	.130	-.061	.045
OC_Autonomy_2	-.005	.207	.754	.148	.026	-.115	-.140	.081	.034	-.065	.052
OC_Autonomy_3	-.016	-.226	.703	-.076	.008	.110	-.035	-.040	.017	-.075	.135
OC_Autonomy_4	-.014	-.007	.709	.049	-.035	-.086	.035	.058	-.035	.031	-.401
OC_Autonomy_5	.012	-.103	.748	-.097	.167	-.002	-.078	-.167	-.007	.042	-.073
OC_Form_1	-.058	-.134	-.063	.536	.038	.074	.074	.143	-.071	.007	.196
OC_Form_2	-.060	-.088	-.005	.700	-.107	-.019	.176	.037	.000	-.019	-.084
OC_Form_3	.062	.163	.081	.830	.144	-.061	-.004	-.070	.155	-.049	-.220
OC_Form_4	.013	.006	.041	.726	-.108	.027	-.040	-.091	-.037	.040	.048
OC_Form_5	-.012	-.021	-.267	.486	.203	-.021	-.072	.004	-.105	.090	.096
OC_Reflex_1	.007	-.014	-.139	-.023	.036	-.055	.782	.027	.015	.020	.211
OC_Reflex_2	-.039	.329	-.161	.037	-.017	.040	.196	-.019	.094	-.089	.495
OC_Reflex_3	-.019	.078	.215	-.016	-.049	.017	.382	.032	-.074	.052	.276
OC_Reflex_4	.058	.118	.022	-.064	.155	-.205	.127	-.021	.092	-.067	.704
OC_Reflex_5	.014	-.025	-.045	.143	.045	-.041	.822	.019	-.037	.060	-.027
OC_Inno_1	.011	.262	-.109	-.099	.174	-.062	.345	-.211	.087	.133	.222
OC_Inno_2	.003	.948	-.068	.077	.045	.048	-.250	.034	-.023	.001	.084
OC_Inno_3	.007	.835	-.053	.039	.038	.034	-.077	-.002	.019	.035	.090
OC_Inno_4	.015	.142	.483	.002	-.073	-.033	-.082	.039	-.161	.116	.298
OC_Inno_5	-.020	.272	.207	.137	-.156	.092	.127	-.038	.016	-.030	.304
OC_Inno_6	-.052	.257	.305	-.042	.039	-.007	-.008	.066	.030	.121	.352
OC_Trad_1	.057	-.421	-.153	.116	.005	.020	-.308	-.029	-.008	.062	.270
OC_Trad_2	.017	-.795	.139	.108	.038	-.029	-.068	-.003	.051	.085	-.024
OC_Trad_3	-.029	-.539	-.097	.014	.037	.024	-.147	.060	.098	.002	.017
OC_Trad_4	-.010	-.074	-.267	.012	.201	-.191	-.281	-.076	.114	.007	-.219
IWB_1	.576	.095	.102	-.004	-.051	-.053	.017	.078	-.038	.110	-.209
IWB_2	.858	-.016	.024	-.031	.052	-.004	.007	.039	.008	-.022	-.019
IWB_3	.877	-.050	.043	.017	.067	.005	.058	.017	.048	-.041	.023
IWB_4	.874	-.059	.021	-.010	.031	.012	.085	.007	.060	-.060	.067
IWB_5	.888	-.068	.022	.040	.010	.032	.069	-.022	.028	.009	-.006
IWB_6	.842	.059	-.069	.010	-.083	-.060	.001	.037	-.095	.072	-.050
IWB_7	.853	-.002	-.066	-.004	-.058	-.031	-.034	-.004	-.128	.088	-.005
IWB_8	.877	.004	-.072	-.046	-.010	.076	-.013	-.080	.009	-.015	.080
IWB_9	.829	.040	.049	.022	.007	.053	-.134	-.027	-.025	-.023	.024
IWB_10	.838	.011	.029	-.011	-.031	-.016	-.032	.022	.074	-.050	.098

Extraction Method: Principal Component Analysis.  
Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Appendix F: Pattern Matrix after taking out the variables OC\_Tradition and OC\_Inno\_Flex & forced to load on 9 factors, values below .3 suppressed

**Pattern Matrix<sup>a</sup>**

	Component								
	1	2	3	4	5	6	7	8	9
Contacts_1									.720
Contacts_2									.843
Contacts_3					.322				.693
Curiosity_1								.764	
Curiosity_2								.742	
Curiosity_3								.816	
Dominance_1							.763		
Dominance_2							.780		
Dominance_3							.842		
Structure_1						.844			
Structure_2						.818			
Structure_3						.758			
Safety_1					.773				
Safety_2					.826				
Safety_3					.757				
OC_Autonomy_1		.682							
OC_Autonomy_2		.775							
OC_Autonomy_3		.611							
OC_Autonomy_4		.746							
OC_Autonomy_5		.701							
OC_Form_1				.528					
OC_Form_2				.708					
OC_Form_3				.828					
OC_Form_4				.724					
OC_Form_5		-.324		.489					
OC_Reflex_1			.747						
OC_Reflex_2			.754						
OC_Reflex_3			.635						
OC_Reflex_4			.721						
OC_Reflex_5			.620						
IWB_1	.562								
IWB_2	.858								
IWB_3	.880								
IWB_4	.880								
IWB_5	.892								
IWB_6	.837								
IWB_7	.855								
IWB_8	.873								
IWB_9	.826								
IWB_10	.837								

Extraction Method: Principal Component Analysis.  
 Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

## Appendix G: Descriptive Statistics

16 MRS descriptive statistics (Döhrendahl et al.)

<b>Scale</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>H</i></b>	<b>LCRC</b>	<b><math>\alpha</math></b>
Curiosity	3.52	0.97	0.68	0.84 (4)	0.84
Social Acceptance	2.53	0.97	0.40	0.63 (3)	0.64
Dominance	2.39	1.13	0.61	0.82 (4)	0.82
Status	2.17	1.09	0.58	0.78 (3)	0.79
Retention	3.35	0.92	0.49	0.71 (3)	0.72
Autonomy	3.47	0.77	0.32	0.52 (2)	0.55
Social Participation	2.74	1.00	0.57	0.76 (3)	0.78
Morality	3.61	0.77	0.43	0.65 (3)	0.64
Idealism	3.02	1.04	0.56	0.74 (3)	0.76
Structure	2.92	1.18	0.61	0.79 (3)	0.80
Safety	3.16	0.96	0.56	0.75 (3)	0.76
Revenge	2.11	1.19	0.53	0.74 (3)	0.75
Physical Exercise	2.58	1.30	0.76	0.87 (4)	0.89
Food Enjoyment	3.26	1.06	0.64	0.81 (4)	0.82
Family	3.65	1.04	0.62	0.80 (4)	0.81
Sex <sup>a</sup>	2.38	1.06	0.48	0.68 (3)	0.68

<sup>a</sup> $n = 921$ .

Company 1 :founded 1978, active in 48 countries, manufacturing, around 300 employees.

Company 2: founded 1988, active in 8 countries, software, engineering and AI development, around 2000 employees.

Company 3: founded 1990, active only in Germany, software development, around 40 employees.

Company 4: founded in 2013, active in Germany, software development, around 15 employees.

Company 5: founded in 1888, active internationally, manufacturing, around 8000 employees.

Company 6: founded in 1891, active internationally, manufacturing, around 31000 employees.

Company 7: founded in 1872, active internationally, manufacturing, around 2300 employees.

Company 8: founded in 2019 but just the research facility (sister company of an old manufacturing business which was founded in 1927 with >2000 employees)

## Appendix H: ANOVA

Age groups - IWB

ANOVA					
IWB	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.493	4	2.873	4.512	.001
Within Groups	233.710	367	.637		
Total	245.203	371			

### Multiple Comparisons

Dependent Variable: **WB**

Tukey HSD

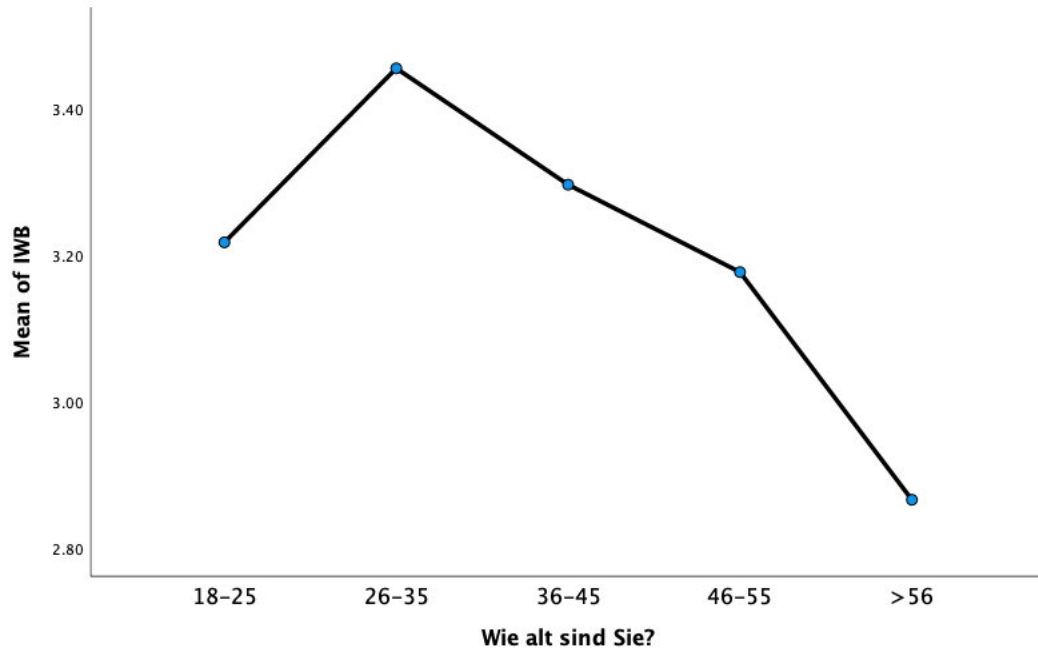
(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
18-25	26-35	-.23791	.20465	.773	-.7989	.3231
	36-45	-.07882	.21202	.996	-.6600	.5024
	46-55	.04072	.21085	1.000	-.5373	.6187
	>56	.35193	.23591	.568	-.2948	.9987
26-35	18-25	.23791	.20465	.773	-.3231	.7989
	36-45	.15908	.10915	.591	-.1401	.4583
	46-55	.27863	.10687	.071	-.0143	.5716
	>56	.58984*	.15039	.001	.1776	1.0021
36-45	18-25	.07882	.21202	.996	-.5024	.6600
	26-35	-.15908	.10915	.591	-.4583	.1401
	46-55	.11955	.12037	.858	-.2104	.4495
	>56	.43076	.16027	.058	-.0086	.8701
46-55	18-25	-.04072	.21085	1.000	-.6187	.5373
	26-35	-.27863	.10687	.071	-.5716	.0143
	36-45	-.11955	.12037	.858	-.4495	.2104
	>56	.31121	.15872	.287	-.1239	.7463
>56	18-25	-.35193	.23591	.568	-.9987	.2948
	26-35	-.58984*	.15039	.001	-1.0021	-.1776
	36-45	-.43076	.16027	.058	-.8701	.0086
	46-55	-.31121	.15872	.287	-.7463	.1239

\*. The mean difference is significant at the 0.05 level.

### Descriptives

**WB**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
18-25	17	3.2176	.86547	.20991	2.7727	3.6626	1.60	4.50
26-35	144	3.4556	.78525	.06544	3.3262	3.5849	1.30	5.00
36-45	85	3.2965	.81364	.08825	3.1210	3.4720	1.10	5.00
46-55	91	3.1769	.79792	.08365	3.0107	3.3431	1.10	4.60
>56	35	2.8657	.77912	.13170	2.5981	3.1334	1.40	4.50
Total	372	3.2847	.81297	.04215	3.2018	3.3676	1.10	5.00



### Appendix I: Company Industry t-test

Group Statistics					
	Industry	N	Mean	Std. Deviation	Std. Error Mean
OC_Formalization	Manufacturing	272	2.6147	.51723	.03136
	Software	100	2.4420	.43790	.04379
OC_Autonomy	Manufacturing	272	2.9110	.49427	.02997
	Software	100	2.9600	.50131	.05013
OC_Reflexivity	Manufacturing	272	2.6022	.53717	.03257
	Software	100	2.8700	.45516	.04552
IWB	Manufacturing	272	3.2272	.83608	.05070
	Software	100	3.4410	.72768	.07277

**Independent Samples Test**

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OC_Formalization	Equal variances assumed	2.459	.118	2.970	370	.003	.17271	.05815	.05836	.28705
	Equal variances not assumed			3.206	206.738	.002	.17271	.05386	.06652	.27889
OC_Autonomy	Equal variances assumed	.042	.838	-.844	370	.399	-.04897	.05802	-.16307	.06513
	Equal variances not assumed			-.838	174.278	.403	-.04897	.05841	-.16425	.06630
OC_Reflexivity	Equal variances assumed	2.356	.126	-4.433	370	.000	-.26779	.06040	-.38657	-.14902
	Equal variances not assumed			-4.785	206.563	.000	-.26779	.05597	-.37814	-.15745
IWB	Equal variances assumed	5.694	.018	-2.261	370	.024	-.21379	.09455	-.39972	-.02787
	Equal variances not assumed			-2.411	201.113	.017	-.21379	.08869	-.38867	-.03892

## Appendix J: Company age – t-tests

**Group Statistics**

	Company_Age	N	Mean	Std. Deviation	Std. Error Mean
OC_Formalization	> 130 years old	209	2.6258	.50374	.03484
	< 45 years old	163	2.4945	.49257	.03858
OC_Autonomy	> 130 years old	209	2.9139	.51277	.03547
	< 45 years old	163	2.9374	.47481	.03719
OC_Reflexivity	> 130 years old	209	2.6191	.52844	.03655
	< 45 years old	163	2.7448	.52366	.04102

**Independent Samples Test**

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OC_Formalization	Equal variances assumed	.072	.789	2.520	370	.012	.13136	.05213	.02885	.23387
	Equal variances not assumed			2.527	351.776	.012	.13136	.05199	.02912	.23360
OC_Autonomy	Equal variances assumed	.701	.403	-.454	370	.650	-.02355	.05188	-.12557	.07848
	Equal variances not assumed			-.458	359.247	.647	-.02355	.05139	-.12461	.07752
OC_Reflexivity	Equal variances assumed	.021	.884	-2.284	370	.023	-.12565	.05500	-.23380	-.01749
	Equal variances not assumed			-2.287	349.707	.023	-.12565	.05494	-.23370	-.01759

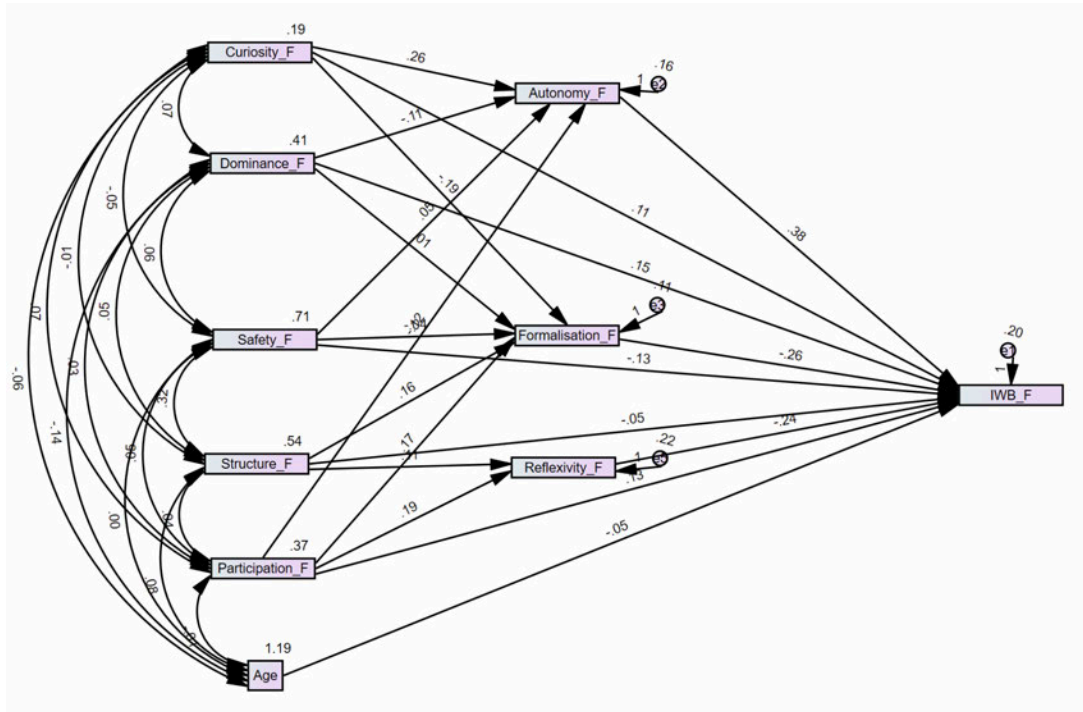
## Appendix K: Validity Analysis from CFA model in Amos

### Validity Analysis - Confidence Intervals

	<b>CR</b>	<b>AVE</b>	<b>Lower 95% CR</b>	<b>Upper 95% CR</b>	<b>Lower 95% AVE</b>	<b>Upper 95% AVE</b>
<b>IWB_F</b>	0.952	0.668	0.937	0.963	0.600	0.726
<b>Auto_F</b>	0.755	0.384	0.641	0.834	0.267	0.503
<b>Reflex_F</b>	0.755	0.382	0.634	0.844	0.260	0.520
<b>Form_F</b>	0.723	0.345	0.591	0.815	0.229	0.469
<b>Safe_F</b>	0.769	0.531	0.670	0.853	0.410	0.663
<b>Struc_F</b>	0.756	0.511	0.657	0.837	0.393	0.633
<b>Dom_F</b>	0.747	0.499	0.632	0.843	0.368	0.644
<b>Cur_F</b>	0.706	0.448	0.536	0.855	0.280	0.665
<b>Contact_F</b>	0.692	0.442	0.428	0.900	0.217	0.763

## Appendix L: Alternative Model Testing, Amos

Theoretical model:

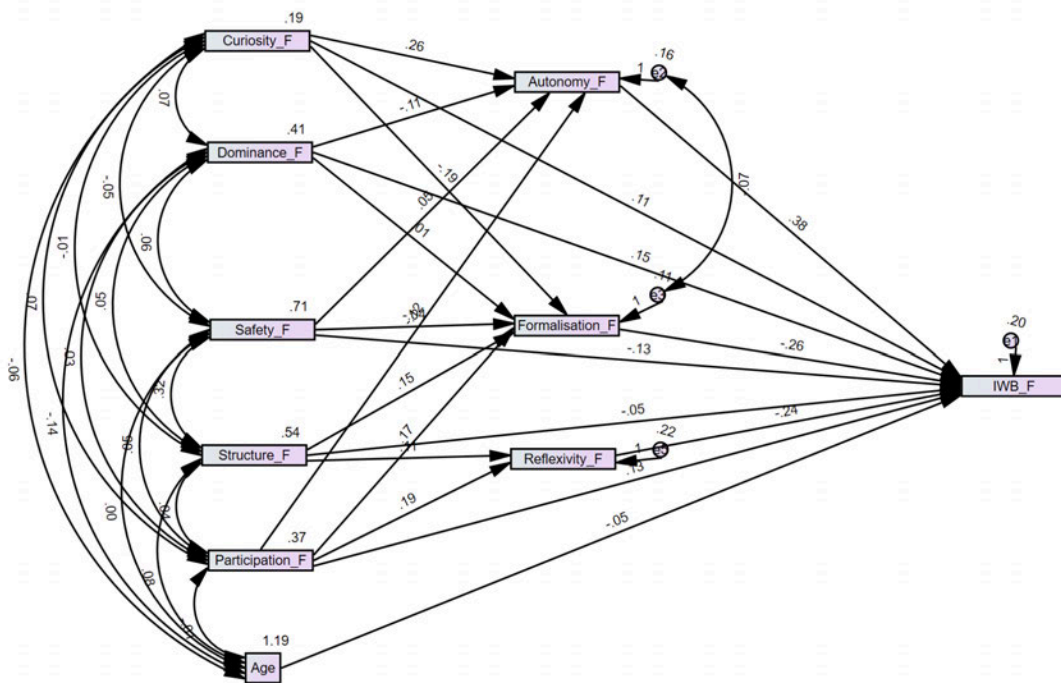


Measure	Estimate	Threshold	Interpretation
CMIN	319.511	--	--
DF	10.000	--	--
CMIN/DF	31.951	Between 1 and 3	Terrible
CFI	0.600	>0.95	Terrible
SRMR	0.099	<0.08	Acceptable
RMSEA	0.289	<0.06	Terrible
PClose	0.000	>0.05	Not Estimated

### Modification Indices (Group number 1 - Default model)

		M.I.	Par Change
e5 <-->	Curiosity_F	6.331	-.024
e3 <-->	e5	5.521	.019
e2 <-->	e5	89.408	.093
e2 <-->	e3	90.233	-.067

Alternative Model 1 following modification indices: covariance between autonomy (e2) and formalization (e3):



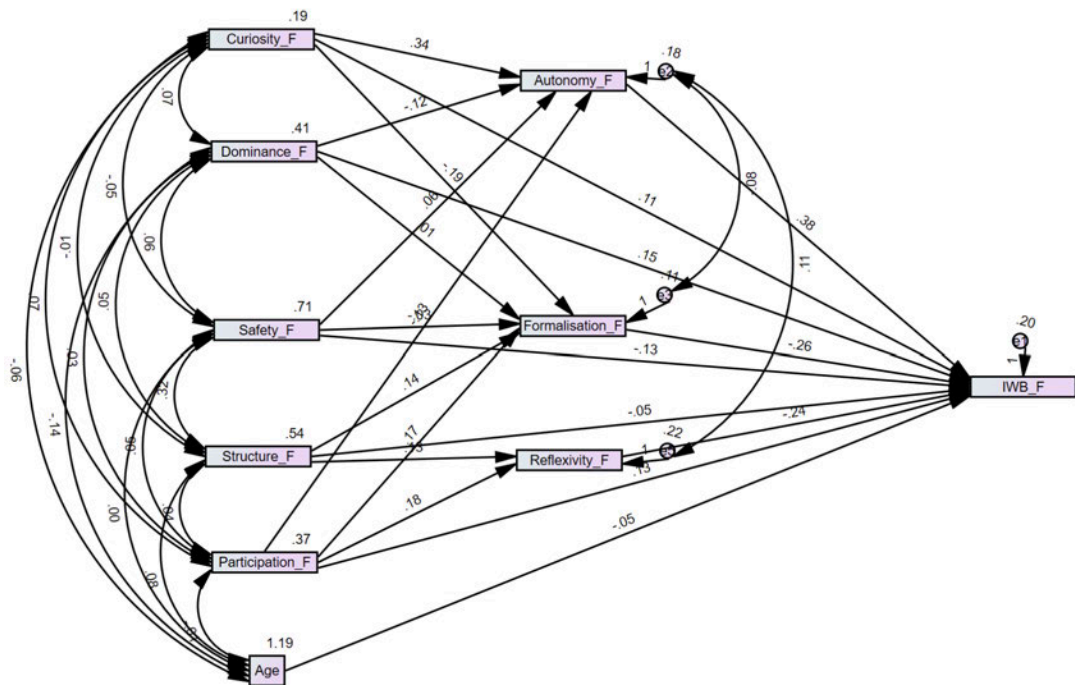
Measure	Estimate	Threshold	Interpretation
CMIN	215.679	--	--
DF	9.000	--	--

CMIN/DF	23.964	Between 1 and 3	Terrible
CFI	0.733	>0.95	Terrible
SRMR	0.071	<0.08	Excellent
RMSEA	0.249	<0.06	Terrible
PClose	0.000	>0.05	Not Estimated

**Modification Indices (Group number 1 - Default model)**

		<b>M.I.</b>	<b>Par Change</b>
e5 <-->	Curiosity_F	6.331	-.024
e3 <-->	e5	65.427	.057
e2 <-->	e5	149.308	.104

Alternative Model 2 following modification indices: covariance between autonomy (e2) and reflexivity (e5):



Measure	Estimate	Threshold	Interpretation
CMIN	15.580	--	--
DF	8.000	--	--
CMIN/DF	1.947	Between 1 and 3	Excellent
CFI	0.990	>0.95	Excellent
SRMR	0.035	<0.08	Excellent
RMSEA	0.051	<0.06	Excellent

PClose	0.438	>0.05	Excellent
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Appendix M: Direct and Indirect Correlations Standardised Estimates

			Estimate	S.E.	C.R.	P	Label
Autonomy_F	<---	Curiosity_F	.332	.046	7.276	***	
Autonomy_F	<---	Dominance_F	-.121	.030	-4.067	***	
Formalisation_F	<---	Structure_F	.144	.023	6.130	***	
Reflexivity_F	<---	Participation_F	.185	.040	4.654	***	
Formalisation_F	<---	Participation_F	.167	.030	5.605	***	
Formalisation_F	<---	Curiosity_F	-.179	.043	-4.116	***	
Formalisation_F	<---	Safety_F	-.033	.024	-1.375	.169	
Reflexivity_F	<---	Structure_F	.126	.029	4.270	***	
Formalisation_F	<---	Dominance_F	.005	.028	.175	.861	
Autonomy_F	<---	Safety_F	.060	.023	2.599	.009	
Autonomy_F	<---	Participation_F	-.133	.036	-3.740	***	
IWB_F	<---	Autonomy_F	.382	.087	4.388	***	
IWB_F	<---	Dominance_F	.155	.040	3.860	***	
IWB_F	<---	Formalisation_F	-.262	.091	-2.864	.004	
IWB_F	<---	Safety_F	-.127	.034	-3.780	***	
IWB_F	<---	Reflexivity_F	-.238	.066	-3.577	***	
IWB_F	<---	Structure_F	-.050	.039	-1.270	.204	
IWB_F	<---	Curiosity_F	.111	.063	1.765	.078	

IWB\_F <--- Participation\_F .125 .043 2.890 .004  
 IWB\_F <--- Age -.052 .022 -2.355 .019

Predictor	Outcome	Std Beta
Dominance_F	IWB_F	.116 *
Safety_F	IWB_F	-.133 *
Structure_F	IWB_F	-.174 **
Curiosity_F	IWB_F	.235 ***
Participation_F	IWB_F	-.017
Autonomy_F	IWB_F	.215 **
Formalisation_F	IWB_F	-.266 ***
Reflexivity_F	IWB_F	-.155 **
Age	IWB_F	-.130 **

Significance of Estimates:

\*\*\*  $p < 0.001$

\*\*  $p < 0.010$

\*  $p < 0.050$

<b>Predictor</b>	<b>Outcome</b>	<b>Std Beta</b>
Curiosity_F	Autonomy_F	.334 ***
Structure_F	Formalisation_F	.287 ***
Participation_F	Reflexivity_F	.230 ***
Participation_F	Autonomy_F	-.188 ***
Curiosity_F	Formalisation_F	-.211 ***
Dominance_F	Formalisation_F	.009
Safety_F	Formalisation_F	-.074
Structure_F	Reflexivity_F	.189 ***
Dominance_F	Autonomy_F	-.179 ***
Participation_F	Formalisation_F	.277 ***
Safety_F	Autonomy_F	.117 **
Dominance_F	IWB_F	.182 ***
Formalisation_F	IWB_F	-.177 **
Safety_F	IWB_F	-.195 ***
Reflexivity_F	IWB_F	-.213 ***

Structure_F	IWB_F	-.067
Curiosity_F	IWB_F	.088
Participation_F	IWB_F	.140 **
Age	IWB_F	-.104 *
Autonomy_F	IWB_F	.302 ***

via Gaskin, J. & Lim, J. (2018), "Merge SRW Tables", AMOS Plugin. [Gaskination's StatWiki](#).

Indirect Path	Unstandardised Estimate	Lower	Upper	P-Value	Standardised Estimate
Curiosity_F --> Autonomy_F --> IWB_F	0.127	0.076	0.194	0.001	0.101***
Curiosity_F --> Formalisation_F --> IWB_F	0.047	0.023	0.087	0.001	0.037***

Structure_F -- > Formalisation _F --> IWB_F	-0.038	-0.065	-0.018	0.001	-0.051**
Structure_F -- > Reflexivity_F - -> IWB_F	-0.030	-0.052	-0.014	0.001	-0.040***
Participation_ F --> Reflexivity_F - -> IWB_F	-0.044	-0.073	-0.023	0.000	-0.049***
Participation_ F --> Autonomy_F - -> IWB_F	-0.051	-0.087	-0.027	0.000	-0.057***
Participation_ F --> Formalisation _F --> IWB_F	-0.044	-0.080	-0.021	0.001	-0.049***
Dominance_F --> Formalisation _F --> IWB_F	-0.001	-0.014	0.014	0.874	-0.002
Dominance_F -->	-0.046	-0.078	-0.023	0.001	-0.054***

Autonomy_F - -> IWB_F					
Safety_F --> Formalisation _F --> IWB_F	0.009	-0.001	0.024	0.133	0.013
Safety_F --> Autonomy_F - -> IWB_F	0.023	0.008	0.043	0.008	0.035**

## Appendix N: PDF document initially sent out for the pilot study



**UNIVERSITY OF  
GLOUCESTERSHIRE**  
at Cheltenham and Gloucester

**Innovation ist der Motor der Wirtschaft.**

Doch was treibt Innovation an? Wie kann Ihr Unternehmen seine Organisationskultur anpassen, Innovation fördern und managen?

In einer **Forschungsarbeit an der University of Gloucestershire** untersuchen wir die Treiber für Innovatives Verhalten und wie das Organisationsklima diese beeinflusst.

Die Untersuchung besteht aus zwei Teilen:

1. Die Team Manager füllen einen Fragebogen zum Innovationsverhalten jedes Mitarbeiters ihres Teams aus (ca. 1-2 Min pro Mitarbeiter)
2. Die Mitarbeiter füllen einen Fragebogen zu ihrer eigenen intrinsischen Motivation aus und zum Organisationsklima (ca. 10 min pro Umfrage)

Die Klarnamen müssen zwar angegeben werden, um die Verbindung zwischen den Fragebögen der Manager und Mitarbeiter zu schaffen, aber die Daten werden höchst vertraulich behandelt und anonymisiert.

Ihr Unternehmen erhält im Anschluss eine Analyse (anonymisiert mit aggregierten Daten), ein Benchmarking im Vergleich zu anderen deutschen Unternehmen und eine Beratung zum Thema: Innovationsmanagement und Organisationskultur.

Bei Fragen wenden Sie sich gerne an:



## Appendix O:



### **Innovation ist der Motor der Wirtschaft. Ablauf der Studie: (01.12.2020-31.03.2021)**

1. Das Forschungsteam erstellt Code-Beispiele für die GL/HAL/Team-Manager und schickt Ihnen diese per Email ebenso wie die Links zu beiden Umfragen.
2. Die GL/HAL/Team-Manager füllen zunächst einen Fragebogen zu ihrer eigenen intrinsischen Motivation aus und zum Organisationsklima (ca. 10 min pro Umfrage) genannt „MP-OCM“
3. Die Team-Manager schicken den Umfrage-Link zu MP-OCM und zugehörigen individuellen Code an jeden Ihrer Mitarbeiter.
4. In regelmäßigen Abständen (oder am Ende der Studie), bekommen die Führungskräfte eine Übersicht welche Mitarbeiter (Codes) die Umfrage ausgefüllt haben.
5. Die Führungskräfte füllen dann den Fragebogen zum Innovationsverhalten „IWB“ ihrer Mitarbeiter aus (1-2 Min pro Mitarbeiter), die den MO-OCM bereits gemacht haben.

Im Anschluss erhalten Sie eine detaillierte Analyse zu Ihrem Unternehmen, Benchmarking und eine Beratung. Für eine solide statistische Analyse ist es hilfreich wenn min. 60 Mitarbeiter innerhalb eines Unternehmens teilnehmen.

Alle Daten sind anonym und werden höchst vertraulich behandelt. Es werden nur aggregierte, anonymisierte Daten in Form der Analyse veröffentlicht.

Zugriff auf die individuellen Daten erhält nur das Forschungsteam der University of Gloucestershire.

Diese werden gemäß der Europäischen DTGVO behandelt (siehe DTGVO Erklärung zur Forschung).

Die Studie richtet sich an alle deutschen Unternehmen ab 50 Mitarbeitern.

Mit Ihrer Teilnahme leisten Sie einen großen Beitrag zur Innovationsforschung. Vielen Dank.

Forschungsleitung:



**DGSVO und Ethische Richtlinien:**

1. Die Teilnahme der einzelnen Unternehmen, Abteilungen und/oder Mitarbeiter ist freiwillig.
2. Es werden keine personenbezogenen Daten gesammelt, weder Namen, noch Emails, IP Adressen oder Personalnummern. Die Teilnahme erfolgt über einen personalisierten Code. Eine Codierung ist erforderlich, damit die Antworten des/der jeweiligen Mitarbeiters/in in direktem Bezug zu den Antworten seines/ihres Vorgesetzten gestellt werden können.  
Durch die Codierung kann von der Forscherin aus kein Rückschluss auf natürliche Personen gemacht werden, lediglich aber auf das Unternehmen und das Team in dem die Person arbeitet. Die Codierung der einzelnen Mitarbeiter ist nur dem jeweiligen Team-Manager bekannt. Die Forscherin verpflichtet sich hier zur strengsten Geheimhaltung der Ergebnisse einzelner Teilnehmer und ihrer Codes gegenüber dem Unternehmen, den Team-Managern und den Mitarbeitern.
3. Daten werden nur auf das Unternehmen und die Teams bezogen gesammelt. Dabei verpflichtet sich die Forscherin zur strengsten Geheimhaltung.
4. Die abschließende Analyse der Daten im Bezug zur Organisation (und die Teams) wird nur den Ansprechpersonen im jeweiligen Unternehmen beim Abschluss/Beratungsgespräch zur Verfügung gestellt.
5. Analysedaten des Unternehmens, die zum Benchmarking benutzt werden, sind komplett anonymisiert, sodass kein Rückschluss auf das Unternehmen genommen werden kann.
6. Aggregierte anonymisierte Daten werden zum Zwecke der Forschung und Publikation (Journals und Bücher) gesammelt und ausgewertet.
7. Die Forscherin versichert dabei sich an das Ethik-Handbuch der University of Gloucestershire zu halten:  
<https://www.glos.ac.uk/docs/download/Research/handbook-of-principles-and-procedures.pdf>
8. Die Daten werden auf der Plattform <https://www.jisc.ac.uk/online-surveys> gesammelt. Diese Plattform wurde speziell für Universitäten und Forschungsinstitute entwickelt (keine kommerzielle Nutzung), ist ISO27001 zertifiziert und ist im Einklang mit der DSGVO.



Bei Fragen können Sie sich gerne wenden an:

Nea Krivokapa-Williams (PhD candidate):

Dr. David Dawson (supervisor):