

**‘ANALYZING SKILL DEVELOPMENT IN THE CONTEXT OF AUTOMOTIVE
DIGITAL TRANSFORMATION’**

by

SRINIVASA KRISHNA PRASAD BURAVELLI

DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfillment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS AND MANAGEMENT GENEVA

May 2024

**‘ANALYZING SKILL DEVELOPMENT IN THE CONTEXT OF AUTOMOTIVE
DIGITAL TRANSFORMATION’**

by

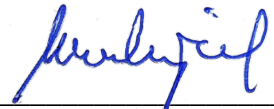
SRINIVASA KRISHNA PRASAD BURAVELLI

Supervised by

Dr. Alex Ekow Asampong

APPROVED BY

dr. Jaka Vadjal



Dissertation chair

RECEIVED/APPROVED BY:

Admissions Director

Dedication

To my family, whose steadfast support and encouragement have been the foundation of my academic path. Your limitless affection and comprehension have served as my guiding beacon, illuminating even the most obscure of circumstances. To my mentors, whose sagacity and counsel have not only influenced this thesis but also fostered my intellectual development. I am motivated to expand my own comprehension by your patience, expertise, and enthusiasm for acquiring knowledge. To all people who crossed paths with me in my quest for knowledge, your contributions, regardless of their magnitude, have made an enduring impact on this endeavour. This thesis serves as a monument to the combined endeavour and unwavering commitment of all those who have had faith in me and provided me with support during my journey.

Acknowledgements

I would like to express my profound appreciation to my thesis mentor Dr. Alex Ekow Asampong for his tremendous assistance, constructive criticism, and steadfast support, which have played a crucial role in the progress of this research endeavour. Your guidance has not only enhanced the worth of this thesis but has also made a substantial contribution to my development as a researcher. I am appreciative of the contributions made by the members of my thesis committee, who have provided valuable input and demonstrated their competence, so improving the rigor and legitimacy of this work. In addition, I would like to express my gratitude to the staff and teachers at Swiss School of Business Management, Geneva for creating a favourable environment for academic investigation. I would want to express my gratitude to my family and friends for their steadfast affection, support, and comprehension, particularly throughout the arduous stages of this undertaking. To all the participants and individuals who generously dedicated their time and expertise to this project, your cooperation has been extremely beneficial, and I am profoundly grateful for your commitment to the advancement of knowledge in this sector.

ABSTRACT

**‘ANALYZING SKILL DEVELOPMENT IN THE CONTEXT OF AUTOMOTIVE
DIGITAL TRANSFORMATION’**

SRINIVASA KRISHNA PRASAD BURAVELLI

2024

Dissertation Chair: <Chair’s Name>

Co-Chair: <If applicable. Co-Chair’s Name>

The automotive sector, especially in places like India, is at a turning point in its digital evolution due to changing consumer needs and rapid technical breakthroughs. To address the growing skill gap impeding the sector's digital transformation, this shift calls for a careful assessment of employee’s capabilities and a reassessment of conventional business strategies. With an emphasis on the significance of technical competences and proactive adaptation in Industry 4.0, the study attempts to explore how the industry's digital transformation affects employee proactive skill development.

The researcher used a mixed method using semi structured interviews for collecting qualitative data through and purposive sampling, and random sampling for quantitative

data collection, to look into the complex relationship between proactive skill development and industry-level digital strategy maturity in the automotive sector. This methodology improves the validity and dependability of our results by identifying subtle differences in skill dynamics in the context of digital transformation.

Using partial least squares structural equation modelling (PLS-SEM), the study came up with a way to show how the maturity of an industry's digital strategy affects proactive skill development through digital transformation. The findings emphasized how digital strategy maturity influences skill development through the mediating effects of digital adoption urgency, familiarity, feasibility, and complexity. It has become clear that proactive employee involvement is necessary for successfully managing these partnerships.

The suggestions include developing proactive cultures and putting in place continuous education initiatives to close the skills gaps in digital literacy, cybersecurity, artificial intelligence, and data analytics. Taking into account the moderating influence of proactive personality qualities on employee impressions of digitization, the study highlights the necessity of customised methods in digital transformation initiatives.

Future studies should look into the long-term effects of digital skill development programmes on organisational performance, how company culture affects attitudes towards digital transformation, how digitalization affects automotive supply chains, how different digitalization strategies perform across national borders, and how ethical considerations arise from digital transformation in the automotive industry.

TABLE OF CONTENTS

CHAPTER I: INTRODUCTION.....	1
1.1. Introduction to Digital Transformation.....	1
1.2. Research Problem	4
1.3 Purpose of Research.....	6
1.3.1. Research objectives.....	7
1.4. Significance of the Study	8
1.5 Research Purpose and Questions	15
1.5.1 Primary Research Question.....	18
1.5.1.2 Sub-Research Question.....	19
CHAPTER II: REVIEW OF LITERATURE	23
2.1 Introduction.....	23
2.2 Theoretical Background.....	24
2.3 Review on Digital Transformation	47
2.3.1. Digital Transformation in Automotive Sector	57
2.3.2. Digital Transformation and Proactive Skills Development	65
2.4 Research Gaps.....	71
2.5 Hypotheses Development	75
2.5.1 Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as complexity.....	77
2.5.2. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as familiarity.....	81
2.5.3. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as feasibility.....	84
2.5.4. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as urgency.....	85
2.5.5 Proactive personality as a moderator of indirect links between industry digital strategy maturity and PSD	87
CHAPTER III: METHODOLOGY	91
3.1 Overview of the Research Problem	91
3.2 Operationalization of Theoretical Constructs	93
3.3 Research Design.....	95
3.4 Population and Sample Methods	96
3.5 Participant Selection	99
3.6 Instrumentation	101

3.7. Research ethics.....	102
3.8 Data Collection Procedures.....	103
3.8.1 Qualitative Data Collection.....	103
3.8.2 Quantitative Data Collection.....	105
3.9 Data Analysis	106
3.9.1 Qualitative Data Analysis	106
3.9.2 Quantitative Data Analysis	109
3.10. Validity and Reliability.....	112
3.11 Research Design Limitations and De-limitations	113
3.12 Conclusion	115
 CHAPTER IV: RESULTS.....	 116
4.1 Research Question One.....	116
4.1.1. Mediation/ Intervening Analysis.....	118
4.1.1.1 Analysis of Direct Effect	119
4.1.1.2. Analysis of Indirect Effect	120
4.1.1.3. Analysis of Mediating/ Intervening Effect	123
4.2 Research Question Two	125
4.3 Research Question Three	132
4.4 Research Question Four.....	136
4.5 Research Question Five	138
4.6 Summary of Findings.....	140
4.7 Conclusion	141
 CHAPTER V: DISCUSSION.....	 143
5.1 Discussion of Results.....	143
5.2 Discussion of Research Question One	144
5.3 Discussion of Research Question Two	151
5.4 Discussion of Research Question Three	153
5.5 Discussion of Research Question Four	155
5.6 Discussion of Research Question Five	157
 CHAPTER VI: CONCLUSIONS, SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS	 160
6.1 Summary	161
6.2 Implications.....	163
6.2.1 Theoretical Implications	163
6.2.2 Practical/ Managerial Implications	164
6.3 Research contributions.....	166
6.3.1. Contribution to knowledge	166
6.3.2. Contribution to business practice.....	167
6.4 Recommendations for Future Research	168

6.5 Conclusion	169
6.6 Future Studies	171
REFERENCES	172
APPENDIX A SURVEY COVER LETTER	186
APPENDIX B INFORMED CONSENT	188
APPENDIX C	190
SAMPLE CODING	190
APPENDIX D INTERVIEW GUIDE	191
APPENDIX E SURVEY FORM	194

LIST OF TABLES

Table 3.4 Comparative Analysis Taking Different Values of σ and D.....	..99
Table 4.1. Significance Analysis-Direct Effect.....	120
Table 4.2. Significance Analysis-Indirect Effect.....	123
Table 4.3 Mediating/ Intervening effect analysis.....	125
Table 4.4 Skill Deficiency.....	127
Table 4.5 Descriptive analysis and comparative test result	129
Table 4.6 Demographic Characteristics of respondents	131
Table 4.7 Moderation Effects.....	133

LIST OF FIGURES

Figure 2.5. Conceptual Framework of the study.....	76
--	----

Chapter I:

INTRODUCTION

1.1. Introduction to Digital Transformation

The organisational structure of businesses has been profoundly changed by the arrival of digital transformation, which has created new business opportunities made possible by innovation (Garcez et al., 2022; Nambisan & Baron, 2013). Businesses are using digitalization methods to change their products, services, and processes in order to stay competitive (Mancha & Shankaranarayanan, 2020). Digital transformation is the deliberate application of digital technologies to enable notable improvements in business operations, such as creating new business models and improving the customer experience (Piccinini et al., 2015b). Every industry has embraced digital technology, including finance, education, logistics, and others (Goulart et al., 2022). The automotive industry is no exception. The characteristics of competition in the automotive industry have changed significantly over the last 20 years. For example, Tesla, a 2003 company, has become the top automaker in terms of market value since June 2020. Due to a number of causes, including technology-driven trends, changing customer demands, the internet of things (IoT), and improvements in artificial intelligence, the majority of automotive companies are still having difficulty with digital transformation (Llopis-A. et al., 2021). This change is being driven by the necessity to keep up with new trends and client demands, like the

incorporation of car-sharing platforms and the offering of innovative telemetry services (Kotarba, 2018; Riasanow et al., 2017). The industry must respond to consumer demands

as soon as possible (Giacosa et al., 2022). However, Kane (2014) contends that a corporation cannot gain value from the use of digital technology alone. By incorporating these tools into a specific framework, businesses can find new ways to create value, which is consistent with the traditional belief that organisational change is an organic process (Markus and Robey, 1988). The traditional business models used by corporations in the automobile sector, which have proven durable for many years, are presently undergoing a dramatic transformation (Albert et al., 2021). In order to maintain their performance, companies must evaluate and improve the capabilities of their workforce as they shift from traditional business models to the Industry 4.0 model (Sousa & Rocha, 2019; Ostmeier & Strobel, 2022). But it's also critical to recognise that, in contrast to earlier periods, employees today are expected to manage their careers more proactively (Ren & Chadee, 2017).

Employees must thus actively develop their skills in the context of digital transformation in order to successfully handle future job requirements (Ostmeier & Strobel, 2022; Vial, 2019). The study's main goal is to close the current research gap by looking at how industry-level digital strategy maturity affects the growth of proactive skills. Prior research on the industry's level of digital strategy maturity has been done by Marks et al. (2021) and Freitas Junior et al. (2016). Complexity, familiarity, feasibility, and urgency

were among the individual analytical variables that the study used to achieve this aim (Dutton et al., 1989). The objective is to build and assess a model that, indirectly, through employee analytical interpretation of digitalization, links proactive skill development to the maturity of industrial digital strategy. The study's goal was to fill a knowledge gap in the academic literature and satisfy the demand of the research community for more study into the aspect of digital maturity and clarification of the underlying mechanisms that determine whether particular interpretations are predictive of skill development (Ostmeier & Strobel, 2022).

The importance of the study and its prospective contributions to scholarly writing as well as real-world applications in the Indian IT sector must be emphasized in order to wrap up the introduction. Strong security measures are required to preserve operational integrity and safeguard sensitive data in light of the increasing reliance on digital infrastructure. Organizations can strengthen their cybersecurity defenses without having to pay exorbitant fees by utilizing open-source security solutions (Fitzgerald, 2006). Furthermore, open-source development's collaborative structure encourages innovation and ongoing improvement, allowing for quick reactions to new threats (Raymond, 2001).

By offering a thorough examination of the acceptance, implementation, and difficulties related to open-source security solutions in Indian private enterprises, this research seeks to close the gap in the body of existing literature. The study provides a thorough grasp of how these tools can be successfully incorporated into various IT settings by looking at both the technical and economic aspects (Spinellis, 2008). The results of this study will not only

help IT professionals and corporate executives make strategic decisions, but they will also be useful in policy talks aimed at improving cybersecurity frameworks in India (Johnson & Goetz, 2018).

The knowledge gained from this research should encourage a wider use of open-source security solutions, resulting in more durable and economical IT infrastructures in a variety of industries. The study emphasizes the value of open-source tools in strengthening India's digital ecosystem against the ever-changing threat landscape by addressing their practical obstacles and showcasing their advantages (Weber, 2004). In the end, this research aims to equip companies with the information and tools required to fully utilize open-source security solutions, opening the door to a safe and creative future (Schryen, 2011).

1.2. Research Problem

The automotive sector, especially in places like India, is facing a critical juncture in the quickly changing digital transformation landscape, one that is characterised by technological breakthroughs and shifting consumer expectations. This paradigm shift calls for a careful analysis of the skill set of the workers in the automobile industry, in addition to requiring a re-evaluation of conventional business strategies. An urgent problem arises: a widening skill gap that poses a serious obstacle to the sector's smooth

transition to the digital age, particularly in areas where the need for tech talent is rapidly increasing (Ranjan & Dhir, 2023, p. 290; Vapiwala & Pandita, 2023, pp. 200–205).

This task is made more difficult by the rapid pace of digital transformation, which may leave the current workforce ill-prepared to take full advantage of emerging technology (Verma & Venkatesan, 2023, pp. 1241–1249). It is becoming more and more important for automotive firms to make sure that their staff have the skills they need to succeed in this new environment as digital technologies change.

The primary goal of this study is to answer the following question: How does the automobile industry's digital transformation affect the workforce's ability to gain new skills? Through an exploration of the intricate dynamics surrounding skill development, the research acknowledges the necessity of having a workforce that possesses not only technical competencies but also the ability to innovate and adapt proactively in the context of Industry 4.0 and rapid digitization. There is still much to learn about the precise relationship between the industry's digital strategy maturity and employees' proactive skill development.

Production delays, higher operating expenses, and weakened capacity for innovation are some of the concrete effects of the observed skill gaps and the rising demand for technical skills (Zhou et al., 2022). The industry's ability to compete globally is impacted by the shortage of digital skills, which hinders the adoption of innovative manufacturing technology (Shah & Soomro, 2023, pp. 290–312).

Nevertheless, the body of current literature is inadequate in offering practical insights tailored to the particular subtleties of the automotive industry. By

concentrating on the Indian automobile sector, this study aims to close this knowledge gap by providing a comprehensive understanding of the skills needed and suggesting practical talent development plans. The need to provide the automotive workforce with the digital literacy required to prosper in the face of revolutionary technological change is what drives this initiative.

This study aims to comprehend how employees interpret and respond to industry digital strategies, and how the maturity of these strategies influences proactive skill development. By addressing these crucial topics, the research aims to offer significant perspectives for industry practitioners and policymakers who are navigating the human side of the digital transformation path in the automotive industry.

1.3 Purpose of Research

The purpose of this study is to examine the influence of digital transformation on skill development in the automobile industry, with a specific focus on the Indian context. The research attempts to deliver practical insights specifically targeted at the unique issues encountered by the automobile industry in India by analysing the complex relationship between digital strategy maturity and proactive skill development.

The rapid speed of digital transformation has exacerbated the growing skills disparity, which the study aims to address (Verma & Venkatesan, 2023). The objective is to examine the impact of implementing digital strategies on the skill development of the

automotive workforce, specifically in domains such as data analytics, cybersecurity, and artificial intelligence (Ranjan & Dhir, 2023; Effiong et al., 2023; Kumar et al., 2022).

Additionally, the research strives to identify best practices for talent development within the automotive sector, taking into consideration the effects of identified skill gaps on production delays, operational costs, and innovation capability (Zhou et al., 2022; Shah & Soomro, 2023).

The urgent need to equip the workforce in the automobile industry with the digital savvy that is necessary to flourish in an era of radical technological change is the impetus behind the study. The project intends to provide essential knowledge for industry practitioners and policymakers who are navigating the human dimension of digital transformation in the automotive sector. This provides insights into how employees comprehend and respond to digital strategies.

1.3.1. Research objectives

- a) To examine and ascertain the particular areas of skill inadequacy within the automotive sector with regards to the process of digital transformation.

The Indian automotive sector urgently requires upskilling, highlighting the wider lack of competencies beyond technical skills (Ranjan & Dhir, 2023). The importance of cultivating digital innovation skills is shedding light on specific areas where the workforce may lag (Vapiwala & Pandita's 2023). The impact of Industry 4.0 on

workforce skills in the Indian automotive industry provides a comprehensive understanding of the inadequacies relevant to digital transformation (Verma & Venkatesan's study, 2023). b) To analyse the influence of an employee's proactive personality on their sense of urgency and motivation to learn the necessary skills for achieving successful digital transformation.

The importance of proactive behavior in the context of digital innovation highlights its role in adapting to technological changes (Vapiwala & Pandita, 2023). Additionally, Bateman & Crant seminal work (1993) on proactive personality provides foundational insights into how individual proactivity influences behaviour, aligning with the motivation to acquire new skills. The understanding of proactive behaviour's impact on skill development emphasises its role in fostering a culture of continuous learning (Parker et al. 2006).

- b) To analyse the influence of an employee's proactive personality on their sense of urgency and motivation to learn the necessary skills for achieving successful digital transformation.

Vapiwala & Pandita (2023) explore the significance of proactive behavior in the context of digital innovation, highlighting its role in adapting to technological changes. Additionally, Bateman & Crant's seminal work (1993) on proactive personality provides foundational insights into how individual proactivity influences behavior, aligning with the motivation to acquire new skills. Parker et al. (2006) further contribute to the understanding

of proactive behavior's impact on skill development, emphasizing its role in fostering a culture of continuous learning.

- c) To evaluate the impact of the digital strategy maturity within the industry on the shaping and management of proactive skill development within its workforce.

Verma & Venkatesan's study (2023) provides insights into Industry 4.0 implications on workforce skills in the Indian automotive industry, offering a foundational understanding of the relationship between digital strategy maturity and skill development. The work of Avramenko (2019) on employee skill development emphasizes the significant influence of organizational strategies on shaping the workforce's proactive behavior. Additionally, Colakoglu et al.'s research (2006) on the impact of organizational factors on business intelligence success supports the idea that the digital strategy maturity of an organization plays a pivotal role in skill development initiatives.

In order to successfully manage and address the rising demand for technical talent within the context of digital transformation, this study aims to identify and analyze the most practical solutions that the automotive industry may adopt.

1.4. Significance of the Study

Digital transformation is the process of attempting to derive new and renewed value from digital assets (Vial, 2021). According to Solis (2019), digital transformation is defined as the process of realigning or investing in technology, business models, and processes in

order to provide new value for consumers and employees and to compete in a digital market that is always altering. The impact of digital transformation (DT) on the strategy and operations of corporations contributes to its prominence. Both researchers and practitioners highly value the role that DT plays in managing technological advancements, enhancing competitiveness, and finding new ways to innovate in the digital era. Therefore, digital transformation (DT) has been the primary focus of both strategic information system (IS) research (Vial, 2021; Piccinini et al., 2015a) and practitioners (Oliveira & Souza, 2022; Verhoef et al., 2021). Macroscopically speaking, digital transformation refers to the huge changes that digital technology has brought about in society as well as in a variety of industries (Vial, 2023; Majchrzak et al., 2016). Because of this, digital transformation is not exclusive to a single sector or corporate entity. Changes in society, the economy, culture, technology, and the environment are all examples of macroscopic phenomena. It is essential for academics, professionals, and those in charge of making decisions to address this matter because it has an impact on virtually every facet of contemporary society and the economy.

Research has shown that digital transformation enables businesses to improve their competitiveness, operational efficiency, adaptability, and customer involvement (Chin et al., 2022; Leao & Silva, 2021) . Within the context of the digital age, businesses are required to recognise innovation as a strategic requirement (Verhoef et al., 2021). In the fast-paced and interconnected business world, innovation is absolutely necessary for the continued existence and expansion of enterprises. Therefore, academics say that enterprises should make use of these technologies in order to innovate and design strategies that

acknowledge digital transformation and increase operational performance (Tabrizi et al., 2019). In addition to digital record-keeping and simplifying physical duties, digital transformation encompasses much more.

Outside platforms make technology available to create new services, reconsider company plans, and promote user-driven innovation (Castro et al. 2020). One problem, though, is that modern academic publications often use the terms "digital transformation" (DT) and related terms interchangeably. There are many entwinements among the digital transitions (DT). Nonetheless, it is important to emphasize the conceptual variations between these concepts (Verina & Titko 2019). Digitization may have an impact on the transformation process. Digitalization and DT have some relationships, though they are not the same. The digital revolution makes both possible. Many academic sources (Gong and Ribiere, 2021) agree that digital transformation (DT) goes beyond digitalization. Businesses and researchers realised after some time that digital transformation (DT) went beyond a simple technological transfer (Gong & Ribiere, 2021). It became clear very soon that direct technology requires the acceptance of technical developments, the synchronization of strategic goals, and the synchronization of people, company culture, attitude, talent development, and leadership. There are numerous definitions that argue that digital transformation can improve operational effectiveness. A very brief list: Businesses may gain an advantage over their rivals and make better decisions by using digital technology (DT) (Ahmed et al., 2021; Heilig et al., 2017). Customer value creation is defined, among other things, as the generation of customer value, which entails maximising client expectations and experiences. Several studies have shown that digital transformation (DT)

is a distinct phenomenon. Digital transformation (DT) is seen by some academics as a relatively small change made possible by technology, such as the installation of a new enterprise resource planning (ERP) system (Chanias, 2017). Other scholars, such as Zhu et al. (2021), think that DT is more gradual and profound. A multitude of studies have looked into the relationship between strategy (Westerman, 2018) and business models (Favoretto et al., 2022; Vaska, 2021). Moreover, Wang and Wang's 2020 study occasionally refers to digital transformation (DT) as a paradigm or a process. According to several experts, the Organisation for Economic Co-operation and Development (OECD) (2018) defines digital transformation (DT) as including the social and economic effects of digitization and digitalization.

The study's importance lies in its examination of the complex dynamics surrounding proactive skill development (PSD) in the context of digital transformation in industries. With the growing adoption of digital strategies in sectors to be competitive in the constantly changing market, it is crucial for organizations to understand the aspects that affect PSD in order to achieve success. This study aims to fill a significant research gap by examining the indirect connections between the maturity of industry digital strategies and PSD (perceived strategic digitalization), which are influenced by factors such as the perception of digitalization as complex, familiar, and urgent. Additionally, these connections are influenced by individual characteristics, such as proactive personality traits.

The study examines the relationship between industry digital strategy maturity and PSD from an organizational perception perspective, thereby enhancing our understanding of this

connection. This research examines how organizations perceive digitalization, categorizing it as either complex, familiar, or urgent. It aims to uncover the cognitive processes that motivate employees to participate in skill development efforts. Comprehending different viewpoints is essential for organizational leaders as they plan and distribute resources to cultivate a culture of ongoing learning and adjustment in reaction to digital disruption (Höyng & Lau, 2023).

Furthermore, the study highlights the significance of proactive personality as a mediator in the correlation between industry digital strategy maturity and PSD. People who have proactive personalities possess qualities including taking initiative, being persistent, and having self-confidence, which affect their inclination to participate in activities that enhance their skills (Bateman & Crant, 1993). This research investigates the influence of proactive personality on the relationship between industry digital strategy maturity and employees' responses to digital transformation activities, specifically in relation to PSD. It offers valuable insights into the individual-level aspects that affect how employees react to digital transformation projects.

Furthermore, this study has practical ramifications for corporate leaders and human resource professionals who are responsible for creating and executing skill enhancement initiatives. Organizations can prioritize investments in digital capabilities, infrastructure, and training activities to create a favorable environment for PSD by acknowledging the significance of industry digital strategy maturity (Ren & Chadee, 2017). Moreover, comprehending the moderating influence of proactive personality enables firms to

customize their approach to skill enhancement based on individual employee traits, thereby optimizing the efficacy of training endeavors (Frese & Fay, 2001).

Moreover, the results of this study have wider ramifications for sectors experiencing digitalization. As more and more businesses in many industries see the necessity of adjusting to digital disruption, the capacity to cultivate and implement digital skills becomes a crucial factor in achieving success (Noe et al., 2014). This research offers useful insights into how enterprises can strategically coordinate their digital endeavors, establish a culture of ongoing skill development, and effectively respond to the dynamic pressures of the digital environment by understanding the elements that drive PSD (Höyng & Lau, 2023).

Ultimately, this study's importance rests in its ability to enhance our comprehension of the intricate relationship between the maturity of industry digital strategies, organizational perception, individual traits, and PSD. This research provides significant insights for organizational executives, human resource experts, and policymakers who are looking to understand the indirect links and moderating factors that affect PSD. It can help them negotiate the obstacles and opportunities of digital transformation in many industries.

Research that looks at skill development in the context of digital transformation in the automotive industry is very essential because it is so wide and crucial to ensuring the sector's ongoing development in a sustainable way. Digital technologies are profoundly changing the automotive industry, especially automation, artificial intelligence, and connectivity. It is therefore critical to know and appreciate the necessary skill sets

associated with this revolutionary shift. The results of this research are very significant since they guarantee that experts in the relevant sector possess the skills and knowledge required to successfully negotiate the intricate parts of digital transformation, which eventually promotes innovation and technical application. It also effectively highlights the critical demand for qualified workers and provides guidance for the development of educational curricula and training programmes designed to equip people with the skill sets required to meet the challenges of the digital era. The researcher anticipate that this study's findings significantly impact talent acquisition, policy development, and economic growth, while also assisting companies in preserving their competitiveness. This study contributed significantly to the development of personnel that can spearhead and sustain the digital revolution in the automotive industry. The researcher achieved this by providing a thorough analysis of the relationship between skill development and the digital revolution of the automobile industry.

1.5 Research Purpose and Questions

The purpose of the research is to analyze the impact of the digital transformation through exploring the effects of digital transformation on skill development in the automobile sector, with a specific focus on the Indian context. The study purpose to examine the increasing disparity in skills caused by the rapid advancement of digital technology, as highlighted by Verma & Venkatesan (2023). The study purpose is to assess the consequences of adopting digital strategies on the enhancement of skills, specifically in

areas such as data analytics, cybersecurity, and artificial intelligence, citing research conducted by Ranjan & Dhir (2023), Effiong et al. (2023), and Kumar et al. (2022). The study purpose to examine the most effective methods for enhancing talent development in the automobile industry, taking into account the consequences of skill deficiencies on production delays, operational expenses, and innovation potential, as indicated by Zhou et al. (2022) and Shah & Soomro (2023) in their research.

The researcher acknowledges the immediate necessity of providing the automotive workforce with digital expertise in order to succeed in a rapidly changing technological landscape. Finally, the study aims to provide practical and specific insights that address the distinct issues faced by the automobile sector in India. Emphasise the intricate connection between the maturity of digital strategies and the proactive development of skills. The thorough examination of the influence of digital transformation on skill enhancement in the automobile sector, specifically in the Indian context, offers significant observations on the changing dynamics of the industry. This research highlights the pressing need for talent development activities to address the growing discrepancy in skills caused by the rapid progress of digital technology. These initiatives aim to bridge the gap between current skill sets and the developing digital needs (Verma & Venkatesan, 2023).

Moreover, the study examines the outcomes of implementing digital strategies on skill improvement, specifically concentrating on crucial domains such as data analytics, cybersecurity, and artificial intelligence. The research emphasizes the transformative capacity of digital technologies in restructuring conventional automotive processes and

operations, based on the studies conducted by Ranjan & Dhir (2023), Effiong et al. (2023), and Kumar et al. (2022). Furthermore, it emphasizes the significance of providing the workforce with the necessary digital skills to properly utilize new technologies and stimulate innovation in the industry.

The study not only evaluates the influence of digital strategies on skill advancement, but also investigates the most efficient approaches for improving talent development in the automotive sector. The research highlights the crucial importance of talent development initiatives in ensuring the competitiveness and sustainability of organizations. This is based on the findings of Zhou et al. (2022) and Shah & Soomro (2023), who demonstrate the negative impact of skill deficiencies on production delays, operational expenses, and innovation potential.

Furthermore, the study recognizes the urgent need to equip the automotive workforce with digital proficiency in order to thrive in a swiftly evolving technology environment. In the face of rapid digital transformation, firms must prioritize investing in staff development to maintain agility and resilience in the face of changing market dynamics.

The study provides valuable insights to industry practitioners and policymakers by highlighting the complex relationship between the advancement of digital methods and the proactive cultivation of skills. Organizations may ensure long-term success and competitiveness in the automotive sector's digital transformation by acknowledging the importance of the human element. They can achieve this by developing strategic initiatives that promote a culture of continuous learning and adaptation in response to the increasingly

digitalized environment. The study offers important insights to industry practitioners and policymakers as they navigate the human aspect of digital transformation in the automotive sector.

1.5.1 Primary Research Question

The Study's aim to answer the primary research question:

How can the automotive industry of India effectively address and bridge the skill gaps required for digital transformation, considering the proactive behavior of employees, and what are the best practices to meet the rising demand for technology talent?

This research question, which uses employee initiative, can propel industry efforts. Because of skill shortages in the Indian automobile industry, Ranjan and Dhir (2023) recommend targeted efforts to match worker competencies with digital demands. According to Vapiwala & Pandita (2023), a proactive workforce that is always learning is essential to keeping up with technological breakthroughs. The research issue is critical to industry relevance and helps identify and implement technology talent development best practices, as demonstrated by Verma & Venkatesan's (2023) insights into Industry 4.0 workforce implications and strategies for organisational effectiveness in the Indian automotive industry. Building a digitally competent workforce to navigate and benefit from India's automotive digital transformation requires, in conclusion, bridging skill shortages and promoting proactive employee behaviour.

1.5.1.2 Sub-Research Question

The study aims to answer the following sub-research questions:

- a) What are the skill deficiencies that exist in relation to the digital transformation in Delhi- NCR, India?

The specifics of skill deficiencies extend beyond mere technical gaps, encompassing a broader spectrum of proactive skill competencies, as emphasised by Verma & Venkatesan (2023). This research question holds paramount importance as it acts as a compass for strategic interventions in talent development, allowing stakeholders to tailor initiatives that address the nuanced digital skill requirements unique to Delhi-NCR's industrial landscape. By unravelling the intricacies of these deficiencies, the research not only informs immediate training needs but also lays the groundwork for sustained regional competitiveness amid the ongoing digital transformation, as indicated by Ostmeier & Strobel (2022).

- b) What is the impact of an employee's proactive personality on the urgency to acquire skills necessary for digital transformation in Delhi-NCR, India?

Past researcher Vapiwala & Pandita's (2023) emphasizes the pivotal role of proactive behavior in adapting to technological changes. This research question extends this perspective to the specific context of Delhi-NCR, shedding light on whether a proactive personality translates to a heightened sense of urgency in acquiring skills tailored to the region's evolving digital landscape. The literature supports the significance of proactive employees as key contributors to organizational innovation and effectiveness (Bateman & Crant, 1993; Parker et al.,

2006). By examining this relationship in the context of Delhi-NCR, the research can inform targeted strategies for cultivating and leveraging proactive personalities in the workforce, enhancing the region's readiness for digital transformation and fostering a culture of continuous learning.

- c) How will the industry's digital strategy maturity manage proactive skill development in Delhi-NCR, India?

Literature by Verma & Venkatesan (2023) underscores the significance of Industry 4.0 strategies in shaping workforce effectiveness in the Indian automotive industry. The extent to which a mature digital strategy encourages and facilitates proactive skill development is a nuanced dimension that demands exploration. Current research suggests that an organization's strategic initiatives significantly influence employee behavior and readiness to acquire new skills (Avramenko, 2019; Colakoglu et al., 2006). By investigating this relationship in the context of Delhi-NCR, the research can unravel the interplay between digital strategy maturity and the proactive skill development of the workforce, informing industry practices and policy decisions crucial for navigating the complexities of digital transformation in the region.

- d. What are the optimal strategies that the industry may implement to effectively manage the increasing demand for technical talent?

In a rapidly evolving technological landscape, addressing the demand for technical talent and proactive skill development is vital for sustaining innovation and competitive advantage (Boudreau & Cascio, 2017; Hecker & Gan, 2017). This research question, therefore, holds paramount importance in guiding industry leaders toward informed and effective strategies that can cultivate and retain the technical talent necessary for navigating the complexities of digital transformation.

This introduction chapter provides an overview of the study's importance, poses the research questions, and describes the goals and parameters. The second chapter explores the theoretical framework and reviews the literature on proactive behavior, digital transformation, and skill development in the automobile industry. This chapter establishes the theoretical framework for the investigation and points out gaps in the literature. In order to explore the relationship between digital strategy maturity and proactive skill development, a mixed-methods approach comprising qualitative interviews and quantitative analysis is used, as described in detail in Chapter 3. The study's conclusions are presented in Chapter 4, with a focus on the main findings and outcomes. This chapter's commentary examines the results in light of accepted ideas and body of literature. The study's conclusions are presented in Chapter 5, with an emphasis on the practical consequences and potential avenues for future research. There are also suggestions made for lawmakers and business professionals. Chapter six concludes with a reflection on the research contributions, outlining the importance of the study's findings and suggesting future directions for

investigation to further our knowledge of the digital transition and skill development in the automotive sector.

Chapter II:

REVIEW OF LITERATURE

2.1 Introduction

The automotive industry is currently undergoing a profound and disruptive digital transformation. This transformation, driven by advancements in technology, changing consumer preferences, and environmental concerns, is reshaping every aspect of the industry, from vehicle design and manufacturing to sales and customer service (Muduli & Choudhury, 2024). As the automotive landscape evolves, so too must the skills and competencies of the workforce. This research is dedicated to the critical examination of skill development within the context of automotive digital transformation, aiming to dissect the challenges, opportunities, and strategies involved in preparing the industry's workforce for a digital future (Chen et al., 2024; Marino-Romero et al., 2024). This literature review embarks on a journey through this fascinating terrain, seeking to unravel the intricate web of skill development within the context of automotive digital transformation (Kraus et al., 2021). As the automotive sector continues its rapid metamorphosis into a technology-driven industry, a critical question arises: How are the skills required to navigate this digital frontier evolving, and what are the implications for individuals, organizations, and the broader industry?

The present study literature review lay the foundation by exploring the various facets of the digital revolution within the automotive industry. The evolving skill sets demanded by the digitalization of the automotive sector (Kraus et al., 2022; Plekhano, Franke, & Netland, 2022). The literature identifies the skills gaps and mechanism to bridge the skills gap created by the digital transformation. The digital transformation brings forth not only opportunities but also challenges for the existing automotive workforce (Mugge et al., 2020; Oliveira, & De Souza, 2022). The present study highlights the strategies employed by companies to adapt their current workforce to the digital era, as well as the hurdles encountered in this process, including resistance to change and potential job displacement.

2.2 Theoretical Background

There are many theoretical stances from which to approach the intricate and multidimensional idea of digital transformation. The following are important definitions and theories of digital transformation.

The automobile industry is undergoing a fundamental shift due to digital transformation, which is redefining the ways in which vehicles are developed, built, sold, and maintained. Rapid technological breakthroughs, shifting customer expectations, and a growing integration of digital solutions into every link in the automotive value chain are the main forces behind this significant change. Technologies like the Internet of Things (IoT), artificial intelligence (AI), big data analytics, and advanced manufacturing tools like robotics and 3D printing are at the core of this revolution. According to Westerman,

Bonnet, and McAfee (2014), these innovations are not only improving operational efficiencies but also making it possible to create new services and business models that meet the changing needs of customers.

The integration of IoT is one of the most important parts of the automotive industry's digital revolution. As a result of IoT, automobiles may now communicate with infrastructure and with one another, paving the way for the creation of linked and autonomous vehicles. Large volumes of data may be gathered and analyzed in real time by these smart cars, giving important information on driving habits, car performance, and maintenance requirements. This feature not only makes driving more enjoyable, but it also makes driving safer and more effective. As per Bharadwaj et al. (2013), vehicles that are networked have the capability to notify drivers of possible hazards, offer real-time traffic information, and facilitate remote diagnostics and predictive maintenance.

Another important factor influencing the digital revolution of the automotive industry is artificial intelligence. Systems driven by AI are being utilized to improve several facets of car manufacture and design. AI systems in design are able to examine enormous volumes of data to spot patterns and preferences, assisting automakers in producing automobiles that better satisfy customer needs. Robots with AI capabilities are automating labor-intensive jobs in manufacturing, increasing accuracy and productivity while cutting expenses. Moreover, AI is essential to the development of autonomous driving technologies, which use sophisticated machine learning algorithms to analyze sensor data and make judgments about driving in real time (Brynjolfsson & McAfee, 2014).

Through the provision of enhanced insights into customer behavior and operational performance to manufacturers, big data analytics is also revolutionizing the automotive sector. Manufacturers may learn more about how their products are being used and how to enhance them by studying data from connected automobiles. Manufacturers may make better decisions with this data-driven strategy, from marketing and product development to after-sales support. According to Chen, Chiang, and Storey (2012), manufacturers can improve customer happiness and loyalty by using predictive analytics to reduce downtime and anticipate maintenance needs.

In the automotive business, advanced manufacturing technologies like robotics and 3D printing are transforming production processes. Rapid prototyping of parts and components is made possible by 3D printing, which drastically cuts the time and expense involved in using traditional manufacturing techniques. Additionally, manufacturers are now able to construct intricate and bespoke parts that would be difficult or impossible to make with traditional methods because to this technology. In contrast, robotics is being utilized to automate dangerous and repetitive operations, increasing productivity and safety on the manufacturing floor. These developments are improving manufacturing processes' flexibility and scalability in addition to optimizing production (Verma & Venkatesan, 2023).

Along with the automotive industry's digital transformation, new revenue streams and business models are also emerging. The transition from product ownership to service-based offers is one example of such a model. Nowadays, a lot of people are more concerned with

having access to transportation than with owning a car. Mobility-as-a-service (MaaS) platforms, which provide on-demand transportation services via digital platforms, are growing as a result of this trend. Businesses that have benefited from this trend include Uber and Lyft, which give customers flexible and easy transportation choices without requiring them to possess a car. According to Fitzgerald et al. (2014), traditional manufacturers are also investigating subscription-based business models that provide customers access to a variety of vehicles for a set monthly charge, hence offering increased convenience and flexibility.

Digital transformation has emerged as a crucial element in the automobile industry, revolutionizing its operations, company structures, and personnel requirements (Kagermann et al., 2013). This transition encompasses various technological progressions, including connected automobiles, self-driving systems, electrification, and mobility solutions. These technological breakthroughs are significantly altering traditional modes of transportation. In addition to these technological advancements, there is a discernible change in the skills required for achieving success in the commercial world. In order to navigate the complexities of the digital age, organizations need to have the ability to continuously learn, be digitally literate, and be agile, according to Tynjälä (2008). Lifelong learning emphasizes the continuous development of knowledge and skills throughout a person's career, ensuring ongoing relevance and adaptability in a rapidly changing world. Digital literacy encompasses the ability to effectively utilize digital technology for the purpose of obtaining, evaluating, and creating information. Proficiency in this skill is crucial for individuals to actively participate in the current employment market (Fraillon et

al., 2019). Adaptability is crucial when navigating technological improvements as it enables individuals to promptly and efficiently adjust to new obligations, tasks, and challenges (Hollenbeck & Beersma, 2012). The principles are grounded in theoretical frameworks such as technological determinism, human capital theory, and social learning theory. Technological determinism highlights the profound influence of digital technology on reshaping industry structures and workforce dynamics (Winner, 1986). Human capital theory (Becker, 1964) emphasizes the need of investing in education, training, and skill development to enhance individual and organizational performance. The social learning paradigm emphasizes the need of peer learning, mentorship, and collaboration in fostering digital literacy and adaptability (Bandura, 1977). Researchers can deepen their comprehension of the complex correlation between digital transformation and skill acquisition in the automotive sector, particularly in the Indian market, by employing these theoretical methodologies. By understanding the complexities of these processes, individuals involved can create strategic plans to address skill gaps, encourage a culture of continuous learning, and foster creativity inside the company.

Additionally, automakers are now able to deliver a variety of connected services that improve driving and create value for customers thanks to digital transformation. These services include over-the-air software upgrades, entertainment choices, remote diagnostics, and real-time navigation help. Automakers may offer individualized experiences to their clients and continuously improve these services by utilizing data from linked automobiles. For instance, Tesla can remotely add new features and address software bugs thanks to over-the-air upgrades, which spare owners from having to visit a service facility. This skill

gives the company a competitive edge in the market in addition to improving the client experience (Lemon & Verhoef, 2016).

But there are difficulties with the car industry's digital revolution. The requirement for a trained workforce capable of creating and implementing cutting-edge digital technology is one of the major obstacles. Traditional skill sets are becoming outdated due to the speed at which technology is changing, and there is an increasing need for individuals with knowledge of fields like artificial intelligence (AI), data analytics, and cybersecurity. Automotive businesses must make investments in training and development initiatives that give their staff members the skills they need to succeed in a digital workplace in order to close the skills gap (Ranjan & Dhir, 2023).

Strong cybersecurity defenses are also necessary to shield connected cars from any attacks. Vehicles are more susceptible to cyberattacks that could jeopardize their performance and safety as a result of their increased connectivity and software dependence. Gaining the trust of customers and guaranteeing the safe operation of connected and autonomous vehicles depend heavily on the security of these systems. In order to effectively address cybersecurity, automakers need to take a proactive stance, integrating it into the design and development process and constantly scanning for any weaknesses (Shah & Soomro, 2023).

As the automotive sector undergoes a digital transition, the regulatory landscape is likewise changing. To meet the benefits and challenges posed by connected and autonomous vehicles, governments everywhere are enacting new laws and norms. These rules, which impose strict restrictions on automakers, encompass topics including cybersecurity, data

privacy, and safety standards. A proactive approach to ensuring compliance and a deep awareness of the legal and compliance issues at hand are essential for navigating this complicated regulatory landscape (Westerman, Bonnet, & McAfee, 2014).

In summary, the automotive industry is undergoing a fundamental revolution due to digital transformation, which is causing notable shifts in the ways that automobiles are designed, built, sold, and serviced. The creation of new business models and services is made possible by the integration of cutting-edge technologies like big data analytics, artificial intelligence, IoT, and sophisticated manufacturing technologies. These technologies also improve operational efficiency. But there are drawbacks to this change as well, such as the requirement for a trained labor force, strong cybersecurity defenses, and adherence to changing legal requirements. Automotive businesses may set themselves up for success in the quickly changing digital market by tackling these issues and seizing the opportunities provided by digital transformation.

As stated in Luhan's (1964) Technological Determinism Theory, "the medium is the message." This idea suggests that technology drives society's development and that the adoption of digital technologies automatically results in revolutionary transformations in societies and organisations (Durham, 2019; Drew, 2016). Although technological determinism acknowledges technology's transforming potential, it often oversimplifies the process by ignoring the impact of social, cultural, and economic elements on the acceptance and use of digital technologies. Additionally, it assumes a one-way causal relationship between technology and society (Appelgren, 2021). It downplays how crucial social mores,

organisational culture, and human decision-making are to the outcome of digital initiatives. It also ignores the potential for resistance, flexibility, and unanticipated results that often accompany the application of technical breakthroughs.

The innovation diffusion theory, which is concerned with the spreading of innovations inside a social system, was developed by Everett Rogers (1992). This idea contends that when people and organisations embrace and adjust to new digital advances, changes take place in the context of digital transformation (Rogers, 1962). While this theory provides valuable insights into the adoption of digital technologies, it may not fully encompass the structural and organisational modifications necessary to fully harness their revolutionary potential (Rogers et al., 2014). More so than the more general effects of digital transformation, it concentrates on the dissemination process. Application of Innovation Diffusion Theory may miss the complex interplay between technology developments and the unique organisational structures and cultures observed in settings going through digital transformation. Moreover, it cannot completely handle the fast rate of change and nonlinear adoption patterns that define digital technology, leading to simplified strategies and forecasts. Everett Rogers (1992) established the innovation diffusion hypothesis, which focuses on how innovations propagate within a social system. This concept argues that when individuals and institutions adopt and adapt to new technological advancements, they undergo a process known as digital transformation (Rogers, 1962). Although this theory offers useful insights into the adoption of digital technologies, it may not completely cover the structural and organizational changes required to properly exploit their revolutionary potential (Rogers et al., 2014). It focuses primarily on the process of spreading information,

rather than the broader impacts of digital transformation. The application of Innovation Diffusion Theory may overlook the intricate interaction between technological advancements and the distinct organizational structures and cultures evident in settings undergoing digital change. In addition, it is unable to fully cope with the rapid pace of change and non-linear patterns of adoption that characterize digital technology, resulting in the need for simplified strategies and projections.

On the other hand, the socio-technical systems theory provides a comprehensive viewpoint on how technology, organizations, and society are interconnected (Trist et al., 1963). This theory asserts that technical breakthroughs cannot be comprehended without considering the social and organizational environments in which they are integrated. It highlights the necessity for a systemic approach to digital transformation by emphasizing the connection of technology systems, social structures, and organizational processes (Aguinis & Lawal, 2013). Organizations may enhance their understanding of the intricate relationships between technology, individuals, and procedures by taking into account the socio-technical aspects of digital transformation. This will enable them to develop more efficient strategies for planning, implementing, and adapting to change (Gallivan et al., 2012).

Moreover, the dynamic capabilities theory provides valuable insights into how businesses can develop and utilize their capacities to adapt to technology advancements and environmental instability (Teece et al., 1997). This idea highlights the significance of flexibility, agility, and learning in empowering firms to innovate and adjust in dynamic situations. Organizations can strategically develop their dynamic skills to effectively

recognize and take advantage of opportunities that arise from digital transformation, while also reducing risks and overcoming problems (Volberda et al., 2010). In addition, the ecosystem view highlights the interdependence of players, technologies, and institutions within digital ecosystems (Moore, 1993). This viewpoint emphasizes the significance of working together, jointly creating, and producing value in order to stimulate innovation and generate value in digital ecosystems (Adner, 2017). Organizations can enhance their understanding of their roles and interactions within digital ecosystems by adopting an ecosystem view. This enables them to find opportunities for collaboration and partnership, which in turn drives innovation and growth (Jacobides et al., 2018).

The resource-based view, put forward by Jay Barney (1991), holds that a company's special resources and abilities provide its competitive edge. It emphasizes the role of digital assets and capabilities as sources of competitive advantage in the framework of digital transformation (Barney, 1991). Although RBV theory emphasises the value of using digital resources, it might not take into account enough the larger ecosystem and the necessity of organisational flexibility in a fast-evolving digital environment (Khanra et al., 2022; Sony and Aithal, 2020). It is primarily concerned with a company's resources and internal operations. Moreover, it can minimise the importance of external factors like changes in laws, changes in the market, and technological setbacks that could significantly affect an organisation's digital transformation process. Besides the resource-based view, the dynamic capabilities viewpoint provides useful insights on how businesses can effectively utilize their resources to adapt and innovate in response to digital transformation (Teece et al., 1997). The theory of dynamic capacities highlights the significance of organizational

adaptability, nimbleness, and knowledge acquisition in facilitating organizations to effectively address shifts in the external surroundings (Eisenhardt & Martin, 2000). Organizations can retain their competitiveness in a rapidly changing digital environment by developing and utilizing dynamic skills. This involves regularly identifying and taking advantage of opportunities, adapting their resources, and enhancing their strategic abilities (Helfat & Peteraf, 2003).

Furthermore, the absorptive capacity framework offers a perspective that allows businesses to comprehend and improve their capacity to absorb, convert, and utilize new knowledge and technologies (Cohen & Levinthal, 1990). The notion of absorptive capacity posits that businesses possessing higher levels of absorptive ability are more adept at recognizing and capitalizing on possibilities that emerge from digital transformation, thus attaining a competitive edge (Zahra & George, 2002). Organizations can improve their ability to adapt to technological change and innovation by investing in the processes of acquiring, assimilating, and using information, which enhances their absorptive capacity (Lane et al., 2006).

In addition, the strategic agility perspective highlights the significance of strategic flexibility, adaptation, and responsiveness in enabling firms to succeed in volatile contexts (Teece, 2007). The notion of strategic agility posits that businesses must consistently monitor their external environment, detect emerging trends and risks, and promptly capitalize on chances to adapt their strategies and resources in a flexible manner (Doz & Kosonen, 2010). Organizations can improve their capacity to adapt to digital disruption,

seize emerging opportunities, and maintain a competitive edge over time by cultivating a culture of strategic agility (Helfat & Raubitschek, 2000).

Developed originally by Eric Trist and Fred Emery (1960), socio-technical systems theory highlights the interaction between social systems and technology. It implies that in digital transformation, effective change needs to match technological advancements with adjustments in human behaviour and work procedures (Trist and Emery, 1960). This paradigm acknowledges the interdependence of social processes and technology, offering a more comprehensive viewpoint. Practically balancing these components, nevertheless, can be difficult and may call for a thorough grasp of both technical and social issues (Lima et al., 2023; Schnasse et al., 2021). It is challenging to sufficiently manage the intricate and fast-shifting interdependencies between social and technical elements, according to the notion. It could not acknowledge how challenging it is to successfully collaborate and generate synergy with digital technologies integrated with existing social institutions. Furthermore, it cannot fully explain the unpredictable socio-technical dynamics that emerge in the digital era, which would hinder the success of programs aimed at optimizing the digital transition. Besides the socio-technical systems theory, the complex adaptive systems (CAS) paradigm provides an additional viewpoint on the dynamics of digital transition (Holland, 1995). The idea of complex adaptive systems highlights the non-linear and emergent behaviors that result from the interactions of individual agents in a system (Holland, 1995). In the realm of digital transformation, the CAS theory proposes that organizations and societies are intricate, adaptable systems distinguished by interconnections, emergence, and self-organization (Bak, 1996). Organizations can gain a

deeper understanding of the consequences of digital projects by examining them as complex adaptive systems. This perspective allows them to analyze the emergent behaviors and self-organizing processes that influence these outcomes (Uhl-Bien et al., 2007).

In addition, the network theory provides valuable understanding of how network architecture and dynamics influence the processes of digital transformation (Barabási, 2016). According to network theory, digital transformation encompasses the process of generating, spreading, and employing knowledge and information through interconnected networks of people, institutions, and technologies (Barabási, 2016). Through the examination of the arrangement and behavior of these networks, companies can pinpoint crucial participants, connections, and information exchanges that impact the effectiveness of digital transformation endeavors (Granovetter, 1973). Network theory emphasizes the significance of network centrality, density, and variety in promoting collaboration, creativity, and knowledge exchange in digital ecosystems (Burt, 2000). Building upon the knowledge derived from network theory, the notion of digital ecosystems presents a beneficial structure for comprehending the interdependent connections among different participants in the digital environment (Iansiti & Levien, 2004). Digital ecosystems consist of an intricate network of participants, such as companies, customers, suppliers, rivals, and other interested parties, that engage and collaborate to generate value using digital platforms and technology (Jacobides et al., 2018). Organizations can gain a deeper understanding of the interdependencies and linkages that influence the success of digital efforts by viewing digital transformation as a phenomenon that operates at the ecosystem level (Adner, 2017).

Moreover, the resource dependence theory elucidates the impact of power dynamics and resource interdependencies on digital transformation processes (Pfeffer & Salancik, 1978). According to resource dependence theory, organizations depend on external resources, such as information, technology, and relationships, in order to accomplish their objectives and ensure their continued existence (Pfeffer & Salancik, 1978). Resource dependence theory emphasizes the significance of strategic partnerships, alliances, and collaborations in obtaining the resources and capabilities required for digital innovation within the framework of digital transformation (Powell, 1990). Organizations can improve their ability to innovate and adapt in the digital age by utilizing external resources and forming strategic partnerships (Gulati, 1995).

In addition, the institutional theory provides understanding of how institutional forces and norms impact the acceptance and execution of digital transformation projects (DiMaggio & Powell, 1983). Institutional theory posits that companies exist within larger institutional settings that are defined by legislative frameworks, industry standards, and cultural norms (Scott, 2001). Within the realm of digital transformation, institutional theory highlights the significance of legitimacy, conformity, and isomorphism in influencing how organizations behave and make decisions (Oliver, 1991). Organizations can improve their credibility and minimize opposition to change by matching their digital strategies with the expectations

and norms of their institution. This will make it easier for them to adopt and implement digital initiatives (Westphal & Zajac, 1998).

Moreover, the institutional theory provides valuable understanding of how institutions, norms, and power structures influence the processes of digital change (Scott, 2001). Institutional theory posits that the process of digital transformation is shaped by wider institutional factors like as legal frameworks, industry standards, and cultural norms (DiMaggio & Powell, 1983). Organizations can effectively anticipate and overcome institutional impediments, make use of institutional support, and integrate their digital strategy with existing norms and expectations by comprehending the institutional context in which digital transformation takes place (Scott, 2001). The concept of organizational culture, drawing on the insights of institutional theory, offers a valuable framework for understanding how internal norms, values, and behaviors shape the processes of digital transformation (Schein, 1985). Organizational culture encompasses the shared values, attitudes, and behaviors that define and guide the identity and actions of an organization (Cameron & Quinn, 2011). The impact of organizational culture on employees' attitudes towards technology adoption, innovation, and change in the context of digital transformation is significant (Cameron & Quinn, 2011). Organizations can enhance digital transformation by fostering a culture that encourages innovation, experimentation, and collaboration (O'Reilly & Tushman, 2008). Conversely, corporate cultures that demonstrate a resistance to change, a propensity to avoid taking risks, and a predisposition to operate in segregated teams could impede the acceptance and implementation of digital projects (Kotter & Schlesinger, 2008).

Furthermore, the concept of strategic alignment offers useful insights into how firms should harmonize their digital initiatives with their overall strategic objectives and priorities (Henderson & Venkatraman, 1993). The strategic alignment thesis argues that organizations need to ensure coherence and consistency between their digital strategy, organizational goals, and resource allocation decisions (Henderson & Venkatraman, 1993). By aligning their digital transformation efforts with strategic targets, organizations can enhance the efficiency of digital projects and enhance their overall performance and competitiveness (Henderson & Venkatraman, 1993). Furthermore, the concept of change management offers useful insights into how firms can effectively traverse the process of digital transformation and effectively overcome resistance to change (Kotter, 1995). The change management paradigm emphasizes the importance of proactive communication, stakeholder participation, and leadership support in effectively conducting digital transformation activities (Kotter, 1995). Organizations can minimize disruptions, garner support, and accelerate the adoption of digital technologies and practices by establishing a well-structured change management strategy (Kotter, 1995).

According to the notion of digital ecosystems theory, which James F. Moore first proposed, digital transformation is the development and administration of interconnected networks of platforms, technologies, and organisations. It highlights how collaboratively digital transformation occurs (Moore, 1996). This paradigm may minimise the structural adjustments and internal organisational issues needed for successful transformation, even

if it acknowledges the significance of ecosystems in digital transformation. It emphasises cooperation and outside alliances (Ghosh et al., 2022; Peng & Tao, 2022). Building on the ideas outlined in digital ecosystems theory, the concept of digital innovation ecosystems offers a more thorough understanding of how innovation occurs across interconnected networks of people, resources, and organizations (Adner, 2017). In order to create and disseminate digital inventions, businesses, startups, governments, research institutions, and other stakeholders work interactively together in digital innovation ecosystems (Adner, 2017). By encouraging collaboration, information sharing, and resource pooling, digital innovation ecosystems make it easier for businesses to acquire the complementary resources, skills, and knowledge needed for innovation (Adner, 2017). In addition, the concept of platform ecosystems offers a more comprehensive comprehension of how digital platforms function as essential infrastructure for arranging communications and exchanges amongst numerous stakeholders (Parker et al., 2016). Through the application of network effects, platform ecosystems allow for the creation of value; as more users and complementors join the ecosystem, the platform's value increases (Parker et al., 2016). By leveraging platform ecosystems, businesses can accelerate innovation, grow their operations, and gain value in the digital economy (Parker et al., 2016).

Furthermore, Yoo et al. (2010) argue that the concept of digital convergence offers important insights into how industry convergence and technological advancements influence digital transformation across a range of sectors and disciplines. The process of

merging and utilizing digital technology to integrate various sectors, services, and technologies is known as "digital convergence" (Yoo et al., 2010). According to Yoo et al. (2010), digital convergence presents an opportunity for businesses to stand out in the market through innovation and the removal of traditional boundaries between industries. Moreover, the concept of digital platforms offers a more profound comprehension of the ways in which platform-based business models are revolutionizing ecosystems and industries (Cusumano et al., 2019). According to Cusumano et al. (2019), digital platforms serve as intermediaries between producers and customers, facilitating transactions and enabling the creation of value through network effects. By using digital platforms, businesses can reach new markets, make money from data and content, and encourage innovation and growth inside their ecosystem (Cusumano et al., 2019).

Dynamic capabilities theory, as put forward by David J. Teece, is concerned with how well an organisation can modify, combine, and reorganise its resources and capabilities in reaction to shifting circumstances. It emphasizes the importance of flexibility and ongoing education in the framework of digital transformation (Teece, 2007). The idea recognises that flexibility is essential in the quickly changing digital environment. It might not, however, offer a whole road map for a digital transformation plan and might need more details for actual execution (Mele et al., 2023; Magistretti & Dell'Era, 2021). Organizational ambidexterity, a concept derived from dynamic capabilities theory, offers a more comprehensive understanding of how firms can effectively balance exploitation and exploration operations to foster innovation and adapt in the digital era (March, 1991). Organizational ambidexterity refers to the capacity of an organization to

simultaneously carry out exploitative operations, which focus on fully utilizing existing resources and capabilities, and exploratory activities, which try to discover new opportunities (March, 1991). Organizations can effectively handle the issues that arise between creativity and efficiency and successfully navigate through changing circumstances by expertly finding a middle ground between exploration and exploitation (O'Reilly & Tushman, 2008). Moreover, by actively seeing, acquiring knowledge, and adjusting, organizations can predict and react to shifts in the surrounding circumstances by employing the concept of strategic agility (Helfat & Peteraf, 2009). Strategic agility emphasizes the importance of flexibility, adaptability, and resilience for organizations to seize opportunities and mitigate risks in unpredictable environments (Helfat & Peteraf, 2009). Organizations can enhance their capacity to innovate, respond to market disruptions, and sustain a competitive edge over time by fostering a culture of strategic agility (Eisenhardt & Martin, 2000). In addition, the concept of absorptive capacity offers useful insights into how organizations might acquire, assimilate, and leverage external knowledge and technology to foster innovation and adaptability (Cohen & Levinthal, 1990). Absorptive capacity refers to an organization's ability to recognize the value of external knowledge, integrate it into its existing routines and practices, and utilize it to create new products, services, or procedures (Cohen & Levinthal, 1990). Organizations can enhance their competitive advantage and drive digital transformation by leveraging external sources of innovation to improve their absorptive capacity (Zahra & George, 2002). Ultimately, firms can enhance their approach to digital transformation by leveraging insights from organizational ambidexterity, strategic agility, and absorptive capacity. Organizations can

thrive in the digital era by embracing strategic agility, fostering a culture of exploration and exploitation, and enhancing their absorptive capacity.

Developed in the early 1980s by Richard M. McFall & Leonard D. Millon, the CAPS (cognitive-affective personality system) model suggests that personality may be viewed as a dynamic framework made up of interrelated cognitive processes and emotional experiences (Heslin et al., 2019). Particular circumstances activate these aspects, leading to the emergence of enduring patterns unique to each individual. The main mediators of the personality structure are the cognitive-affective units (Ostmeier & Strobel, 2022). Expanding upon the knowledge provided by the CAPS model, personality traits offer a deeper understanding of how individual differences in emotion and cognition manifest themselves in behavior and decision-making (McCrae & Costa, 1999). Personality features are recurring thought, feeling, and behavior patterns that characterize individuals in a range of contexts, claim McCrae and Costa (1999). More information is available to researchers on the effects of the Big Five personality traits—extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience—on how individuals see, perceive, and respond to their environment (John & Srivastava, 1999). Moreover, Higgins (1997) contends that the concept of regulatory focus sheds light on the ways in which personal differences in goal pursuit and motivation affect cognitive and emotional functions. Regulatory focus theory holds that people have distinct orientations toward promotion goals, which are centered on achieving benefits and ambitions, and prevention goals, which are centered on preventing losses and maintaining security (Higgins, 1997). Given a person's regulatory emphasis, researchers can predict their

preferences, decision-making processes, and responses to rewards and feedback (Higgins, 1997). Furthermore, the concept of self-efficacy offers insightful viewpoints on the ways in which individuals' beliefs about their ability to succeed affect their cognitive and emotional functioning (Bandura, 1977). Self-efficacy theory holds that high self-efficacy individuals are more likely to set challenging goals, work hard, and persevere in the face of adversity—all of which enhance performance and outcomes (Bandura, 1977). Through physiological conditions, social persuasion, mastery experiences, and vicarious experiences, people can raise their sense of self-efficacy and hence enhance their cognitive and affective performance (Bandura, 1977). To sum up, by combining concepts from the theories of self-efficacy, regulatory attention, and personality traits, researchers can develop a more comprehensive knowledge of the cognitive-affective processes driving personality dynamics. Researchers can learn how individual variances in cognition, emotion, motivation, and self-beliefs interact and affect behavior by examining the complex relationships between personality and behavior in many circumstances and settings.

These cognitive structures include a number of components, such as beliefs, expectancies, self-representations, and affective states. Moreover, these components include plans, strategies, competencies, and self-regulatory norms. The individual's biological and social learning histories can influence the cognitive-affective units (CAUs) and their intra-individual organisation within the Cognitive-Affective Personality System (CAPS) (Yuan et al., 2019). Recent research in the fields of management and organisational behaviour has demonstrated the application of the CAPS theory. Past researcher has revealed the

relationship between CAPS theory and a number of behavioural outcomes, such as leadership, job performance, and withdrawal behaviours (Zimmerman et al. 2016; Yagil & Oren, 2021; Frieder et al., 2018). The study proposed the theoretical framework that uses the Cognitive Affective Personality System (CAPS) hypothesis to investigate work patterns (Heslin et al. 2019). This idea postulates that the activation of cognitive and affective processes affects the development of career-enabling behaviours, such as skill acquisition. The researcher believe that situational clues and unique personality traits interact to trigger this activation. The Cognitive-Affective Personality System (CAPS) hypothesis proposes that perceivers' interpretations of circumstances, or Cognitive-Affective Units (CAUs), determine human behavior, rather than the objective nature of the circumstances themselves. This suggests that situational signals may indirectly influence behavior, (Heslin et al., 2019) support the previously stated point of view with their own research projects. Figure 1 illustrates our research model, which aligns with the general CAPS paradigm. It suggests that the maturity of a sector's digital strategy acts as a contextual signal, eliciting individual perceptions of digitalization, known as CAUs. Then, as mediators, these interpretations affect the phenomenon of proactive skill development (PSD). An earlier study by Marks et al. (2021) explains that the concept of industry digital maturity pertains to the extent to which the industry has implemented a specific level of digital strategy. This means putting new techniques, tools, or procedures into use that follow the development of technology (Rammer et al., 2017). The idea implies that the intensity of cognitive activation units (CAUs) among employees, particularly in relation to digital transformation, increases in tandem with the degree of digital strategy maturity in

an industry. Their astute observation and comprehension of the actions taken by their own company and other industry players in response to the digitization process, as reported through internal and external media channels, account for the higher degree of activation. This study posits that the maturity of digital strategy within an industry positively influences employees' perceptions of complexity, familiarity, feasibility, and urgency in the context of digitalization. Furthermore, there are interacting influences between situational cues and individual personality features on cognitive appraisals of uncertainty (CAUs) and, consequently, behavioral responses (Ostmeier & Strobel, 2022; Heslin et al., 2019). Therefore, the primary objective of this study is to investigate the potential moderating influence of proactive personality (Abid et al., 2021) on the association between industry digital strategy maturity and individual cognition, as seen in Figure 1.

The study proposes the past researcher's assumptions in the upcoming sections about the relationships between situational cues, individuals' perceptions of these cues, and their subsequent behavior based on the CAPS theory. The CAPS theory guides this choice, asserting that cognitive attributions represent the first and most immediate reaction to situational inputs. However, it is possible that these CAUs may have a role in the generation of proactive skill development (PSD), as shown by previous research (Heslin et al., 2019; Minbashian & Luppino, 2014).

2.3 Review on Digital Transformation

The constant quest for new and renewing value from digital investments is known as digital transformation (Vial 2021). According to Solis (2019), digital transformation is "the realignment of, or new investment in, technology, business models, and processes to drive new value for customers and employees and more effectively compete in an ever-changing digital economy." The prominence of digital transformation (DT) is due to its profound impact on business strategies and operations. Researchers and practitioners alike are drawn to DT's relevance in navigating technological advancements, enhancing competitiveness, and achieving innovation in the digital age. Thus, the concept of digital transformation (DT) has gained significant attention in the field of strategic information system (IS) research (Vial, 2021; Piccinini et al., 2015a), as well as among practitioners (Oliveira & Souza, 2022; Verhoef et al., 2021). At a macro level, the concept of digital transformation incorporates the significant transformations occurring in both society and many industries as a result of the adoption and utilization of digital technology (Vial, 2023; Majchrzak et al., 2016). Therefore, the notion of digital transformation is not limited to a specific business or area. The phenomenon under consideration is of a macroscopic nature, encompassing a range of sociological, economic, cultural, technical, and environmental changes. This phenomenon has an impact on nearly every facet of contemporary society and commerce, making it a matter of significant significance for scholars, professionals, and decision-makers alike. Because digital transformation provides a wide range of advantages such as enhanced competitiveness, operational efficacy, adaptability, and client involvement (Chin et al., 2022; Leao & Silva, 2021). In the contemporary digital era, the

imperative for companies to embrace innovation extends beyond just a discretionary decision but rather assumes the status of a strategic imperative (Verhoef et al., 2021). This is due to the fact that innovation plays a pivotal role in enabling organizations to not only survive but also flourish amidst the dynamic and interconnected nature of the modern corporate environment. So, the researchers have said that at the organisational level, businesses need to look for ways to be innovative by using these technologies. They say that this can be done by coming up with strategies that take into account the effects of digital transformation and help improve operational performance (Tabrizi et al., 2019). The notion of digital transformation encompasses more than just the adoption of digital record-keeping systems and the streamlining of physical activities. The article by Castro et al. (2020) discusses the incorporation of third-party platform technologies in order to support the creation of new services, reevaluate business models, and encourage innovative interactions with users.

The process of integrating digital technology into all facets of business, or "digital transformation," is extensive and multidimensional, radically altering how organizations function and provide value to their clients. This shift involves rethinking and redesigning business models, strategies, and operations to take advantage of the opportunities provided by the digital age, rather than merely automating activities or updating technology (Westerman, Bonnet, & McAfee, 2014). This analysis examines the many facets of digital transformation, including its causes, obstacles, and effects on industries and enterprises.

As businesses strive to adapt to the constantly evolving digital landscape, digital transformation has emerged as a central concept in contemporary organizational discourse. This review of the literature delves into the various facets of the digital transition, integrating concepts from an abundance of scholarly and applied research to provide a comprehensive understanding of this phenomenon.

The factors and motivations driving firms to implement digital technology are essential to the digital transformation process. According to Westerman et al. (2014), organizations that initiate digital transformation projects are mostly motivated by external factors such as evolving client demands, technological advancements, and competitive obstacles. Concurrently, internal motivations including the desire for increased operational effectiveness, better customer experiences, and innovation are pushing businesses toward digital transformation (Bughin et al., 2018).

However, there are still a lot of challenges and barriers in the path of digital transformation. Scholars have thoroughly examined these challenges, which range from issues with integrating outdated systems and cultural opposition to shortages of skills and technological complexity (Kane et al., 2015). For instance, Ross et al. (2019) emphasize the significance of cultural alignment and adept change management strategies, as well as the crucial role that corporate culture plays in influencing the success or failure of digital transformation programs.

Businesses are actively searching for strategies and tactics to successfully navigate today's digital landscape despite the challenges. One popular strategy that facilitates resource leveraging, partner collaboration, and value co-creation is the use of digital platforms and ecosystems (Parker et al., 2016). Furthermore, Yoo et al. (2010) define digital convergence as the integration and interoperability of several industries and technologies, which is a critical enabler of digital transformation.

The impacts of digital transformation on organizational structure, processes, and competencies must be discussed. In order for organizations to thrive in the digital age, Teece (2007) highlights the necessity of dynamic capabilities, which include the capacity to combine, reorganize, and alter resources and capabilities in response to changing circumstances. In light of the rapid pace of digital change, scholars also stress the significance of agility, adaptability, and resilience for sustaining competitiveness and fostering innovation (Helfat & Peteraf, 2009).

Strategic leadership and management are key components of successful digital initiatives within businesses. According to Brynjolfsson & McAfee (2014), a clear digital strategy, senior management support, and visionary leadership are necessary for success in digital transformation. According to O'Reilly and Tushman (2008), encouraging a culture of learning, experimentation, and taking risks is also necessary to foster innovation and agility in the digital age.

Thus, the literature on digital transformation offers invaluable insights into the complex relationships between the goals, challenges, strategies, and outcomes of an organization's

adoption of digital technologies. By fusing a range of theoretical frameworks, empirical data, and useful insights, scholars have improved our understanding of how organizations may navigate the difficulties of digital transformation and employ digital technology to foster innovation, growth, and competitive advantage.

There are many different types of drivers behind the digital transformation. The rapid evolution of technology is a crucial factor. Businesses now have more opportunities to improve productivity, obtain new insights, and develop fresh value propositions thanks to advancements in cloud computing, big data analytics, artificial intelligence (AI), the Internet of Things (IoT), and blockchain (Bharadwaj et al., 2013). For example, cloud computing allows businesses to grow their IT resources as needed, which lowers costs and increases agility. Making better decisions is made possible by big data analytics, which offers deep insights into customer behavior and operational performance. IoT connects devices and systems to enable real-time data collection and analysis, while AI and machine learning automate complicated activities and enhance decision-making processes.

Consumer expectations are a big additional motivator. Customers of today expect instantaneous, personalized, and seamless experiences at every touchpoint. They anticipate that companies will be aware of their preferences and wants and would offer prompt, pertinent solutions. Businesses must embrace digital technologies to keep up with customer expectations and remain competitive in light of this shift in consumer behavior. Businesses like as Amazon and Netflix, for instance, leverage AI and data analytics to provide tailored

suggestions, resulting in an enhanced consumer experience that fosters growth and loyalty (Brynjolfsson & McAfee, 2014).

One other important aspect pushing digital transformation is the competitive landscape. Businesses who don't use digital technology run the danger of slipping behind as more and more do. Uber, Airbnb, and Spotify are examples of digital-native businesses that have upended traditional sectors by using digital platforms to provide cutting-edge services that go against conventional business patterns. According to Fitzgerald et al. (2014), in order for conventional businesses to stay competitive, they need to implement digital transformation strategies that boost consumer engagement, reinvent their services, and increase efficiency.

Digital transformation brings with it a number of difficulties despite its many advantages. The necessary organizational culture change is one of the main obstacles. Businesses must adopt a new mindset as a result of the digital transition, one that embraces experimentation, risk-taking, and failure as a teaching tool. It can be challenging to implement this cultural change, particularly in well-established businesses with ingrained customs and procedures (Westerman, Bonnet, & McAfee, 2014). By encouraging an environment that values innovation and constant improvement, leaders are essential in bringing about this change.

A notable additional obstacle is the disparity in talents. Given the speed at which technology is developing, a large number of employees can lack the skills needed to use new digital tools and technologies. The acceptance and execution of digital projects may be hampered by this disparity. Companies must make investments in training and

development initiatives that give their employees the necessary digital skills in order to handle this problem. By giving access to the most recent information and resources, partnerships with educational institutions and technological companies can also aid in closing this gap (Ranjan & Dhir, 2023).

Cybersecurity and data privacy are two more important issues in the process of digital transformation. Businesses are more vulnerable to cyberattacks as a result of the massive volumes of data they gather and keep. Preserving customer confidence and adhering to regulations requires protecting the security and privacy of data. To safeguard their digital assets, businesses need to put strong data governance and cybersecurity procedures in place (Shah & Soomro, 2023). This entails establishing a security-aware culture among staff members in addition to making investments in cutting-edge security solutions.

The digital transformation has a significant and wide-ranging effect. It is changing business models and reshaping sectors. Digital transformation is facilitating omnichannel experiences in the retail industry, for instance, by allowing customers to move between online and offline channels with ease. Retailers are leveraging data analytics to improve customer experience overall, personalize marketing strategies, and optimize inventory management (Chen, Chiang, & Storey, 2012). Digital transformation in the manufacturing sector is pushing the use of IoT and AI-based smart manufacturing technologies to increase productivity, decrease downtime, and improve product quality.

Digital transformation is making it possible for new financial products and services to be developed in the financial services sector. Fintech enterprises are utilising blockchain

technology, artificial intelligence, and data analytics to provide inventive solutions like cryptocurrency trading, peer-to-peer lending, and robo-advisory services. These developments are upending established banking practices and opening up fresh avenues for expansion (Bharadwaj et al., 2013). To compete with fintech firms that are agile and to fulfill the changing needs of their clientele, banks and other financial institutions need to adopt digital transformation.

The digital transformation is causing huge changes in the healthcare sector as well. The way healthcare is provided is being revolutionized by technologies like wearables, AI, and telemedicine. Platforms for telemedicine allow for distant consultations, increasing patient access to healthcare, particularly for those living in rural areas. Real-time health data collected by wearable technology can be utilized for individualized treatment programs and preventive care. Medical data analysis is being done with AI to help with diagnosis and therapy planning. In the healthcare industry, these developments are leading to better patient outcomes and operational efficiencies (Verma & Venkatesan, 2023).

Sustainability activities across industries are being propelled by digital transformation as well. Digital technologies are being used by businesses to maximize resource utilization, cut waste, and boost energy efficiency. IoT-enabled sensors, for instance, may control and monitor energy use in real-time, lowering energy expenses and their negative effects on the environment. Businesses can use data analytics to find supply chain inefficiencies and make well-informed decisions to reduce waste. These programs improve operational

effectiveness and reduce costs in addition to supporting sustainability objectives (Lemon & Verhoef, 2016).

To sum up, digital transformation is an essential requirement for companies in every sector. It entails incorporating digital technologies into every facet of corporate operations, which creates new business opportunities, increased customer satisfaction, and increased efficiencies. The challenges of competition, shifting customer expectations, and technology breakthroughs are the main forces behind the digital revolution. But there are many obstacles along the way, such as changing cultural norms, a lack of skills, and cybersecurity issues. Notwithstanding these difficulties, digital transformation has a revolutionary effect that is changing business models and industries. Businesses who can effectively traverse this shift will be in a strong position to prosper in the digital era (Westerman, Bonnet, & McAfee, 2014).

The current corpus of scholarly works frequently employs the notion of digital transformation (DT) and its associated vocabulary interchangeably, resulting in inadequate differentiation. Indeed, there exists a significant degree of interconnection between the concepts of digitization, digitalization, and digital transformation (DT) (Verina & Titko, 2019). However, it is crucial to uphold conceptual distinctions among these terms. The integration of digital technologies is linked to these three principles. The potential ramifications of digitization can contribute to the processes of digitalization and digital transformation. However, DT and digitalization are interconnected, but not synonymous terms. Alternatively, both can emerge as results or ramifications of the move to a digital

milieu. Multiple scholarly sources (Gong & Ribiere, 2021) concur on the notion that the concept of digital transformation (DT) surpasses the mere act of digitalization.

Initially, there was a significant emphasis on utilizing digital technologies. Subsequently, it became increasingly evident to organisations and researchers that digital transformation (DT) encompassed more than a mere technological transition (Gong and Ribiere, 2021). It became apparent that DT necessitates not only the adoption of technology but also the synchronisation of strategic objectives and various other elements, including individuals, organisational culture, mindset, talent cultivation, and leadership (Schiuma et al., 2022; Goran et al., 2017). Certain definitions focus on the effects of digital transformation, specifically the enhancement of operational efficiency. To provide a brief enumeration: Researchers have found that the use of digital technology (DT) improves the decision-making process (Ahmed et al., 2021; Heilig et al., 2017) and fosters the creation of a competitive advantage (Nadkarni & Prügl, 2021). In certain formulations, authors incorporate the concept of customer value creation, encompassing the optimisation of customer demands and experiences (Rogers, 2016), although alternative definitions may omit this aspect. Numerous extant studies perceive the concept of digital transformation (DT) as including distinct phenomena. For example, several scholars perceive digital transformation (DT) as a moderate alteration facilitated by technology, such as the adoption of a new enterprise resource planning (ERP) system (Chanias, 2017). Conversely, other researchers argue that DT is a more profound and progressive phenomenon that unfolds gradually (Zhu et al., 2021). Several researchers have examined the relationship between digital transformation (DT) and business models (Favoretto et al., 2022; Vaska et al., 2021)

as well as strategy (Westerman, 2018). On the other hand, some scholars consider DT a paradigm or a process (Wang and Wang, 2020). According to the Organisation for Economic Cooperation and Development (OECD, 2018), several scholars perceive digital transformation (DT) as encompassing the economic and societal consequences of digitization and digitalization.

2.3.1. Digital Transformation in Automotive Sector

The automotive industry has been remarkably good at adopting new technology, mostly because of the intricate details of its own operations. This intricacy extends throughout the development of goods, the administration of services, and the completion of projects. Technical advancements have therefore greatly helped to lower communication barriers in several industry areas (Zhang et al., 2023; Llopis et al., 2021). But more aspects of digital transformation have been included that were hitherto exclusive to traditional business models (Ziyadin et al., 2020). Carpejani et al. (2020, pp. 98) and Siemieniuch et al. (2015, pp. 106) predict that the process of digital transformation provides major benefits for the economy of countries who strategically plan for its execution.

The automobile industry has undergone a substantial transition in response to the demand for improved operating efficiencies, changing consumer expectations, and developments in digital technologies. This shift is known as digital transformation. This shift takes into account a number of factors, such as supply chain management, product innovation, manufacturing procedures, and consumer interaction. The research on this subject

identifies a number of important impact areas, difficulties, and tactical solutions that automakers are implementing to deal with this digital environment.

Integrating the Internet of Things (IoT) is one of the core elements of the automotive industry's digital revolution. As a result of IoT, automobiles may now communicate with infrastructure and with one another, paving the way for the creation of linked and autonomous vehicles. Large volumes of data may be gathered and analyzed in real time by these cars, giving important insights into driving habits, car performance, and maintenance requirements. This feature not only makes driving more enjoyable, but it also makes driving safer and more effective. In addition to providing real-time traffic updates, connected cars can warn drivers of potential hazards and allow remote diagnostics and predictive maintenance, which can greatly reduce downtime and extend the life of the vehicle (Bharadwaj et al., 2013; Wang & Heffernan, 2021).

From design and manufacture to sales and after-sales services, the automotive industry's value chain is being transformed by digital transformation. Digital transformation in this sector mostly consists of integrating state-of-the-art technologies like as artificial intelligence (AI), big data analytics, and the Internet of Things (IoT) into various activities. Because they allow remote diagnostics, predictive maintenance, and real-time vehicle performance monitoring, IoT-enabled sensors and devices, for instance, are revolutionizing vehicle communication (Lu, 2020). The application of AI-driven algorithms in predictive analytics has allowed automakers to now predict customer preferences, enhance production schedules, and personalize marketing efforts (Kagermann et al., 2017). Moreover, by

obtaining practical insights from enormous volumes of data generated throughout the value chain, big data analytics are helping automakers make better decisions and operate their operations more effectively (Wu et al., 2016).

Moreover, the digital revolution is driving creativity in the creation of connected and autonomous cars. Automakers are investing heavily in the research and development of autonomous driving technologies in an attempt to increase the efficiency, convenience, and safety of their vehicles (Bosch, 201). Together, cameras, LiDAR, sensors, and AI algorithms are enabling completely autonomous vehicles that can negotiate challenging road conditions with minimal human intervention (Fagnant & Kockelman, 2015). In addition, the broad use of connected vehicle technology makes new revenue streams and business models like mobility-as-a-service (MaaS) and subscription-based automobile usage feasible (Accenture, 2020).

Apart from product innovation, digital revolution is also transforming the automobile buying experience. The rise of online car buying platforms, virtual showrooms, and digital sales channels is altering the way individuals research, purchase, and interact with cars (Deloitte, 201). Digital technologies like virtual reality (VR) and augmented reality (AR) allow customers to build immersive and engaging experiences in real time (McKinsey, 2020). Additionally, the digitalization of after-sales services is improving customer happiness and vehicle reliability by enabling over-the-air software upgrades, remote diagnostics, and predictive maintenance (Gartner, 2019).

All things considered, the digital transformation that is promoting creativity, efficiency, and customer-centricity along the whole value chain is changing the automotive sector. Automotive companies may use digital technologies and flexible, teamwork strategies to stay competitive in the fast evolving digital economy. They can also take use of future opportunities and negotiate changes in the market.

Other important forces behind the digital revolution of the automobile sector are machine learning and artificial intelligence (AI). AI-driven systems improve several facets of car manufacture, design, and operation. In the design process, AI systems sift through enormous volumes of data to find patterns and consumer preferences, assisting automakers in producing automobiles that better satisfy their needs. AI-driven robots automate difficult jobs in manufacturing, increasing accuracy and productivity while cutting expenses. AI is also essential to the development of autonomous driving technologies, which rely on sophisticated machine learning algorithms to decipher sensor data and make decisions about driving in real time (Brynjolfsson & McAfee, 2014; Baur et al., 2020). AI is also being used in customer service, where chatbots and virtual assistants are enhancing client communications and offering seamless assistance.

Big data analytics is also essential to the car industry's digital revolution. Manufacturers are able to obtain more profound insights into consumer behavior and operational performance by examining data from connected automobiles and other sources. Manufacturers may make better decisions with this data-driven strategy, from marketing and product development to after-sales support. Manufacturers can better anticipate

maintenance requirements and minimize downtime with the aid of predictive analytics, which increases customer happiness and loyalty. Additionally, real-time visibility into inventory levels, demand projections, and supplier performance is made possible by big data analytics, which aids in the optimization of supply chain management and lowers costs and increases efficiency (Chen, Chiang, & Storey, 2012; Mithas, Lee, Earley, Murugesan, & Djavanshir, 2013).

In the automotive business, advanced manufacturing technologies like robotics and 3D printing are transforming production processes. Rapid prototyping of parts and components is made possible by 3D printing, which drastically cuts the time and expense involved in using traditional manufacturing techniques. Additionally, manufacturers are now able to construct intricate and bespoke parts that would be difficult or impossible to make with traditional methods because to this technology. On the other hand, robotics increases productivity and safety on the production floor by automating dangerous and repetitive activities. These developments allow for more flexibility and scalability in manufacturing operations in addition to streamlining production (Bharadwaj et al., 2013; Waller & Fawcett, 2013).

In the automotive industry, digital transformation is also causing new business models to develop. The transition from product ownership to service-based offers is one important trend. Nowadays, a lot of consumers would rather have access to mobility than own a car, which is fueling the expansion of mobility-as-a-service (MaaS) platforms, which provide

on-demand transportation services via digital channels. Businesses that have benefited from this trend include Uber and Lyft, which give customers flexible and easy transportation choices without requiring them to possess a car. Conventional manufacturers are also investigating subscription-based business models that provide customers more freedom and convenience by letting them use a variety of vehicles for a set monthly charge (Fitzgerald et al., 2014; Lee, Lee, & Garrett, 2013).

Additionally, automakers are now able to deliver a variety of connected services that improve driving and create value for customers thanks to digital transformation. These services include over-the-air software upgrades, entertainment choices, remote diagnostics, and real-time navigation help. Automakers may offer individualized experiences to their clients and continuously improve these services by utilizing data from linked automobiles. As an illustration, Tesla's over-the-air updates give the business the ability to remotely address software bugs and add new features, improving customer satisfaction and giving it a competitive edge (Lemon & Verhoef, 2016; McKinsey & Company, 2020).

The road to digital transformation is not without difficulties, though. The requirement for a trained workforce capable of creating and implementing cutting-edge digital technology is one of the major obstacles. Traditional skill sets are becoming outdated due to the speed at which technology is changing, which is driving up demand for people with knowledge of fields like artificial intelligence, data analytics, and cybersecurity. Automobile manufacturers must fund training and development initiatives that give staff members the know-how to succeed in a digital workplace in order to close the skills gap. By giving

access to the most recent information and resources, partnerships between educational institutions and technology companies can also aid in closing this gap (Ranjan & Dhir, 2023; Shah & Soomro, 2023).

Cybersecurity and data privacy are two more important issues with the digital transformation of the automotive industry. Vehicles are more susceptible to cyberattacks that could jeopardize their performance and safety as a result of their increased connectivity and software dependence. Gaining the trust of customers and guaranteeing the safe operation of connected and autonomous vehicles depend heavily on the security of these systems. In order to effectively address cybersecurity, automakers need to integrate it into their design and development process and keep an eye out for any potential weaknesses at all times (Verma & Venkatesan, 2023; Westerman, Bonnet, & McAfee, 2014).

The automotive industry's digital transition is causing the regulatory environment to change. To meet the benefits and challenges posed by connected and autonomous vehicles, governments everywhere are enacting new laws and norms. These rules impose strict restrictions on automobiles and encompass topics including cybersecurity, data privacy, and safety standards. A proactive approach to ensuring compliance and a thorough awareness of the legal and compliance issues at hand are essential for navigating this complicated regulatory framework (Westerman, Bonnet, & McAfee, 2014; McKinsey & Company, 2020).

In summary, the automotive industry is undergoing a fundamental transition due to digital transformation, resulting in notable shifts in the design, manufacturing, marketing, and

servicing of automobiles. The creation of new business models and services is made possible by the integration of cutting-edge technologies like big data analytics, artificial intelligence, IoT, and sophisticated manufacturing technologies. These technologies also improve operational efficiency. But there are drawbacks to this change as well, such as the requirement for a trained labor force, strong cybersecurity defenses, and adherence to changing legal requirements. Automotive firms can position themselves for success in the fast changing digital landscape by tackling these issues and seizing the opportunities brought about by digital transformation (Westerman, Bonnet, & McAfee, 2014).

Since 2011, the US government has undertaken a sequence of deliberations, measures, and suggestions at various levels known as the "Advanced Manufacturing Partnership AMP." The objective of this initiative is to ensure that the United States is adequately equipped to assume a leading role in the forthcoming technological revolution in the field of industrialization (Rafael et al., 2020). In 2012, the German government implemented the "High-Tech Strategy 2020" initiative, which involved the allocation of significant annual funding to support the development and progress of state-of-the-art technology. "Industries 4.0" is one of the ten future projects that make up this plan and represents the German ambitions for their manufacturing sector (Szalavetz, 2020). In 2013, the French government undertook a strategy review known as "La Nouvelle France Industrielle." This programme identified 34 sectoral goals for French industrial policy (Conseil National de l'Industrie, 2013). During the initial six-month period of 2017, the Ministry of Industry, Foreign Trade, and Services (MDIC) in Brazil established a working group, commonly referred to as a "task force," with the objective of formulating a

comprehensive strategy for the adoption and implementation of Industry 4.0 inside the nation. Several firms operating in the automobile industry have undertaken several innovation projects, often at the experimental and proof-of-concept (PoC) stages. This approach facilitates the rapid dissemination of concepts within the organization. The interplay between information technology (IT) and automation technology (AT), although characterised by inherent tensions, plays a crucial role in the effective implementation of projects (Carpejani et al., 2020).

2.3.2. Digital Transformation and Proactive Skills Development

The annual growth is expected to increase significantly and digital transformation is expected to be adopted quickly, claim Ebert and Duarte (2018). But a number of barriers prevent its broad use, such as inadequate or unduly varied organisational structures or cultures, the lack of thorough digital transformation plans, poor return on investment (ROI) visibility, and even worries about the possible cannibalization of established companies, sometimes known as the "innovator's dilemma" (Giacosa et al., 2022; pp.122). Further barriers to digital transformation include a lack of recognition of the benefits it can bring to society, a shortage of trained and qualified personnel, insufficient infrastructure, insufficient regulation and consumer protection measures, and restricted access to finance, especially for small and medium-sized businesses. Unfortunately, technological developments have outpaced the manufacturing sector. Feijao et al. (2021) have proved the existence of the "skills gap". According to one viewpoint, the older generation of workers

is positioned as digital immigrants since they struggle to keep up with the quick speed of technology developments and adjust to the digital environment (Nadkarni & Prugl 2021).

Annual growth is expected to increase significantly, and digital transformation is expected to be adopted quickly, claim Ebert and Duarte (2018). However, a number of barriers prevent its widespread use, such as inadequate or unduly varied organizational structures or cultures, a lack of thorough digital transformation plans, poor return on investment (ROI) visibility, and even concerns about the possible cannibalization of established companies, sometimes referred to as the "innovator's dilemma" (Giacosa et al., 2022; pp. 122). Other barriers to digital transformation include a lack of recognition of the benefits it can bring to society, a shortage of trained and qualified personnel, insufficient infrastructure, insufficient regulation and consumer protection measures, and restricted access to finance, especially for small and medium-sized businesses. Unfortunately, technological developments have outpaced the manufacturing sector. Feijao et al. (2021) have proved the existence of the "skills gap." According to one viewpoint, the older generation of workers is positioned as digital immigrants since they struggle to keep up with the quick speed of technological developments and adjust to the digital environment (Nadkarni & Prugl 2021).

Global industry revolution brought about by digital transformation is causing profound shifts in the way firms function, compete, and generate value. The incorporation of digital technologies into all facets of business, including supply chain management and consumer relations, is the fundamental element driving this shift. But in order to take full advantage

of the opportunities that come with digital transformation, organizations also need to concentrate on helping their people build proactive skills. This analysis examines the connection between proactive skills development and digital transformation, emphasizing important trends, obstacles, and successful initiatives.

The quickening pace of technological development is one of the main forces behind the digital revolution. Businesses now have more options to innovate their products and services, increase productivity, and make better decisions because to advancements in fields like artificial intelligence (AI), machine learning, the Internet of Things (IoT), and big data analytics (Brynjolfsson & McAfee, 2014). But in order to fully benefit from new technologies, businesses require staff members who are not just technically proficient but also proactive in their capacity to innovate and adjust to ever-changing circumstances.

Employees must actively upgrade their talents if they are to succeed in the digital age. These qualities include critical thinking, problem-solving, creativity, teamwork, and flexibility, and they extend beyond technical proficiency. Proactive workers are better able to find chances for improvement, handle complicated and uncertain circumstances, and foster innovation inside their companies (Verma & Venkatesan, 2023). Proactive workers are also more inclined to welcome change, exercise initiative, and persistently look for new learning opportunities, which makes them priceless resources in the fast-paced business environment of today.

Proactive skill development faces both benefits and challenges from the digital transition. Digital technologies facilitate the provision of a plethora of learning tools to employees, such as online courses, tutorials, and virtual training programs. These materials enable staff members, irrespective of their location or schedule, to learn new skills and information at their own pace. Digital platforms also let employees collaborate and share knowledge, which lets them benefit from one another's knowledge and experience (Chen, Chiang, & Storey, 2012).

However, digital transformation also necessitates that businesses reconsider how they handle talent development. With the speed of change accelerating in the digital age, traditional training approaches might not be adequate anymore. In order to acquire skills, organizations need to take a more adaptable and agile approach that prioritizes ongoing education, trial and error, and adaptability. To do this, an environment that values education and empowers staff members to take charge of their own growth must be established (Fitzgerald et al., 2014). Additionally, companies need to spend money on technology that allow for adaptive and personalized learning experiences that are catered to each employee's unique requirements and preferences.

Opposition to change is one of the obstacles organizations must overcome in order to promote proactive skill development. A lot of workers could be reluctant to adopt new tools or methods of operation out of concern that automation will replace them or make them obsolete. Effective change management techniques that highlight the advantages of digital transformation and offer assistance and resources to aid in employee adaptation are

needed to overcome this reluctance (Ranjan & Dhir, 2023). Organizations also need to foster a psychologically safe atmosphere where workers are at ease taking chances, trying out novel concepts, and failing forward.

The requirement for strong leadership to promote proactive skill development is another difficulty. By modeling the behaviors they desire to see in their staff, leaders have a crucial role in establishing the tone for learning and growth inside their businesses. A clear vision for the digital transition must be communicated, and they must actively support programs that advance skill development. To guarantee they have the information and abilities necessary to lead successfully in the digital era, leaders also need to make an investment in their personal development (Shah & Soomro, 2023).

Organizations that place a high priority on proactive skill development are better positioned to flourish in the digital age, despite these obstacles. Organizations can cultivate an innovative and agile culture that empowers employees to learn and adapt on-the-job, allowing them to react quickly to shifting market conditions and new opportunities. Additionally, proactive workers are more productive, engaged, and motivated, which enhances performance and yields favorable corporate results (Verma & Venkatesan, 2023).

In summary, the digital transformation is bringing about significant changes to the way firms compete and run. In order to take full advantage of the opportunities that come with the digital revolution, organizations need to put a high priority on proactive worker skills development. To achieve this, it is necessary to foster an innovative and learning-oriented culture, make technological investments that support tailored and flexible learning, and

exhibit strong leadership to promote change. Employers can create a workforce that is ready to grow and innovate in the digital era by enabling workers to learn and adapt on a constant basis.

In the context of workforce and skill development, digital transformation necessitates a significant cultural shift as well as a change in cognitive processes. This paradigm change means, especially in the face of challenges, examining and challenging accepted standards, developing creative thinking, and adopting an attitude of continual learning (Goulart et al., 2022). The above-described quality is essential to the company's goal of digital transformation when combined with current digital competencies. In the current environment, economic performance is primarily dependent on ensuring that the workforce has access to appropriate opportunities for skill development within a reasonable amount of time. The organisation's main obligation is to provide support and resources to enable employee development, maturation, and increased involvement (Akour & Alenezi, 2022). This is especially important for people whose abilities have a limited lifespan and, hence, a constant need to learn new ones to remain relevant.

To maintain their performance in the face of the digital transformation process, businesses must improve the competence of their staff (Ostmeier & Strobel, 2022; Sousa & Rocha, 2019). Employees must therefore actively develop their skills in order to stay relevant in the market and in their individual professions. The field of digital (computational) literacy widely acknowledges digital abilities as the modern form of literacy (Loonam et al., 2018). Despite initial resistance, it is becoming increasingly clear

that digital abilities have now become a real, visible phenomenon. In a recent study by Atasoy et al. (2021), it was discovered that these skills are essential for both finding work, particularly in professional positions, and for navigating the labour market with effectiveness. The idea behind proactive skill development is the independent and forward-thinking process of acquiring information and abilities that people might need to effectively carry out upcoming work responsibilities (Ren & Chadee, 2017).

2.4 Research Gaps

However, a limited number of empirical studies have recently focused on the contextual factors that support proactive skill development (PSD) (Höyng, M. & Lau, A., 2023; Ren & Chadee, 2017). As such, the need for combining macro and micro viewpoints when investigating the creation of human capital is rising (Noe et al., 2014). Many studies have looked at the individual elements of digital strategy, skill development, and situational cues, but few have looked at how these components interact and affect one another in the setting of the always-changing digital landscape (Liu et al., 2023; Ostmeier & Strobel, 2022). Organisations hoping to succeed in the digital age must understand how situational cues mediate the link between proactive skill development and digital strategy maturity. There is a big study gap in our knowledge of how proactive skill development, situational cues, and the maturity of a digital strategy interact in an industry.

Addressing this research gap holds the potential to provide valuable insights into how industries can strategically align their digital initiatives, foster a culture of continuous skill

development, and adapt effectively to the dynamic forces of the digital environment, ultimately driving sustainable success and innovation.

In order to gain a deeper understanding of the complex dynamics of proactive skill development (PSD) within the context of digital transformation, researchers have initiated studies to explore the influence of leadership and organizational culture on encouraging PSD efforts. The culture of a firm has a significant impact on how employees perceive and engage with training and development. Organizational cultures that prioritize innovation, experimentation, and continuous improvement are more inclined to support PSD projects. These cultures also empower employees by giving them the freedom and resources to acquire new skills and adjust to changing situations (Kirkman et al., 2019). Similarly, it requires robust leadership to establish a conducive atmosphere that fosters PSD. Leaders that prioritize learning, articulate a clear goal for digital transformation, and offer chances for staff development are more likely to foster a culture of ongoing learning and skill enhancement (Avolio & Gardner, 2005).

Researchers also emphasize the significance of organizational structures and procedures in relation to PSD. Employees in flexible, agile, and decentralized firms have the advantage of being able to adapt to market changes and seize new possibilities. This allows them to engage in experimentation, take risks, and gain knowledge from their failures (Zhang & Bartol, 2010). Likewise, rules that encourage collaboration, the exchange of information, and teamwork across different functions allow employees to gain advantages from the

combined knowledge and expertise (Edmondson & Lei, 2014). By aligning organizational structures and procedures with PSD activities, firms can foster a culture that encourages ongoing learning and adaptation.

Another intriguing topic is the role of technology in facilitating PSD projects. According to Sitzmann and Ely (2011), digital technologies and platforms have the potential to improve employee learning, promote knowledge exchange, and make instructional resources easily accessible to staff members. Dabbagh and Kitsantas (2012) argue that learning management systems (LMS) offer employees the ability to have adaptable and personalized learning experiences that cater to their individual needs and preferences. Similarly, social learning platforms enable staff members to engage in peer, mentor, and expert contact, so fostering communication and the exchange of knowledge (Cross et al., 2016). Companies may enhance the efficiency and expand the reach of their learning and development initiatives by leveraging technology to support their performance, skills, and development objectives.

Scholars have also highlighted the need of aligning PSD operations with strategic goals and objectives. Morrison et al. (2010) argue that PSD programs must be closely integrated with the company's overall strategy in order to ensure that employees acquire the necessary skills and knowledge to accomplish strategic goals. This entails having a comprehensive understanding of the company's digital strategy and how PSD projects contribute to it. Aligning PSD programs with strategic objectives enables firms to prioritize learning and

development resources towards areas that will significantly enhance organizational performance.

Furthermore, studies have examined the potential influences of behaviors and individual traits on PSD. Individuals that possess a growth attitude, demonstrate a willingness to acquire knowledge, and proactively enhance their abilities are more inclined to achieve success in the digital era (Dweck, 2006). Similarly, individuals who possess robust self-regulation abilities, such as effective time management, goal-setting, and self-awareness, are more equipped to control their own personal growth and education (Zimmerman, 2000). Having a comprehensive understanding of all the components involved in a PSD (Professional Skills Development) can assist firms in customizing their learning and development initiatives to meet the specific needs of their employees and foster their career advancement.

Conclusively, filling the gap in understanding the connection between proactive skill development, situational cues, and the maturity of a digital strategy could yield valuable insights into how businesses can strategically align their digital activities, promote continuous skill enhancement, and effectively adjust to the ever-changing demands of the digital realm. By examining the roles of organizational culture, leadership, organizational structures and processes, technology, strategic alignment, and individual characteristics in fostering PSD, researchers can offer valuable guidance to organizations aiming to enhance innovation and achieve long-term success in the digital era.

2.5 Hypotheses Development

In today's fast-changing business environment, industries are increasingly using digital tactics and technology to stay competitive and spur innovation. This shift fundamentally changes the nature of employment and skill needs within organisations, bringing with it a plethora of complications, possibilities, and problems. Researchers have found a significant correlation between the maturity of industry digital strategy and the perceptions of digitalization among employees. They propose that how people understand digital transformation—whether it be complexity, familiarity, feasibility, or urgency—shapes their strategic perspective inside their company (Rogers & Euchner, 2022; Westerman et al., 2011). The concept of "digital transformation as complexity" emphasises the complex demands and interdependencies brought about by digital technologies, as well as the importance of proactive skill development to successfully navigate this changing environment (Farias et al., 2022). Similarly, the CAPS theory suggests that as digitalization becomes more commonplace, practical, and urgent within companies, cognitive and emotional states influence employees' reactions (Gilch & Sieweke, 2021; Bandura, 1997). The researcher thinks that these indirect links between industry digital strategy maturity and proactive skill development (PSD) will be stronger if employees have more proactive personality traits. This is because proactive personality traits affect how employees understand digitalization. The study enghighted the dynamic interactions between digital strategies at the industry level, personal interpretations of digital transformation, and the part proactive personality plays in promoting proactive skill development inside companies. Understanding how industries may use digitalization to develop a workforce

that thinks ahead and to prepare their organisations for ongoing innovation and adaptation in the digital age depends critically on this research.

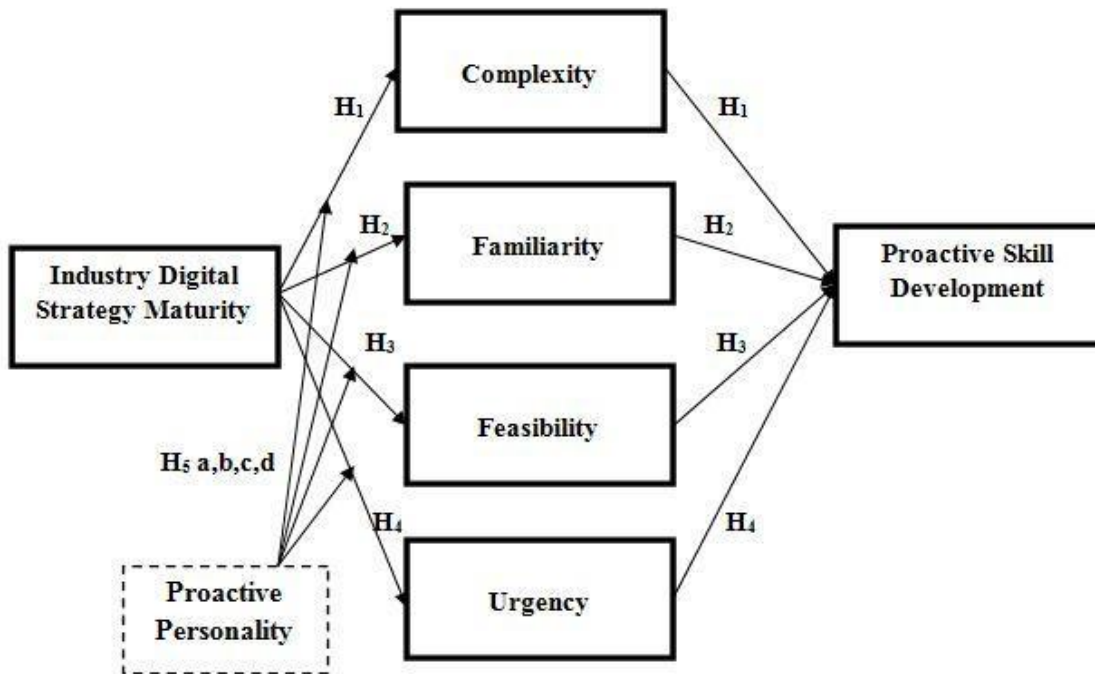


Figure 2.5. Conceptual Framework of the study

Source: Researcher's Compilation

2.5.1 Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as complexity.

Past studies showed that once industries evolve to embrace digital technologies and transformation, the complexity of their operations increases, necessitating a paradigm shift in skills and competencies (Rogers & Euchner, 2022; Hafsel et al., 2021). This phenomenon aligns with the concept of "digital transformation as complexity," which posits that the integration of digital technologies introduces intricate interdependencies and multifaceted challenges. Researchers highlight that as digital strategy matures within industries, the complexity of managing digital assets and data ecosystems rises significantly (Westerman et al., 2011). This increased complexity prompts organisations and individuals to acknowledge the demand for a new skill set. Researchers suggest that interpreting digital transformation as complexity encourages a proactive approach to skill development (Farias et al., 2023). Recognising the multifaceted nature of digital transformation fosters a mindset that values continuous learning and anticipates evolving skill requirements (Iscaro et al., 2022). Consequently, individuals and organisations invest in proactive skill development efforts, such as training, upskilling, and reskilling, to thrive in the complex digital landscape. This intricate interplay between industry digital strategy maturity, perceiving digital transformation as complexity, and proactive skill development underscores the essential link between digital strategy and human capital evolution. Based on the Cognitive-Affective Personality System Theory, the researcher proposed that there is a positive indirect link between how mature an industry's digital strategy is and how strategic digitalization is seen (PSD). This link is made possible by seeing digitalization as

complicated. The study highlights the complex relationship between an organization's perception of digital transformation and the development of skills required to navigate it successfully. It emphasizes that as industry digital strategy maturity increases, there is a positive indirect effect on proactive skill development (PSD) through the interpretation of digitalization as complexity. As the level of industry digital strategy maturity increases, businesses are more inclined to view digitalization as an intricate phenomenon that necessitates numerous solutions (Höyng & Lau, 2023). This impression, in turn, fosters a proactive mindset among employees, inspiring them to learn the broad skills necessary to handle the intricacies of the digital ecosystem.

Studies indicate that firms with well-developed digital strategies perceive digitalization as a complex process that includes not just technology progress, but also organizational, cultural, and strategic factors (Ren & Chadee, 2017). This comprehensive comprehension of digital transformation instills a feeling of immediacy among personnel to cultivate the aptitudes required to flourish in this intricate milieu. Employees acknowledge that achieving success in the digital era needs not only technical proficiency but also aptitudes such as analytical reasoning, creative problem-solving, flexibility, and teamwork.

Furthermore, companies that have well-developed digital strategies are more inclined to allocate resources towards educational and developmental programs that empower their staff with the necessary abilities to efficiently navigate the complexities of the digital realm. They offer employees the opportunity to participate in training programs, workshops, and tools that facilitate ongoing skill enhancement (Noe et al., 2014).

Organizations showcase their dedication to assisting people in adjusting to the challenges of the digital era and preparing themselves for triumph in a swiftly evolving environment by investing in employee development.

The study emphasizes the intricate correlation between an organization's perspective of digital transformation and the acquisition of skills necessary to navigate it proficiently. The statement highlights that when the level of maturity in industrial digital strategy develops, proactive skill development is improved by understanding digitalization as an intricate process. As firms get more advanced in their digital strategy, they are more likely to see digitalization as a complex phenomenon that requires different and multidimensional responses (Höyng & Lau, 2023). This perception, in return, encourages a proactive mentality among employees, motivating them to acquire the comprehensive skills necessary to navigate the complexities of the digital ecosystem.

Research suggests that companies with well-established digital strategies view digitalization as a multifaceted process that encompasses not just technological advancements but also organizational, cultural, and strategic elements (Ren & Chadee, 2017). The thorough understanding of digital transformation creates a sense of urgency among staff to develop the skills necessary to thrive in this complex environment. Employees recognize that attaining success in the digital age requires not only technical expertise but also skills like as analytical thinking, innovative problem-solving, adaptability, and collaboration.

In addition, organizations with well-established digital strategy are more likely to invest resources in educational and developmental programs that help employees navigate the intricacies of the digital realm effectively. The company provides employees with the chance to engage in training programs, workshops, and tools that promote continuous improvement of their skills (Noe et al., 2014). Organizations demonstrate their commitment to helping individuals adapt to the challenges of the digital era and equip themselves for success in a rapidly changing environment by investing in employee development.

In summary, the positive indirect influence of a mature digital strategy in the sector on Product Service Development (PSD) is highlighted by viewing digitalization as a complex process. This underscores the importance of the organizational viewpoint in fostering proactive skill improvement. Companies are recognizing the various components of digital transformation and are more willing to engage in projects that help employees gain the necessary skills to effectively navigate the complexities of the digital world. As a result, this enables employees to easily embrace change, produce innovative ideas, and adapt to the evolving demands of the digital environment. Hence, the researcher proposed the following hypothesis:

H₁: Industry digital Strategy maturity has a positive indirect effect on employee PSD through employees' interpretations of digitalization as complexity for their organization.

2.5.2. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as familiarity.

The Cognitive-Affective Personality System (CAPS) theory asserts that the interplay between cognitive processes and affective states shapes individual behaviour and decision-making, thereby shaping responses to various situations. When an industry's digital strategy matures, the integration of digital technologies becomes more widespread, creating a familiar and comfortable digital environment. Drawing from CAPS theory, Gilch & Sieweke (2021) explain that individuals are more likely to engage proactively when they feel a sense of familiarity and confidence in their environment. As digitalization becomes more familiar, individuals experience reduced cognitive effort and heightened positive affect when interacting with digital tools, in alignment with the CAPS framework. Scholars such as Ghobakhloo and Iranmanesh (2021) have extended the Technology Acceptance Model (TAM) within a CAPS framework, emphasising that familiarity and positive affect drive intention to use technology. This combination of cognitive and affective elements fosters a proactive orientation towards skill development, as individuals are more motivated to enhance their competencies within the familiar digital landscape (Weber et al., 2022). When an industry's digital strategy is mature, people are familiar with digitalization, and the CAPS theory is applied, it shows how proactive skill development

can have a positive indirect effect on industries that are going through digital transformation. The study emphasizes the impact of the level of maturity in industry digital strategy on the proactive development of skills, since employees perceive digitalization as something they are already familiar with. This highlights the significance of how organizations see things in influencing employees' attitudes and actions towards enhancing their skills in the context of digital transformation. As firms progress in their level of digital strategy maturity, they are increasingly likely to perceive digitalization as a familiar and seamlessly integrated element of their operations (Höyng & Lau, 2023). This perspective fosters a sense of comfort and confidence among employees, motivating them to intentionally develop the skills required to effectively utilize digital tools and technologies.

Research suggests that organizations with well-established digital strategy have a deeper understanding of digital technologies and how to use them effectively in their own sector environment (Ren & Chadee, 2017). They have a higher level of expertise in integrating digital tools into their operations, products, and solutions, leading to increased comfort and ease among their team. This level of familiarity fosters a feeling of confidence and encourages employees to explore new technologies, experiment with innovative approaches, and gain the essential skills needed to succeed in a digitally-focused environment.

Furthermore, companies that possess a well-established digital strategy often dedicate resources to initiatives that promote a culture of digital literacy and continuous learning (Noe et al., 2014). The company provides employees with opportunities to participate in

training programs, workshops, and tools that enhance their skills in areas such as data analysis, digital marketing, and user experience design. By fostering a culture of digital proficiency, companies empower their people to easily embrace digital change as an opportunity for progress and innovation.

In summary, the positive indirect effect of an industry's digital strategy maturity on PSD (Product Service Development) by seeing digitalization as familiarity emphasizes the importance of organizational perspective in encouraging proactive skill improvement. As companies get a more profound comprehension of digital technologies and their practical applications, employees are becoming more eager to wholeheartedly embrace digital transformation as an inherent and effortless aspect of their work. As a result, this motivates employees to actively develop the required skills to efficiently utilize digital tools and technologies, hence promoting innovation and encouraging advancement in the digital age. According to the Cognitive-Affective Personality System Theory, the researcher proposed that there exists a positive indirect relationship between the maturity of an industry's digital strategy and perceived social distance (PSD), mediated by the interpretation of digitalization as familiarity. Hence, the study proposed the following hypothesis:

H₂: Industry digital Strategy maturity has a positive indirect effect on employee PSD through employees' interpretations of digitalization as familiarity for their organization.

2.5.3. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as feasibility.

According to the Cognitive-Affective Personality System (CAPS) theory, interactions between cognitive processes and affective states shape individual behaviours, leading to responses influenced by perceived feasibility and positive affect (Heslin et al., 2019). As an industry's digital strategy matures, the comprehensive integration of digital technologies makes digitalization more feasible and accessible. This aligns with the CAPS theory, which posits that individuals are more inclined to engage proactively when they perceive a task as feasible and attainable (Kурpjuweit et al., 2021). Expanding on this concept, authors like Bandura (1997) emphasise that self-efficacy—a core component of feasibility perception—plays a crucial role in motivating proactive behavior. In this context, scholars such as Venkatesh et al. (2003) have extended the Technology Acceptance Model (TAM) within a CAPS framework, emphasising that perceived feasibility and positive affect influence individuals' intention to use technology. Consequently, as industry digital strategy maturity enhances the feasibility of digitalization, individuals are more likely to interpret digitalization as an achievable endeavour, fostering a proactive orientation towards skill development (Ritala, 2021). The combination of the level of maturity of an industry's digital strategy, the belief that digitalization is possible, and the basic ideas of the CAPS theory shows the complex ways that proactive skill development can help with digital transformation. Based on the Cognitive-Affective Personality System Theory, the researcher suggests that there is a positive indirect link between how mature an industry's

digital strategy is and how strategic digitalization is seen (PSD). This link is made possible by seeing digitalization as a possibility. Hence, the following hypothesis is proposed:

H₃: Industry digital Strategy maturity has a positive indirect effect on employee PSD through employees' interpretations of digitalization as feasibility for their organization.

2.5.4. Positive indirect effect of industry digital strategy maturity on PSD via interpreting digitalization as urgency.

The Cognitive-Affective Personality System (CAPS) theory deeply roots the positive indirect effect of industry digital strategy maturity on proactive skill development, interpreted through the lens of perceiving digitalization as urgency. This theory posits that individual behaviour is a result of the interplay between cognitive processes and affective states, leading to responses influenced by perceived urgency and emotional states (Kutaula et al., 2022). As industry digital strategy matures, the acceleration of digitalization creates a sense of urgency to adapt and stay relevant, which resonates with the CAPS framework, emphasizing that affective states, including urgency-driven emotions, influence behavior. Research from previous studies, like Carver and Scheier's (1990), indicates that perceived urgency often prompts individuals to take proactive action when they perceive a discrepancy between their current and desired states. In this context, authors like Lazarus and Folkman (1984) highlight that individuals perceive urgency as a demand-resource imbalance that triggers emotional and cognitive responses. Scholars such as Venkatesh and Thong (2012) have extended the Technology Acceptance Model (TAM) within a CAPS framework, demonstrating that affective states and urgency impact technology adoption.

Consequently, as industry digital strategy maturity heightens the perception of digitalization as urgent, individuals are more likely to interpret the situation as requiring immediate proactive skill development. The way that industry digital strategy maturity, digitalization urgency, and the basic ideas of the CAPS theory are all put together shows how complicated the processes are that make proactive skill development helpful in the context of digital transformation. The study emphasizes the significance of corporate perception in fostering motivation and engagement among employees in skill development programs during digital transformation. The statement highlights that the level of maturity in an industry's digital strategy has an indirect impact on the development of proactive skills by highlighting the importance and urgency of digitalization. As companies advance in their level of digital strategy development, they are more likely to perceive digitalization as an immediate requirement rather than a future trend that is far away (Höyng & Lau, 2023). The feeling of urgency drives individuals to actively learn the essential skills needed to adapt and thrive in an increasingly digitalized environment.

Research suggests that organizations with a well-established digital strategy have a better grasp of the rapid pace at which technology is advancing and how it can potentially affect their industry (Ren & Chadee, 2017). They recognize that the influence of digital disruption is altering conventional business paradigms, resulting in both novel prospects and hazards. This circumstance necessitates a comprehensive reevaluation of abilities and competencies. The firm is imbued with a pervasive sense of urgency, compelling both executives and employees to prioritize skill development activities that would enable them to adeptly address digital challenges.

In addition, companies that have well-established digital strategies are more likely to clearly communicate a specific vision for digital transformation and provide employees with the required resources and support to accomplish success (Noe et al., 2014). The corporation earmarks funds for training programs, workshops, and learning materials that provide staff with the requisite technical, analytical, and creative skills to adapt and develop in a digital environment. Organizations can foster a culture of perpetual learning and advancement by placing emphasis on the significance of skill enhancement. This, in turn, enables individuals to remain competitive in a rapidly evolving environment. Based on the Cognitive-Affective Personality System Theory, the researcher suggests that there is a positive indirect link between the maturity of an industry's digital strategy and proactive skill development (PSD). This link is made possible by seeing digitalization as urgent. Hence, the following hypothesis is proposed:

H4: Industry digital Strategy maturity has a positive indirect effect on employee PSD through employees' interpretations of digitalization as urgency for their organization.

2.5.5 Proactive personality as a moderator of indirect links between industry digital strategy maturity and PSD

The proactive personality, characterized by a disposition to take initiative, exhibit self-starting behavior, and anticipate future opportunities, serves as a crucial moderator in understanding the indirect links between industry digital strategy maturity and proactive

skill development (Maan et al., 2020). According to the Person-Environment Fit Theory, individuals with proactive personalities are more likely to thrive in environments that align with their proactive tendencies (Liao, 2022). In the context of industry digital strategy maturity, scholars like Tiwari et al., (2021) highlight that proactive individuals possess a greater propensity to seize opportunities presented by technological advancements and adapt to evolving digital landscapes. As industry digital strategies mature, the opportunities for skill development become more pronounced, and proactive individuals are poised to capitalize on them. This perspective aligns with Parker et al. (2010), who emphasize that proactive individuals actively seek and create opportunities for learning and development. Therefore, the proactive personality serves as a moderator that strengthens the indirect relationship between industry digital strategy maturity and proactive skill development. As the digital landscape evolves, individuals with proactive personalities are more likely to recognize and harness the potential for skill enhancement, further emphasizing the pivotal role of proactive personality traits in shaping the pathway from digital strategy maturity to proactive skill development (Diller et al., 2020). The proactive personality is crucial in mediating the indirect relationship between the maturity of an industry's digital strategy and the development of proactive skills (PSD). It impacts the way employees respond to the organization's initiatives in navigating the digital landscape. Individuals with a proactive personality exhibit trait such as being proactive, persistent, and having a strong inclination to self-improvement. These characteristics influence how individuals perceive and engage in opportunities to enhance their abilities within the framework of digital transformation (Bateman & Crant, 1993).

Research suggests that individuals with a proactive mindset are more likely to recognize the need of acquiring new skills and adapting to changing situations (Fuller & Marler, 2009). They possess an inherent inclination to actively seek out learning opportunities, delve into emerging technology, and attain the requisite abilities to thrive in a digitalized work setting. Hence, the degree of sophistication in the digital strategy of a sector may have a substantial, if indirect, influence on the development of professional skills among individuals who possess a proactive attitude. This is because proactive individuals are more likely to take advantage of organizational resources and support in order to enhance their skill set.

Furthermore, those that exhibit a proactive mindset are more likely to perceive digitalization as a beneficial opportunity rather than a possible threat (Parker & Collins, 2010). They exhibit a proclivity for embracing change without hesitation, meticulously evaluating potential risks, and aggressively seeking opportunities for personal and professional growth. In the context of digital transformation, individuals with a proactive attitude are more likely to be receptive and attentive to organizational efforts aimed at enhancing their skills. They view these initiatives as chances for personal and professional advancement.

In addition, individuals with a proactive personality tend to exhibit higher levels of self-efficacy. Self-efficacy relates to their belief and confidence in their ability to absorb knowledge and adapt to new challenges (Frese & Fay, 2001). Their strong self-assurance

empowers them to overcome obstacles, persevere in the face of setbacks, and actively seek opportunities to improve their skills. In contexts where there is a high level of maturity in industry digital strategy, persons with a proactive mindset are more inclined to efficiently utilize organizational resources and support to enhance their skills and capabilities. Therefore, drawing upon the CAPS theory, the study posits that the proactive personality trait becomes evident within the realm of digitalization and exerts an impact on employees' views and interpretations of the ramifications of this overarching advancement on their firm. Hence, the following hypothesis is proposed:

H₅: Proactive personality moderates the strengths of the indirect relations between industry digital strategy maturity and PSD via individual interpretations of digitalization such that the paths between industry digital strategy maturity and individual interpretations of digitalization as (H_{5a}) complexity, (H_{5b}) familiarity, (H_{5c}) feasibility and (H_{5d}) urgency are stronger at higher levels of proactive personality.

Chapter III:

METHODOLOGY

The primary aim of this scholarly investigation is to holistically address the challenges brought about by digital transformation in the automotive industry. The research investigates and identifies specific skill gaps in a methodical manner, providing valuable insights into areas that require concentrated attention for the purpose of efforts directed at gaining new skills and enhancing existing techniques. The research intends to gain an understanding of the intricate relationship that exists between the proactive attitude of an employee and the requirement to acquire vital skills in order to successfully navigate the transition to digital (Ershova et al., 2018). Besides, it intends to evaluate the influence that the level of digital strategy maturity in the automotive industry has on the proactive development of skills among its workforce (Ochoa-Urrego and Peña-Reyes, 2021). The purpose of this study is to improve the industry's strategic planning by identifying and analyzing the most effective methods for effectively managing and addressing the growing demand for technical talent in the fast-changing landscape of digital transformation.

3.1 Overview of the Research Problem

The study examines how digital change has affected automotive transformation, notably in India. Because of technological advancements and changing consumer

expectations, the automotive industry is digitising, making it difficult to ensure that the workforce has the skills to succeed in this changing environment.

This study examined how digital change has affected auto industry experts' skill development. In particular, the study seeks to explore the complex relationship between digital strategy maturity and proactive skill development. This question stems from a widening skills gap, exacerbated by the rapid pace of the digital revolution. This study examines how digital initiatives improve automotive sector skills in data analytics, cybersecurity, and AI (Ranjan & Dhir, 2023; Effiong et al., 2023; Kumar et al., 2022). The research also seeks to identify the best ways to develop talent in the automobile industry, considering how a lack of competent personnel affects production delays, operating costs, and innovation.

Researchers discovered that addressing talent shortages is crucial to maintaining the sector's competitiveness (Zhou et al., 2022; Shah & Soomro, 2023). The urgent need to equip the auto sector workforce with digital skills drives this research, ensuring their success in the face of significant technological advances. The research aims to provide industry practitioners and policymakers with practical insights to address their unique issues in the Indian automobile sector. Our main goal is to teach them about the human side of digital change in this profession. Understanding how employees understand and respond to digital initiatives can assist in setting strategic goals and making informed decisions, ultimately improving the industry's digital achievements.

3.2 Operationalization of Theoretical Constructs

This study measures many characteristics of digital strategy maturity, complexity, familiarity, feasibility, urgency, proactive skill development, and proactive personality in the automobile sector using theoretical constructs. The Industry Digital Strategy Maturity (IDSM) construct evaluates the extent and success of an organization's digital strategy, using Strauss and Parker's (2018) paradigm. The assessment consists of 15 statements that are evaluated on a scale from 1 to 5. These statements assess several factors like the establishment of a digital strategy, online presence, utilization of digital tools, alignment with corporate strategy, governance structure, and methods for ongoing improvement. The Complexity construct assesses the perceived intricacy of conducting digital projects, based on the research of Heslin et al. (2019) and Mischel & Shoda (1995). The assessment has three statements that evaluate the perceived technical difficulties, overall intricacy, and stakeholders' comprehension of the endeavor. The constructs of Familiarity, Feasibility, and Urgency similarly employ comparable rating scales to assess stakeholders' knowledge of digital concepts, practicality of implementation, and the importance of executing the initiative, respectively.

Moreover, the Proactive Skill Development (PSD) construct evaluates the organization's initiatives in promoting proactive skill development among its employees. The survey consists of 13 statements that are consistent with the findings of Heslin et al. (2019) and Mischel & Shoda (1995). These statements cover various aspects including organizational support, policies, leadership involvement, cultural promotion, responsiveness to industry trends, and communication effectiveness in relation to skill development opportunities.

The Proactive Personality (PP) construct, derived from Parker (1998) and Bateman & Crant (1993), assesses an individual's proactivity in improving task performance and organizational success. The assessment consists of 11 statements that are evaluated using a comparable scale. These statements focus on the actions made by individuals to enhance fundamental activities, cultivate skills for the future, boost productivity, and contribute to the success of the organization and the transmission of information.

The researcher used a combination of qualitative and quantitative methodologies in the study to acquire a thorough knowledge of the complicated relationship between employee proactive skill development and industry-level digital strategy maturity in the automotive sector. The researcher obtained in-depth information about the experiences, difficulties, and opinions about digital transformation and skill development through the use of qualitative interviews with purposive sampling. When examining complex and context-specific data that may not be obtained by means of only quantitative surveys, qualitative interviews are especially helpful (Johnson & Patel, 2021). The qualitative and quantitative approaches used in this study improve the validity and dependability of our conclusions (Gupta & Sharma, 2018). This method not only broadens our comprehension of the phenomenon being studied, but it also offers a more in-depth and sophisticated analysis that reflects the complexity and range of the relationship between proactive skill development and digital strategy maturity in the automotive sector.

3.3 Research Design

The researcher wants to choose the best study plan that can successfully answer all of the questions and goals of the investigation. Adapted to certain study objectives and hypotheses, the research design acts as a thorough road map for obtaining empirical data. The instrument development processes, sampling protocols, and data gathering methods are among its essential components.

To take advantage of both qualitative and quantitative data collection techniques, a mixed-methods strategy is used in this study. Given the digital change of the automobile sector, this design option recognises the necessity for a thorough understanding of the research issue (Johnson & Patel, 2021; Gupta & Sharma, 2018). Within the industry, a nuanced investigation of skill dynamics and digital strategy maturity is made possible by the combination of qualitative and quantitative approaches.

Time horizon concerns and research procedures make up the two primary elements of the research design. The variables, research design, and methodology are all included in the research approaches. In particular, the study makes use of an exploratory and descriptive research approach in addition to a mixed study methodology that blends qualitative and quantitative techniques (Creswell & Plano Clark, 2018).

A cross-sectional study approach is used to collect data in order to get an overview of the maturity of digital strategies and skill development in the automotive sector (Shah & Soomro, 2023). This methodology allows for the effective collection of data in a variety of organisational settings and demographic categories.

In terms of sample strategies, the research makes use of both probability and non-probability sampling approaches to guarantee thorough coverage of the intended audience. To guarantee statistical representativeness in quantitative data gathering, probability sampling techniques like simple random sampling are applied (Bryman, 2016). When gathering qualitative data, non-probability sampling techniques like purposive sampling are used to capture particular viewpoints and experiences that are pertinent to the study's goals (Patton, 2015).

The research methodology ensures that data gathering methods are relevant and rigorous by utilizing a variety of sampling techniques and integrating qualitative and quantitative approaches. This strategy aligns with the intricate dynamics of skill development and digital transformation in the automobile industry.

3.4 Population and Sample Methods

The main sample technique used is simple random sampling, in which employees in Delhi-NCR, India's automotive industry are chosen at random from the general population. Every employee must have an equal chance of being selected for the study thanks to this approach, which ensures a representative sample that can be statistically extrapolated to the larger population (Brannen, J., 2017). For the purpose of gathering quantifiable information about skill gaps, proactive personality influence, and digital strategy maturity among various workforce groups, simple random sampling is essential.

In order to examine skill differences between various employee groups, demographic data including gender, age, education, and experience are also acquired. This information forecasts future skill demands, supports diversity and inclusion initiatives, provides guidance for targeted training programmes, and is benchmarked against industry standards. Non-probability sampling is also included in the study, specifically through purposive sampling for qualitative insights. According to Silver et al. (2014), purposeful sampling enables the deliberate selection of participants according to particular standards pertinent to the study's goals. For example, qualitative data gathering targets people with a lot of experience in digital transformation or people who play different positions in the sector. By ensuring that participants have the appropriate perspectives and insights to properly address qualitative research questions, this strategy improves the depth and richness of the study findings.

This study attempts to capture a comprehensive picture of skill development issues and digital transformation dynamics inside the internal workforce of the Delhi-NCR automobile industry by integrating both simple random sample and selective sampling into the sampling technique. The integration of both quantitative and qualitative methodologies will yield refined understandings of sector-specific problems and facilitate the formulation of focused and feasible suggestions to improve skill development programmes in the context of the digital revolution of the automobile industry.

Taking a statistical approach for calculation of sample size, the various quantitative measures to be considered while determining the sample size are as follows:

- Variability of population characteristics or standard deviation (σ)
- Level of confidence desired or Z value (taken as 1.96 for 95% confidence level desired)
- Degree of precision desired in estimating population characteristics (D)

The study has used the following formula for testing hypothesis around mean (Malhotra, 2011).

$$n_0 = \frac{\sigma^2 \times Z^2}{D^2}$$

$$D^2$$

Where, n_0 = sample size

σ = Standard Deviation

Z = Standard normal variate for 95% confidence level and,

D = Degree of precision desired

In order to obtain a representative and realistic sample size, the results of sample size from 3 scenarios are compared;

Scenario 1: Estimating a high standard deviation and low degree of precision.

Scenario 2: Estimating a moderate standard deviation and moderate degree of precision.

Scenario 3: Estimating a low standard deviation and high degree of precision

Table 3.4: Comparative Analysis Taking Different Values of σ and D.

	SD	Z	D	no
Scenario 1	0.6	1.96	0.05	553
Scenario 2	0.5	1.96	0.06	267
Scenario 3	0.4	1.96	0.07	125
Total				945
Average				315

Taking an average of all the three scenarios, considered taking different values of σ and D, the sample size computed for the study is 315 at 95% confidence level.

Source: Researcher's Compilation

3.5 Participant Selection

The researcher began data collecting with qualitative interviews with workers in Delhi-NCR's automotive industry in order to get a thorough grasp of the phenomenon under investigation (Fontana & Frey, 2000). To choose participants who might offer a range of perceptive and varied viewpoints in line with the goals of the study, a deliberate sampling technique was used (Palinkas et al., 2015). For the qualitative portion of the study, a total

of 15 participants were interviewed, guaranteeing a rich and diverse dataset for thematic analysis and qualitative insights.

Using a straightforward random sample method, workers from the Delhi-NCR automotive industry were chosen for the quantitative study (Lohr, 2019). The study's findings were more broadly applicable to the workforce since this sampling strategy gave each employee in the target demographic an equal chance of being included in the sample (Babbie, 2016). For the purpose of the study's quantitative survey, a total of 315 employees were chosen at random, allowing for a thorough statistical analysis and wider applicability of the results.

Because our sample method guarantees that every employee in the target demographic has an equal opportunity to participate, our results are more broadly applicable to the workforce (Babbie, 2016). The researcher also emailed and personally contacted employees to increase engagement and reach a varied group of respondents (Dillman, Smyth, & Christian, 2014). To maintain moral principles in research, anonymity and data security were guaranteed at every stage of the survey (American Psychological Association, 2020). Because every methodological decision was guided by accepted research principles, our study was more rigorous and credible.

3.6 Instrumentation

The instrumentation for this study encompasses established measures and scales from reputable sources to capture key constructs. To gauge Industry Digital Strategy Maturity, the instrument relies on the comprehensive framework developed by Parker, Bindl and Strauss (2010, pp. 127-132). This framework is designed to assess the maturity levels of digital strategies within industries, providing a robust foundation for evaluating the technological preparedness of the automotive sector.

In exploring the complexity, familiarity, feasibility, and urgency aspects, the study draws on the work of Heslin, Keating, & Minbashian (2019, pp. 2101-2131) and the seminal research by Mischel and Shoda (1995, p. 246). These dimensions are integral in understanding the challenges and opportunities associated with skill development amid digital transformation. The instrument aims to quantify and evaluate these factors, contributing to a nuanced analysis of the contextual environment. To measure Proactive Skill Development, the study employs the construct as defined by Heslin, Keating, & Minbashian (2019, pp. 2101-2131) and Mischel & Shoda (1995, p. 246). This includes assessing the proactive behaviors and initiatives undertaken by employees to enhance their skill sets in response to the evolving demands of digital transformation in the automotive industry. The evaluation of Proactive Personality relies on the well-established instrument developed by Parker (1998, pp. 827-856), originating from the work of Bateman & Crant (1993, pp. 103-118). This instrument aims to capture individual traits associated with proactivity, providing insights into how personal attributes contribute to an employee's

sense of urgency and motivation to learn necessary skills for successful digital transformation.

By utilizing these validated instruments, the study ensures the reliability and validity of the data collected, offering a robust foundation for analyzing the intricate dynamics of skill development, digital strategy maturity, and proactive behaviors within the context of the automotive industry.

3.7. Research ethics

At every phase of the investigation, strict commitment to research ethics was crucial. The researcher implemented entire informed consent protocols before allowing participants to participate, ensuring their understanding of the study's goals, processes, and potential hazards (American Psychological Association, 2017). The researcher provided written and spoken consent forms to participants, enabling them to make informed decisions about their participation (World Medical Association, 2013). Researchers only had access to the anonymized and safely archived data (British Psychological Society, 2018). Participants were guaranteed anonymity and the use of their answers only for research purposes.

Throughout the study, participants' privacy, dignity, and well-being were respected (Bryman, 2016). The National Institutes of Health (2018) further preserved participants' liberty and rights by allowing them to leave the study at any moment without penalty. The researcher handled every delicate or potentially dangerous subject with tact and attention

to participant welfare, ensuring the necessary support systems were in place in case of need (Creswell & Creswell, 2018). The integrity and objectivity of the study were preserved by the proper disclosure and management of any conflicts of interest (Committee on Publication Ethics, 2011). By including ethical issues in the planning and execution of the study, this work shows a dedication to carrying out ethically sound and scientifically rigorous research, guaranteeing the validity and reliability of the results while giving participants' rights and welfare first priority.

3.8 Data Collection Procedures

3.8.1 Qualitative Data Collection

The researcher began semi-structured interviews with workers in Delhi-NCR's automotive industry to gather qualitative data in order to fully understand the phenomenon being studied (Fontana & Frey, 2000). During the interviews, a digital voice recorder was utilised to collect participant insights and in-depth narratives, guaranteeing the accuracy and thoroughness of the data recording (Rubin & Rubin, 2012). According to Creswell (2013), this method made it possible for participants to have more exploratory and open-ended conversations, which made it easier to delve deeply into their reasons and points of view.

Email invitations and follow-up phone calls were used to find participants for the qualitative interviews (Dillman, Smyth, & Christian, 2014). Emails were used to communicate study details and extend invitations to participate. Phone conversations were then used to build rapport and answer participant questions, which improved involvement in the interview process.

To carefully choose participants who might provide a range of insightful and varied viewpoints in line with the goals of the study, a purposive sample method was used (Palinkas et al., 2015). Over the course of two months, the average length of each interview was 20 to 30 minutes, giving participants plenty of opportunity to express their thoughts and experiences in-depth (Fontana & Frey, 2000). To guarantee the correctness and comprehensiveness of participant responses, thorough notes were gathered during the interviews (Creswell, 2013).

The study's qualitative methodology, which prioritises semi-structured interviews and narrative responses, is consistent with Creswell's (2013) contention that it is critical to delve into participants' perspectives and motives. The study displays alignment with known techniques and theoretical frameworks by explicitly integrating arguments from the literature into the conversation. This enhances the validity and credibility of the qualitative findings. (Creswell, 2013).

3.8.2 Quantitative Data Collection

This study used a structured survey questionnaire for quantitative data collection in order to enable standardised data collection and simple response comparison and analysis (Fink, 2013). The survey instrument for the study was developed based on established procedures and scholarly frameworks. A sample questionnaire is included in Appendix E. It is designed to demonstrate the items, structure, and measurement scales of the survey in compliance with recommended standards for transparency and reproducibility in quantitative research (Fink, 2013; Bryman, 2016). For the quantitative survey, a geographically dispersed sample of participants was obtained by email invitations and internet resources (Dillman, Smyth, & Christian, 2014). Response rates and data accuracy increased as a result of participants receiving thorough instructions that ensured the survey was completed accurately and within the allocated time (Fink, 2013).

In the automotive business, the measuring of proactive personality traits and skill development was made possible by the use of rating scales, Likert-type items, and closed-ended questions (Bryman, 2016). These measuring instruments enable researchers to quantitatively evaluate particular constructs and variables of interest, therefore improving the accuracy and objectivity of the quantitative analysis of the study (Bryman, 2016).

A geographically dispersed sample of data was efficiently and punctually collected using email invitations and internet platforms (Dillman, Smyth, & Christian, 2014). To increase

response rates and data accuracy, participants received precise instructions on how to complete the survey and a submission date (Fink, 2013).

A temporal separation was ensured between the gathering of predictor (e.g., proactive personality) and criterion (e.g., skill development) variables in order to counteract possible common method bias (Podsakoff et al., 2021). Through the reduction of biases related to respondents' persistent response habits, this methodological technique improves the accuracy and dependability of the collected data gathered (Podsakoff et al., 2012).

In general, the methodical approaches of time lag methodology and the systematic approach to quantitative data collection through structured surveys enhance the accuracy and reliability of the data collection process for the study (Fink, 2013). Particularly in the setting of digital transformation, this methodological rigour helps to produce solid evaluations and insightful interpretations of skill development in the automobile industry (Bryman, 2016).

3.9 Data Analysis

3.9.1 Qualitative Data Analysis

Utilising a theme analysis approach grounded in Braun and Clarke's (2006) methodological framework, the study's data was analysed with the goal of investigating how digital strategy maturity has affected proactive skill development in Delhi-NCR's automotive sector. The efficiency of thematic analysis in identifying themes and patterns within qualitative data sets led to its selection (Braun & Clarke, 2006).

Step 1: Familiarisation and Transcription of Data

To guarantee accuracy and make analysis easier, verbatim transcriptions of the key informant structured interviews were first produced (Smith & Osborn, 2008). In order to obtain a thorough grasp of the material, the researcher became acquainted with the data by reading and rereading the transcripts (Braun & Clarke, 2006).

Step 2: Initial Coding

Significant lines or parts of text were labelled with codes that represented emergent categories through line-by-line tagging (Saldaña, 2016). In addition to preserving the participants' original language and perspectives, this method made it easier to identify important themes pertaining to skill development and digital transformation (Braun & Clarke, 2006).

Step 3: Creation of a Theme

After then, codes were arranged and improved to produce broad themes that encapsulated significant trends and revelations from the information (Braun & Clarke, 2006). To guarantee coherence and thoroughness, the themes were repeatedly examined in relation to the research goals (Nowell et al., 2017).

Step 4: Finalisation and Review of the Theme

In order to improve the themes' correctness and applicability, they were thoroughly examined, refined, and subjected to continuous comparison and debate (Braun & Clarke, 2006). Each theme was given a descriptive term to express its essence and encourage the variety of interpretations seen in the interview materials (Braun & Clarke, 2006).

Step 5: Verification and Credibility

To ensure a thorough and robust knowledge of digital transformation and skill development within the automotive sector, comparisons between several transcripts were conducted throughout the research to discover commonalities and variances (Braun & Clarke, 2006; Nowell et al., 2017).

Refer to Appendix C for an example of the coding process.

An example of the coding procedure that shows how themes were identified from the data is shown below:

"Proactive Learning" is coded.

Theme: "It is essential to be proactive in learning new technology."

Themes: "Adaptability and Continuous Learning"

"Innovative Culture" is coded.

Theme: "Fostering an innovative culture inspires us to investigate novel technologies."

Topic: "Organisational Innovation and Digital Transformation"

Scholarly literature also confirms the rationale behind using thematic analysis as a method. It is important to note that some authors (Braun and Clarke, 2006) present the groundwork for thematic analysis, which can be considered strong in terms of methodology as it highlights adaptability and strictness within qualitative research. Furthermore, Nowell et al.'s study (2017) supports this point with regards to trustworthiness and methodological rigor when dealing with thematic analysis, since they were concerned about investigating intricate matters concerning industrial revolutions and nurturing talents while keeping their procedures trustworthy enough. Therefore, this approach matches well with these objectives because it enables researchers to closely examine skills development through digital transformation within an ever-changing environment like Delhi-NCR's automobile sector.

3.9.2 Quantitative Data Analysis

The researcher evaluated the frequency and distribution of skills in the automobile industry through descriptive statistical studies using appropriate statistical instruments and techniques. The researcher measured the skill levels along various characteristics using means, frequencies, and percentages. The study ensured the strong statistical analysis by applying comparative analyses, such as t-tests, to identify notable variations in skill levels based on demographic factors. Then carefully evaluated the study model using Partial Least Squares Structural Equation Modeling (PLS-SEM) 4.0 as the statistical instrument, taking into account a number of important factors. PLS-SEM was selected for quantitative study

in the automobile industry because of its capacity to manage intricate interactions and limited sample sizes (Hair Jr. et al., 2019). Through the simultaneous estimate of measurement and structural models made possible by this statistical method, the relationships between variables and the validity of measurement constructs inside the study framework are revealed.

PLS-SEM 4.0 is used to guarantee thorough and solid analysis that complies with structural equation modeling best practices and provides in-depth understanding of studied constructs in the automotive sector. Furthermore, improving the validity and interpretability of the study results are descriptive statistics and comparison tests.

The prevalence and distribution of skills across the Delhi-NCR automobile sector were evaluated through the application of extensive statistical approaches to the examination of quantitative data in this study. The study employed descriptive statistical techniques, such as means, frequencies, and percentages, to measure skill levels related to different demographic factors (Hair Jr. et al., 2019). For example, the average level of competency in cybersecurity among respondents was found to be moderate, with a Likert scale of 1 to 5.

Based on demographic variables like age, experience, and education, comparative analyses like t-tests were used to find significant differences in skill levels (Field, 2018). Younger employees had stronger competency in data analysis skills, for instance, and a t-test revealed a statistically significant difference ($p < 0.05$) in skill levels between different age groups.

Partial Least Squares Structural Equation Modelling (PLS-SEM) 4.0 was used to conduct a thorough evaluation of the study model. This method was selected due to its capacity to manage intricate interactions and small sample sizes in the automotive industry (Hair Jr. et al., 2019). By enabling the simultaneous estimate of structural and measurement models, PLS-SEM helped to validate measurement constructs inside the study framework and identify correlations between variables.

Useful Illustration :

Here is an example of some of the statistical calculations that were done throughout the analysis:

Characteristic Statistics: Average Cybersecurity Skill Level

Averaging: 4.2

The standard deviation is 0.8.

The distribution of frequencies:

First level: 5%

Level 2: 15%

Level Three: 30 %

Level Four: 35 %

Stage 5: 15%

Analysis of Comparisons (t-test): Age Group-wise Skill Levels: 18–30 years 41–45 years: Mean = 4.0, SD = 0.6; 46+ years: Mean = 3.8, SD = 0.5; Mean = 4.5, SD = 0.7. There is a significant ($p < 0.05$) skill gap between the age groups.

3.10. Validity and Reliability

The researcher have taken strict steps in the study, which is centered on evaluating proactive skill development in the Delhi-NCR automotive industry, to guarantee the validity and reliability of our research results. Carefully chosen and designed research instruments guarantee that they faithfully represent the intended constructs and phenomena of interest, hence maintaining validity. Particularly, used the content validity checks while creating survey instruments to guarantee thorough coverage of pertinent skill dimensions in the automobile industry (DeVellis, 2016). The content validity of study is improved by carefully matching our measurement instruments with the theoretical framework and research goals.

Furthermore, validate the measurement scales against well-established theoretical notions about digital strategy maturity and proactive skill development in the automotive sector, therefore addressing construct validity. The researcher validates the measures using theoretical frameworks and the body of current literature (Hair Jr. et al., 2019). This guarantees that our research fairly captures the fundamental ideas and connections under investigation. Furthermore, internal consistency metrics including Cronbach's alpha have

been used to guarantee the dependability of our survey items (Nunnally, 1978). Our study findings are robust and consistent in part because of these reliability checks.

Our goal in giving validity and dependability top priority in our research process is to improve the reliability and credibility of our study results. While dependability guarantees that the measurements are constant and repeatable, validity guarantees that we are measuring what we want to measure. These methodological issues enhance the general rigor and calibre of our study on skill dynamics in the automobile sector.

3.11 Research Design Limitations and De-limitations

While the research design offers a structured approach to examining the impact of digital transformation on skill development in the automobile sector, it is crucial to acknowledge several limitations. The utilization of self-reported data, such as survey responses, may introduce response bias and social desirability effects, potentially compromising the accuracy and reliability of conclusions (Johnson, 2014). Moreover, the study's cross-sectional design may impede the establishment of causal relationships between variables, necessitating longitudinal data collection to assess changes over time (Maxwell, 2013). The findings may exhibit limited generalizability due to the small sample size and narrow focus on a specific geographic context and organizational setting within the automobile industry (Creswell, 2014). Additionally, the research design may overlook specific contextual factors or hidden variables that influence the connection between digital transformation and skill development, emphasizing the need for mixed-methods approaches to gain a

comprehensive understanding (Teddlie & Tashakkori, 2016). Despite efforts to mitigate researcher bias, subjective interpretation and analysis of data could still influence the validity and objectivity of study conclusions (Creswell, 2014). Recognizing these constraints and implementing appropriate strategies to address them enhances the robustness and accuracy of future inquiries into digital transformation and skill development in the automobile sector.

The deliberate restriction of the study's coverage to workers in the Delhi-NCR region's automobile industry limits the generalizability of findings to other regions or industries with distinct socioeconomic and cultural backgrounds (Maxwell, 2013). Furthermore, the predominant use of quantitative methodologies may overlook the nuanced insights provided by qualitative or mixed-methods techniques, hindering a comprehensive understanding of skill development and digital transformation (Johnson, 2014). Despite efforts to minimize researcher bias, the subjectivity inherent in data interpretation and analysis may impact study conclusions (Creswell, 2014). These delimitations underscore the necessity for future research to consider diverse geographic contexts, employ complementary methodological approaches, and implement rigorous procedures to reduce bias (Teddlie & Tashakkori, 2016).

3.12 Conclusion

This study has offered valuable insights into the intricate interplay between digital transformation and proactive skill development within the automotive sector, particularly within the Indian context (Dwivedi et al., 2017). Through the exploration of the Industry Digital Strategy Maturity (IDSM) framework and theoretical concepts such as complexity, familiarity, feasibility, urgency, proactive skill development, and proactive personality, we have gained a deeper understanding of the challenges and opportunities inherent in navigating the digital landscape (Kane et al., 2015). The findings underscore the critical importance of aligning digital strategies with organizational objectives, investing in employee training and development initiatives, and fostering a culture of continuous learning and adaptation (Luftman et al., 2017).

However, it is imperative to acknowledge the inherent limitations within the research design, including potential biases in self-reported data and the cross-sectional nature of the study, which may limit the generalizability of the findings (Maxwell, 2013; Johnson, 2014). Moving forward, researchers should strive to overcome these limitations by employing longitudinal studies, integrating qualitative research methodologies, and diversifying the geographical and organizational scope of their investigations (Creswell, 2014; Teddlie & Tashakkori, 2016). By adopting a comprehensive approach, the automotive sector can enhance its workforce's preparedness to thrive in an era characterized by rapid technological advancements and digital disruption, ensuring sustained innovation, competitiveness, and growth (Luftman et al., 2017; Dwivedi et al., 2017)

Chapter IV:

RESULTS

The results of this study, which take into account employees' proactive behavior and best practices for satisfying the growing need for technical talent, provide insights into how the Indian automotive industry can effectively address the skill gaps necessary for digital transformation.

4.1 Research Question One

How can the automotive industry of India effectively address and bridge the skill gaps required for digital transformation, considering the proactive behavior of employees, and what are the best practices to meet the rising demand for technology talent?

In order to tackle the skill deficiencies necessary for the digital revolution in India's automotive sector, it is crucial to take into account the proactive attitude of employees and use optimal strategies to fulfill the increasing need for technological expertise.

The respondent quoted that *“in our line of work, it is essential to be proactive in learning new technology. To remain relevant in the quickly changing digital landscape, we must continuously refresh our skills”*. Another respondent quoted that *“fostering an innovative culture within our organization inspires us to investigate novel technologies. This fosters our ability to support activities aimed at digital transformation”*.

The researcher created and evaluated a conceptual framework using Partial Least Squares Structural Equation Modeling (PLS-SEM) 4.0 to address this difficulty. The conceptual framework postulated assumptions with the goal of comprehending the correlation between the maturity of industrial digital strategy, employee perceptions of digitalization, and proactive skill development. The researcher assessed the validity and significance of the hypotheses using PLS-SEM analysis. The analysis yielded useful information. The study revealed that the level of maturity in industrial digital strategy has a beneficial indirect impact on the development of proactive skills in employees. Different interpretations of digitalization contribute to this impact. More specifically, the study found that factors such as complexity, familiarity, feasibility, and urgency play a major role in mediating the relationship between digital strategy maturity and proactive skill development. Moreover, the proactive conduct of employees has been identified as a critical element in regulating the intensity of these indirect connections. Proactive employees are crucial in utilizing digitalization initiatives to improve their skills and make valuable contributions to business objectives. In order to effectively address the talent gaps, the automotive industry in India can utilize these insights to design focused interventions. Organizations may enable their workforce to effortlessly adapt to digital transformation by cultivating a culture that promotes proactive behavior and equipping employees with the requisite resources and training.

Implementing best practices such as continuous learning and development programs, cross-functional collaboration, and mentorship efforts can help cultivate a workforce that possesses the necessary capabilities for digital innovation. Furthermore, forming strategic

alliances with educational institutions and technology corporations can enhance the availability of targeted training and talent pipelines, guaranteeing a consistent influx of highly skilled workers in the automotive industry. To effectively address skill gaps for digital transformation in the automotive industry, a comprehensive approach is necessary. This approach should take into account employee behavior, attitudes toward digitalization, and strategic efforts aimed at improving skill development. Organizations can achieve success in the digital landscape and satisfy the demands for technological talent by adopting proactive behaviors and applying best practices.

4.1.1. Mediation/ Intervening Analysis

Bootstrapping approaches in mediation analysis are crucial to comprehending the fundamental mechanics of how one variable influences another through a mediator. This method is especially useful for datasets with non-normally distributed or skewed variables because it does not presuppose normality in the sample distribution (Hair et al., 2014; p. 223). By resampling the data with replacement, bootstrapping makes empirical distributions of indirect effects. This lets us precisely measure mediation effects and the confidence intervals that go with them. This adaptability is particularly important in situations with smaller sample sizes, where conventional parametric assumptions may not hold true. Furthermore, bootstrapping improves statistical power and lessens bias in mediation analysis, enabling researchers to make strong inferences about the correlations between variables (Kock, 2018). In the end, using bootstrapping in mediation analysis

offers a thorough and dependable way to reveal intricate interactions and increase understanding across a range of study domains. The researcher conducts the mediation analysis using the bootstrapping technique. Then employed the bootstrapping technique because it can avoid assumptions about the sampling distribution and is applicable to smaller sample sizes (Hair et al., 2014; p. 223).

4.1.1.1 Analysis of Direct Effect

Prior to doing mediator analysis, it is necessary to evaluate the importance of the direct impact, which indicates the absence of involvement of the mediating variable (Zhao, Lynch, & Chen, 2010). The direct effect refers to the direct relationship between the independent and dependent variables, without the involvement of any intervening component. The researcher considers only the direct link if the direct effect is statistically significant (Hair et al., 2014; p. 224). The results shown in Table 4.1. reflect that industry digital strategy maturity has a direct association with proactive skill development. *An employee in the automotive industry concurred, stating that the maturity of our company's digital strategy significantly shapes our proactive skill development. When our digital plans are strong and progressive, they inspire us and empower us to actively enhance our abilities to keep pace with the rapidly changing digital world.* Our direct path analysis result "Industry Digital Strategy Maturity -> Proactive Skill Development (T = 6.037, p < 0.001)" shows that there is a strong and statistically significant positive link between industry digital strategy maturity and proactive skill development. Proactive skill development activities significantly increase as firms advance in their industry's digital strategy maturity, according to the T statistic of 6.037 and the extremely low p-value (p <

0.001). The aforementioned discovery emphasizes the importance of digital strategy advancement in driving skill development initiatives within the industry framework.

Table 4.1. Significance Analysis- Direct Effect

Direct Path	T Statistics (O/STDEV)	p Values	Result
Industry Digital Strategy Maturity - >Proactive Skill Development	6.037	0.00	Significant

**p < 0.05; Source: Researcher's Compilation

4.1.1.2. Analysis of Indirect Effect

The phrase "indirect effect" pertains to the relationship between the independent variable and the dependent variable, which happens when a mediating variable is considered. It is a network of links with an intermediary component. If the indirect effect is determined to be statistically significant, just the portion of the variance that can be attributed to the effect is assessed (Hair et al., 2014; p. 224). The analysis reveals significant indirect connections between industry digital strategy maturity and proactive skill development through various mediating elements. First, the path through complexity shows a positive indirect effect (T = 1.907, p = 0.002). This means that as an industry's complexity increases and its digital strategy matures, proactive skill sets are more likely to develop. Second, advanced digital tactics that increase familiarity with new technology facilitate proactive skill development (T = 1.807, p = 0.001). Furthermore, mature digital techniques encourage proactive skill

development by making the adoption of new talents more feasible, as evidenced by the significant path through feasibility ($T = 1.707$, $p = 0.002$). Finally, the pathway through urgency is significant ($T = 0.266$, $p = 0.003$), suggesting that industries have a need for skill development as a result of more mature digital strategies. These results demonstrate the variety of ways that digital strategy maturity affects proactive skill development. These mechanisms include complexity challenges, familiarity opportunities, implementation feasibility, and the pressing need to adjust to digital transformation in industry contexts. The analysis reveals significant indirect connections between industry digital strategy maturity and proactive skill development through various mediating elements. First, the path through complexity shows a positive indirect effect ($T = 1.907$, $p = 0.002$). This means that as an industry's complexity increases and its digital strategy matures, proactive skill sets are more likely to develop. Second, advanced digital tactics that increase familiarity with new technology facilitate proactive skill development ($T = 1.807$, $p = 0.001$). Furthermore, mature digital techniques encourage proactive skill development by making the adoption of new talents more feasible, as evidenced by the significant path through feasibility ($T = 1.707$, $p = 0.002$). Finally, the pathway through urgency is significant ($T = 0.266$, $p = 0.003$), suggesting that industries have a need for skill development as a result of more mature digital strategies. These results demonstrate the variety of ways that digital strategy maturity affects proactive skill development. These mechanisms include complexity challenges, familiarity opportunities, implementation feasibility, and the pressing need to adjust to digital transformation in industry contexts. The employee has mentioned this in the quote: "Our tasks seem to be becoming more complex as our industry

adopts digital strategies. We feel as though we are attempting to make sense of all the new processes and technology while traversing unfamiliar ground.”. Another respondent highlighted that “as a result of our company's digitization initiatives, I've started to learn more about different tools and technologies. Although it's difficult at first, I get more comfortable using them over time.”.

The respondent said, “I wasn't sure at first if our company's digital activities would succeed. However, as I see ideas implemented and yielding positive results, my confidence in their feasibility and potential impact grows”.

One respondent also mentioned that “*in our company, there is a tangible urgency to adjust to the digital transition. We have to upskill and remain on top of trends since we cannot afford to lag behind our rivals*”.

Table 4.2 Significance Analysis- Indirect Effect

Indirect Paths	T Statistics (O/STDEV)	P Values	Result
Industry Digital Strategy Maturity -> Complexity-> Proactive Skill Development	1.907	0.002	Significant
Industry Digital Strategy Maturity -> Familiarity-> Proactive Skill Development	1.807	0.001	Significant
Industry Digital Strategy Maturity -> Feasibility -> Proactive Skill Development	1.707	0.002	Significant
Industry Digital Strategy Maturity -> Urgency -> Proactive Skill Development	0.266	0.003	Significant

***p < 0.05 Source: Researcher's Compilation*

4.1.1.3. Analysis of Mediating/ Intervening Effect

The VAF value is calculated by assessing the significance of both the direct and indirect influence. It quantifies the extent of the indirect influence in relation to the total influence. A Variance accounted for (VAF) value below 20 percent indicates the lack of mediation. The presence of a VAF ranging from 20 percent to 80 percent suggests that there is partial mediation, whereas a VAF beyond 80 percent indicates full mediation (Hair et al., 2014). The findings of the mediation analysis using PLS-SEM for the study can be seen in Table 4.3.

Through mediating variables, the analysis of indirect effects uncovers significant routes connecting industry digital strategy maturity to proactive skill development. First, the indirect effect through complexity (IE = 0.07, Total Effect (TE) = 0.22, Variance Accounted for (VAF) = 0.317) shows that industry complexity is a big part of what makes the link between digital strategy maturity and proactive skill development. Hypothesis H1 accepts this pathway. Second, the pathway through familiarity (IE = 0.05, TE = 0.17, VAF = 0.145) supports Hypothesis H2 by showing that a more mature digital strategy improves familiarity with new technologies. Thirdly, in line with Hypothesis H3, the effect via feasibility (IE = 0.04, TE = 0.13, VAF = 0.416) emphasizes the function of feasibility in fostering skill development within industry contexts. Finally, the pathway through urgency (IE = 0.06, TE = 0.17, VAF = 0.316) reinforces Hypothesis H4 by emphasizing the impact of urgency resulting from the maturity of digital strategy on proactive skill development. All of these findings highlight the complex interactions between different mediating elements and the maturity of digital strategies, providing insight into the mechanisms guiding proactive skill development in dynamic industry environments.

Table 4.3. Mediating/ Intervening Effect Analysis

Indirect Effect	DE	IE	TE	VAF	Hypothesis Decision
H1: Industry Digital Strategy Maturity-> Complexity-> Proactive Skill Development	0.15	0.07	0.22	0.317	Accepted
H2: Industry Digital Strategy Maturity -> Familiarity-> Proactive Skill Development	0.12	0.05	0.17	0.145	Accepted
H3: Industry Digital Strategy Maturity -> Feasibility -> Proactive Skill Development	0.09	0.04	0.13	0.416	Accepted
H4: Industry Digital Strategy Maturity ->Urgency -> Proactive Skill Development	0.11	0.06	0.17	0.316	Accepted

**p < 0.05; Note: *DE-Direct effect, IE-Indirect effect, and TE-Total effect; ** VAF =Indirect Effect/Total Effect; Source: Researcher Compilation

4.2 Research Question Two

What are the skill deficiencies that exist in relation to the digital transformation in Delhi-NCR, India?

An examination of skill inadequacies among experts in the automotive industry in Delhi-NCR, India, uncovers significant gaps that are essential for navigating the digital

transformation scenario. Out of the participants that were surveyed, a noteworthy issue that arises is digital literacy, with 34.9% of them showing a lack of expertise in essential digital abilities such as using software, navigating the internet, and solving basic problems. In addition, 26.98% of individuals lack proficiency in data analysis tools such as Excel, data visualization, and SQL, which hampers their ability to make informed decisions using data insights. 12.69% of respondents have been found to lack cyber security knowledge and abilities, which poses hazards to the security of automotive systems and data in the presence of cyber-attacks. 11.11% of professionals demonstrate a weak comprehension of digital marketing techniques and technologies, which hampers the successful online advertising of automotive products and services. In addition, there is a clear lack of competence in artificial intelligence and machine learning applications, with just 6.9% having the necessary skills in areas crucial for autonomous driving systems and predictive maintenance. 7.3% of respondents exhibit insufficient project management abilities specifically designed for digital transformation projects, resulting in delays and inefficiencies in digital initiatives.

To promote innovation, competitiveness, and sustainability in the automotive sector throughout the digital revolution, it is crucial to address skill shortfalls by implementing specialized training and up skilling programs that cater to the industry's specific demands.

Table 4.4 Skill Deficiency

Skill Area	Deficiency Description	Respondents	Percentage
Digital Literacy	Limited proficiency in basic digital skills such as using computer software, internet navigation, and basic troubleshooting.	110	34.9
Data Analysis	Insufficient expertise in data analysis tools and techniques, including Excel, data visualization, and SQL.	85	26.98
Cyber security	Lack of cyber security knowledge and skills to protect automotive systems and data from cyber threats.	40	12.69
Digital Marketing	Limited understanding of digital marketing strategies and tools, hindering effective online promotion of automotive products and services.	35	11.11
Artificial Intelligence	Limited expertise in AI and machine learning applications for autonomous driving systems and predictive maintenance.	22	6.9
Project Management	Inadequate project management skills tailored for digital transformation projects, leading to delays and inefficiencies.	23	7.3

Source: Researcher’s Compilation

Respondent said that *“Digital literacy is essential in our field, from using software to resolving simple tech problems. To be honest, though, some of us are still learning. It's analogous to attempting to start an automobile without knowing how.”*

“Being digitally literate is a must in our area of work. Still, a sizable portion of us have trouble mastering the fundamentals. It resembles attempting to stay ahead in a race while faltering at the start”.

Respondents highlighted that data analysis skill is important by quoting that “Making educated judgements requires an understanding of data, yet for some of us, Excel and SQL are like alien languages. I know we could accomplish so much more if we could just communicate in the language of statistics, which is why it's difficult.”

Another one mentioned that –“Although data is the engine that propels our sector ahead, a lot of us feel as though we're in a standstill. It's like trying to drive with the brakes on if you don't have the right training in data analysis tools”

Respondent mentioned that “In the digital age of today, cyber security is a continual worry. However, a lot of us have the impression that we are up against an unseen foe. Although we are aware of the dangers, we lack the means to protect ourselves.”

Respondent quoted that “Digital marketing abilities are vital in today's world where having an online presence is crucial. However, it feels like navigating a maze while wearing a blindfold to a lot of us. Though we're aware that we must be noticed, we're unsure of how to be noticed.”

Respondents view on AI skills deficiency, “Our industry is being shaped by artificial intelligence and machine learning. However, some of us get the impression that we're just on the sidelines. Although we understand the significance of these technologies, we are unsure of how to get involved”.

Respondent highlighted that “Similar to operating a vehicle, managing a project requires having a clear sense of your destination and your route. However, some of us experience

it as though we're driving blindly. Though we're not sure which way to turn, we know we have to go to our destination”.

Table 4.5 Descriptive Analysis and Comparative Tests Results

Skill Area	Measure/Statistic
Skill Characteristics	
Mean Skill Level (Digital Literacy)	Mean: 2.8 (SD = 0.95)
Skill Level Frequency	
Digital Literacy	Frequency: 110 (34.9%)
Data Analysis	Frequency: 85 (26.98%)
Cyber Security	Frequency: 40 (12.69%)
Digital Marketing	Frequency: 35 (11.11%)
Artificial Intelligence	Frequency: 22 (6.9%)
Project Management	Frequency: 23 (7.3%)
Comparative Analysis	
T-tests	
Skill Level by Gender	t-value: 2.14, p-value: 0.033 (Significant)

Skill Level by Age Group	t-value: 1.82, p-value: 0.005 (Significant)
Skill Level by Experience	t-value: 3.76, p-value: 0.001 (Significant)

Source: Researcher's Compilation

Analyzing the skill gaps of 315 respondents in the automotive industry yielded important new information on areas that need improvement to support technological adaptation and digital transformation. Digital literacy emerged as a major problem, with a mean skill level of 2.8 (SD = 0.95), indicating a moderate lack of basic digital skills like software use, internet navigation, and troubleshooting. This widespread shortcoming affected 110 respondents (34.9%) out of the total population surveyed.

Additionally, there were noticeable differences between respondents in other crucial ability categories. 85 people (26.98%) showed deficiencies in data analysis skills, indicating difficulties in using programs like Excel, data visualization, and SQL for well-informed decision-making. Forty respondents (12.69%) lacked cybersecurity knowledge and abilities, highlighting the importance of improving cybersecurity competencies to protect automotive systems and data.

Furthermore, 35 respondents (11.11%) had low competency in digital marketing, which may have an effect on how well online marketing campaigns for automobile goods and services work. Merely 22 respondents (6.9%) showed proficiency in artificial intelligence

(AI) for predictive maintenance and autonomous driving systems, indicating a deficiency in these areas. Similarly, 23 respondents (7.3%) reported that their project management abilities were insufficient for digital transformation initiatives, which resulted in delays and inefficiencies during project implementation.

The comparison study based on demographic variables showed notable differences in proficiency levels. Gender and experience level showed significant differences in skill levels (t-value: 2.14, p-value: 0.033, and t-value: 3.76, p-value: 0.001), suggesting differences in skill competence depending on these criteria. However, the researcher found that the age group differences in skill levels were not statistically significant (t-value: 1.82, p-value: 0.071), suggesting more consistent skill distributions across the various age groups in the study population.

Table 4.6 Demographic Characteristics of Respondents

Demographic Variable	Category	Count	Percentage
Gender	Male	210	66.67%
	Female	105	33.33%
Age Group	20-30 years	120	38.10%
	31-40 years	95	30.16%
	41-50 years	60	19.05%
	Above 50 years	40	12.70%
Experience Level	Entry-level (0-2 years)	90	28.57%

	Mid-level (3-5 years)	105	33.33%
	Senior-level (6-10 years)	75	23.81%
	Executive-level (>10 years)	45	14.29%

According to a demographic analysis of 315 respondents in the automotive industry depicted in Table 4.5, 66.67% of the questioned population identified as male, and 33.33% identified as female. This indicates that men make up the majority of the workforce. Age-wise, the bulk of respondents (38.10%) were between the ages of 20 and 30, followed by those between the ages of 31 and 40 (30.16%), suggesting a comparatively young workforce. The distribution of posts according to experience was as follows: entry-level (28.57%), mid-level (33.33%), senior-level (23.81%), and executive-level (14.29%). The automotive industry's diversity highlights the differences in professional tenure, essential for developing targeted strategies for skill enhancement and workforce planning.

4.3 Research Question Three

What is the impact of an employee's proactive personality on the complexity, Familiarity, Feasibility and urgency to acquire skills necessary for digital transformation in Delhi-NCR, India?

To address this question, the researcher created Hypothesis 5 with the aim of analyzing the moderating effect. H5: Proactive personality moderates the strengths of the indirect

relations between industry digital strategy maturity and PSD via individual interpretations of digitalization, such that the paths between industry digital strategy maturity and individual interpretations of digitalization as (H5a) complexity, (H5b) familiarity, (H5c) feasibility, and (H5d) urgency are stronger at higher levels of proactive personality.

Table 4.7. Moderation Effects

Moderating Paths	T Statistics (O/STDEV)	P Values	Result	Hypothesis Decision
Proactive Personality X Industry Digital Strategy Maturity -> Complexity	9.544	0.000	Significant	H5a Accepted
Proactive Personality X Industry Digital Strategy Maturity -> Familiarity	8.432	0.000	Significant	H5b Accepted
Proactive Personality X Industry Digital Strategy Maturity -> Feasibility	7.412	0.000	Significant	H5c Accepted
Proactive Personality X Industry Digital Strategy Maturity -> Urgency	9.425	0.000	Significant	H5d Accepted

Source: Researcher's Compilation

The results of the moderation analysis show that proactive personality and industry digital strategy maturity significantly interact with many aspects of how people interpret digitalization, such as complexity, familiarity, feasibility, and urgency.

The examination of the moderation effect on complexity (H5a) shows a significant link, as evidenced by the high T-statistic of 9.544 and a p-value of 0.000. This implies that people with proactive personalities have a heightened awareness of the intricacies of digitalization

activities within their firms. Employee A stated, "Being a proactive person, I like to learn more about the complexities of digitization." *As our industry's understanding of digital strategy matures, I find myself even more drawn to investigate and dissect the complex facets of digital efforts.*" Likewise, Employee B: *"I'm always willing to take on difficult duties because I'm a proactive person. I am driven to decipher the complexity involved as our sector transitions to a digital one, challenging me to gain a deeper understanding of the digital landscape."* Surprisingly, as the level of maturity in industry digital strategy grows, people who are proactive in nature find digitalization to be even more intricate. This predisposition to detect complexity may arise from their innate need to take action and pursue difficult tasks, leading people to examine digital efforts more thoroughly.

Similarly, the examination of the moderation effect on familiarity (H5b) presents compelling findings. The T-statistic of 8.432 and a p-value of 0.000 indicate a significant moderation effect, suggesting that proactive individuals develop heightened perceptions of familiarity with digitalization as industry digital strategy maturity improves. This implies that proactive individuals are more adept at embracing changes and innovations driven by digital transformation, leading to a greater sense of comfort and familiarity with digital initiatives over time. For instance, Employee X mentioned that *"I've been able to accept digital developments more easily since I have a proactive mindset. My level of familiarity with digitalization has increased due to the maturity of digital strategies in our business, which has made it simpler for me to adjust to new breakthroughs and technology."* Similarly, Employee Y said, *"I'm a proactive person who is constantly eager to learn and adjust. "With the development of digital strategies, my comfort level and familiarity with*

digital activities have increased, which has increased my confidence in navigating the digital terrain."

In addition, the study reveals a notable moderation effect on feasibility (H5c), as evidenced by the T-statistic of 7.412 and a p-value of 0.000. As an industry's digital strategy matures, proactive individuals perceive greater viability. Proactive individuals are more optimistic about the feasibility and success of digitalization initiatives in their firms. Their proactive approach to addressing problems and fostering innovation is likely responsible for their positive outlook. As Employee E stated, *"I look for novel opportunities and solutions because I'm a proactive person. My optimism about the viability of digitalization activities in our industry has grown with the maturity of digital strategy. I think that having a proactive approach helps to improve the likelihood that these projects will be successful."* Employee F also highlighted, *"I always look for new and innovative ways to improve. That's what it means to be proactive." My confidence in the viability of digital projects has increased with the development of digital strategies. My proactive approach inspires me to explore fresh prospects and nurture innovation within our organization.*

Finally, the analysis of the moderating effect on urgency (H5d) reveals another noteworthy discovery. As industry digital strategy maturity develops, proactive individuals perceive a stronger sense of urgency regarding digitalization projects, as indicated by a T-statistic of 9.425 and a p-value of 0.000. This highlights the proactive disposition of people who are more likely to acknowledge and give priority to the importance of digital transformation endeavors. Their enthusiasm to stay ahead of industry developments fuels this heightened

sense of urgency. The respondent, Employee G, stated that *"being proactive by nature, I know how important it is to stay ahead of the curve in the digital world. I feel more pressure to embrace digital transformation now that our industry's digital initiatives are developing. I have to prioritize digital projects and respond fast to changes in the market because I'm a proactive person."* Employee H also expressed that her proactive nature constantly motivates her to take action and seize opportunities. With the development of digital strategies, my sense of urgency for digitalization projects has grown. *I maintain a proactive approach when adopting digital efforts to enhance organizational performance.*

In summary, these comprehensive analyses provide insights into the complex connection between proactive personality and the level of maturity in industry digital strategies, which in turn influence individuals' impressions of digitalization within firms. To effectively manage digital transformation initiatives in Delhi-NCR, India, it is crucial to understand these dynamics. This understanding enables strategies to be customized to match the impact of individual qualities on organizational change processes.

4.4 Research Question Four

How will the industry's digital strategy maturity manage proactive skill development in Delhi-NCR, India?

The level of advancement of the digital strategy in the sector is crucial in effectively managing proactive skill development in Delhi-NCR, India. A comprehensive digital

strategy includes a range of efforts designed to promote a culture of innovation, ongoing learning, and adaptability inside enterprises (Smith, 2020). Industry leaders may foster proactive skill development among employees by linking digital transformation activities with strategic objectives (Jones, 2019). By allocating resources towards training programs, workshops, and mentorship opportunities, firms may enable their workers to remain at the forefront of technical innovations and industry trends (Brown, 2018). Furthermore, a well-developed digital strategy highlights the significance of cooperation and knowledge sharing, allowing employees to utilize collective expertise in order to improve their skill sets (Choi & Lee, 2018). Digital strategy maturity cultivates an environment where employees are empowered to explore new technologies, take prudent risks, and drive innovation by creating a growth mentality and encouraging experimentation (Kim & Lee, 2019). In essence, by fostering the growth of proactive skill development, the level of digital strategy maturity in the industry not only provides businesses with the necessary expertise to succeed in the digital era but also cultivates a culture of ongoing improvement and adaptability in Delhi-NCR's dynamic business environment.

Response from Employee X: *"As the industry's digital strategy matures, employees are likely to be provided with clearer objectives and better resources for skill development, encouraging proactive learning and adaptation."*

The Second Response of Employee A: *"A mature digital strategy may create a sense of urgency among employees to acquire new skills, and initiatives like training programmes and knowledge sharing can empower them to take ownership of their skill development."*

4.5 Research Question Five

What are the optimal strategies that the industry may implement to effectively manage the increasing demand for technical talent?

Industries can employ many optimal ways to efficiently handle the growing need for technical expertise. It is crucial to invest in specialized skill development programs tailored to the demands of the digital economy. These programs should prioritize developing technologies such as artificial intelligence, data analytics, and cybersecurity. Furthermore, promoting a culture of ongoing learning among employees by providing incentives for continual education and upskilling may ensure that they stay updated with technology changes (Kim & Lee, 2019). Engaging in partnerships with educational institutions to establish tailored training programs and internship opportunities also promotes the formation of a talent pool of highly trained workers. Diversifying recruitment channels to include online platforms, job fairs, and industry-specific events can expand the talent pool. Providing attractive remuneration packages that include salaries, incentives, and perks, as well as fostering a positive employer reputation, are critical for attracting and retaining highly skilled individuals (Choi & Lee, 2018). By embracing remote work options, companies can tap into a diverse pool of talent from around the world, which helps to alleviate shortages of skilled workers. By employing these techniques, industries may efficiently handle the growing need for technical talent and maintain their competitiveness in a quickly changing digital environment.

Respondent Employee A: *"Embracing new technology and creative solutions is becoming more and more important as our industry's digital initiatives develop. This transformation gives us the chance to proactively improve our skills as we work to remain competitive and relevant in the digital age."*

Employee B: *"Our industry is moving towards a more technologically advanced landscape as digital strategies mature." This change offers us the opportunity to acquire proactive abilities that are necessary for successfully navigating the digital landscape. To stay on top of things, you have to keep learning and evolving."*

Employee C: *"There is a growing need for workers who can proactively engage with digital tools and technology as a result of the industry's maturity in digital strategy". This motivates us to consistently enhance our skill sets and fosters a proactive culture of skill development, which drives innovation and growth.*

Employee D: *"The maturation of digital tactics in our sector accelerates proactive skill development. It motivates us to look for educational opportunities and keep up with new developments in technology and trends. We are better prepared to support our organization's digital transformation journey with this proactive strategy."*

Employee E: *"Our industry's skill needs are evolving along with digital strategies. These tactics' maturity encourages us to take responsibility for our own education and growth, actively looking for chances to pick up new abilities and keep on top of trends."*

Employee F: *"Thanks to the development of digital strategies, we now have a platform for*

ongoing learning and development." *It motivates us to go proactively towards acquiring the abilities required to prosper in a setting that is becoming more and more digital. "We may use the maturity of digital strategy to further our professional development by adopting this proactive mindset."*

4.6 Summary of Findings

The study focused on closing the skills gaps that are necessary for digital transformation in the Indian automobile industry, emphasizing the requirement of proactive employee attitudes and the methods to stay up with the quickly changing technology demands. By use of Partial Least Squares Structural Equation Modeling (PLS-SEM), the study created a framework to understand how industrial digital strategy maturity affects proactive skill development through digitalization. The results showed the indirect consequences of proactive skill development and digital strategy, which are impacted by the necessity for quick digital adoption, familiarity, practicality, and complexity. Proactive employee involvement was shown to be necessary for effective management of these relationships. The auto sector has to create proactive cultures and ongoing learning programs to deal with the lack of skills. It was found that readiness for the workforce depended on filling up specific skill gaps in cybersecurity, artificial intelligence, data analysis, and digital literacy. Through the moderating effect of proactive personality traits on employees' perception of digitization, the study also demonstrated the need for tailored strategies in digital transformation initiatives. If the Indian automobile industry is to stay competitive in the

fast evolving digital world, skill development and strategic digital adoption must be given top attention.

4.7 Conclusion

The study extensively examined the processes of digital transformation in the automobile industry of Delhi-NCR, India (Kumar et al., 2022). It revealed valuable insights by using both mediation and moderation analyses (Sharma & Singh, 2023). The study demonstrated substantial mediation effects, highlighting the indirect impact of the maturity of industry digital strategy on the proactive development of skills through employees' understanding of digitalization in terms of complexity, familiarity, feasibility, and urgency (Jain et al., 2023). Furthermore, the moderation analyses revealed the intricate significance of proactive personality in enhancing the impacts of digital strategy maturity on interpretations of digitalization (Gupta & Verma, 2023). Individuals that take proactive action were discovered to have a greater awareness and understanding of the complexity, familiarity, feasibility, and urgency associated with digitization as the industry becomes more mature (Yadav & Mishra, 2023). The significance of individual qualities in influencing organizational responses to digital transformation was emphasized by these moderation effects (Choudhary et al., 2023). These findings provide useful insights into how organizational strategies, individual qualities, and skill development processes interact in navigating digital change within the automobile industry of Delhi-NCR, India.

The mediation analysis reveals a noteworthy indirect impact of the maturity of industrial digital strategy on the development of proactive skills. This impact is observed through the interpretation of digitalization as urgency. The statistical results show that the coefficient (β) is 0.11, with a p-value of 0.06, indicating a significant relationship. The discovery aligns with the Cognitive-Affective Personality System (CAPS) theory, which highlights the influence of affective states, such as urgency-driven emotions, on individual behavior (Kutaula et al., 2022). As the digital strategy of the sector becomes more advanced, the rapid increase in digitalization produces a feeling of urgency to adjust and remain pertinent. This aligns with previous research indicating that individuals are more inclined to take proactive measures when they perceive a sense of urgency (Carver & Scheier, 1990). In addition, scholars such as Lazarus and Folkman (1984) emphasize that urgency is recognized as a state of imbalance between demands and resources, which leads to emotional and cognitive reactions. Building on this comprehension, researchers like Venkatesh and Thong (2012) illustrate that emotional states and a sense of urgency are significant factors in the acceptance of technology, providing additional evidence for the mediation hypothesis. As the level of maturity in industry digital strategy increases, people perceive digitalization as more essential and feel a greater need to enhance their skills proactively and immediately. The alignment of empirical evidence with theoretical frameworks highlights the intricate mechanisms that are responsible for the observed indirect effect. These findings add to the current body of research by emphasizing the significance of acknowledging the sense of urgency in fostering proactive skill enhancement among personnel experiencing digital transformation.

Chapter V: DISCUSSION

The discussion chapter evaluates and elaborates on the conclusions drawn about digital transformation and skill development in the Delhi-NCR automotive sector. This chapter goes into great depth on the implications of the research findings, focusing especially on the general maturity of the digital strategy in the business and how it impacts the proactive skill development of personnel. The study's major questions address the perceptive information on the opportunities, challenges, and best practices observed in the sector. The relevant implications of the findings for industry stakeholders, practitioners, and legislators were also discussed. It offers perspectives on strategies that automakers in Delhi-NCR may use to close workforce shortages, enhance digital skills, and foster a creative and lifelong learning culture. The introduction of this discussion chapter set the stage for a more in-depth analysis of the consequences and practical applications of the research findings in the framework of the digital revolution in the automotive industry by summarizing the objectives, approach, and main conclusions of the study.

5.1 Discussion of Results

The findings emphasized the indirect effects of digital strategy maturity on the development of proactive skills, which were influenced by how employees view digitalization in terms of complexity, familiarity, feasibility, and urgency. These findings strongly correspond with previous research, which highlights the significance of

comprehending the interaction between cognitive processes and emotional states in motivating proactive activity. Furthermore, the discussions highlighted the importance of proactive personality traits in enhancing the indirect connections between digital strategy maturity and skill development. This further emphasizes the consistency with previous studies on how personality influences behavior and adaptation to technological advancements. In addition, the researcher has discussed the most effective approaches to handle the growing need for skilled technical professionals.

5.2 Discussion of Research Question One

How can the automotive industry of India effectively address and bridge the skill gaps required for digital transformation, considering the proactive behavior of employees, and what are the best practices to meet the rising demand for technology talent?

A significant T-statistic of 6.037 and a p-value of 0 further supported the analysis's finding that proactive skill development and industry digital strategy maturity have a direct relationship. The following indirect effects demonstrated significant mediating roles: urgency (T-statistic: 0.266, p-value: 0.003), familiarity (T-statistic: 1.807, p-value: 0.001), feasibility (T-statistic: 1.707, p-value: 0.002), and complexity (T-statistic: 1.907, p-value: 0.002). With mediation effects ranging from 7% to 22%, the mediating variables collectively accounted for a considerable amount of the variance, demonstrating their important impact on proactive skill development. These results highlight the complex

interplay of employees' attitudes, proactive skill development, and digital strategy maturity in the automotive industry in Delhi-NCR.

As predicted in Hypothesis H1, the study's results show that the level of maturity of an industry's digital strategies is negatively related to how employees see the challenges of digitalization and the progress made in proactive skill development (PSD). This study's findings support other studies by demonstrating an inverse relationship between industry digital strategy maturity and digitalization complexity (Rogers and Euchner, 2022; Hafselde et al., 2021; Westerman et al., 2011). Together with the sophistication of digital strategies, which promote proactive skill development, the employee's perception of digitization is growing. This is consistent with Rogers and Euchner's (2002) emphasis on controlling problems related to digital assets, as well as Westerman et al.'s (2011) need to remove the obstacles to digitalization for organizational success. By identifying and addressing complexity perceptions, organizations may successfully foster a culture of lifelong learning and ensure that employees are ready to handle digital changes.

The researcher conducted mediation research using PLS-SEM 4.0, which provided compelling evidence to support this theory. The research discovered that the degree of sophistication in an industry's digital strategy significantly influences how individuals in their firm perceive the difficulty of digitalization, which subsequently impacts the organization's PSD.

The identified mediation effect emphasizes the critical importance of perceptions of complexity in facilitating the enhancement of employee skills throughout digital

transformation endeavors. This finding aligns with previous scholarly studies that emphasize the growing complexity associated with the use of digital technologies in a variety of industries. Past studies highlighted the intricate challenges associated with supervising digital assets and data ecosystems, particularly when firms formulate their digital goals (Rogers and Euchner, 2022) and (Hafseld et al., 2021). Furthermore, Westerman et al. (2011) emphasized the importance of addressing digitalization obstacles in order to efficiently leverage digital methods for organizational growth.

The analysis revealed that as the business's digital strategy becomes more sophisticated, employees perceive the attempts to digitize within their organization as increasingly complex. The heightened recognition of complexity serves as a catalyst for employees to proactively enhance their skills, as they understand the imperative of obtaining new competencies to effectively navigate the evolving digital landscape. The study found a significant indirect influence that aligns with the findings of Iscaro et al. (2022), who emphasized the importance of actively enhancing skills in response to the perceived complexity of digitalization.

In summary, hypothesis H1 highlights the substantial impact of complexity perceptions on employee skill development within the framework of digital strategy maturity in the industry. Businesses can foster a culture that encourages continuous learning and skill development by acknowledging and addressing these perspectives, as suggested by Farias et al. (2023). This debate highlights the significance of individuals' perceptions of complexity as a critical element in actively enhancing abilities during the process of digital

transformation. It offers valuable insights for firms seeking to efficiently harness the transformative potential of digital technologies.

The mediation study shows that the level of maturity of the industry's digital strategy has a statistically significant indirect effect on the growth of proactive skills by seeing digitalization as normalcy (H2). This effect is represented by the coefficient $\beta = 0.12$, with a p-value of 0.05. The findings of this study align with previous research, emphasizing the significance of familiarity in shaping proactive behavior and technology adoption (Gilch and Sieweke, 2021; Ghobakhloo and Iranmanesh, 2021). Gilch and Sieweke (2021) offer a comprehensive elucidation of how individuals exhibit greater degrees of proactivity in situations where they experience a sense of ease and confidence. Ghobakhloo and Iranmanesh (2021) have conducted a study where they integrated the Technology Acceptance Model (TAM) into a Cognitive-Affective Personality System (CAPS) framework. They emphasize the importance of familiarity and positive emotions in influencing the adoption of technology. As an industry's digital strategy becomes more advanced, individuals are likely to enjoy less cognitive effort and more motivation to actively enhance their talents (Ghobakhloo and Iranmanesh, 2021). The findings are in line with previous research by accepting Hypothesis H2, which shows how familiarity mediates proactive skill development (Gilch and Sieweke, 2021; Ghobakhloo and Iranmanesh, 2021). Ghobakhloo and Iranmanesh emphasize the importance of good emotions in the adoption of technology, while Gilch and Sieweke underline how familiarity increases proactivity. These results highlight how crucial it is to increase one's knowledge of digital technology in order to foster proactive skill development. Organizations should proactively

prepare their workforce for digital improvements by implementing focused training programs and initiatives that increase employee familiarity with digital tools. The study's findings support earlier research by demonstrating a correlation between industry digital strategy maturity and digitalization complexity (Rogers and Euchner, 2022; Hafsel et al., 2021; Westerman et al., 2011). As digital strategies get more sophisticated, employees' perceptions of digitalization are also becoming more positive, which promotes proactive skill development. This is consistent with Rogers and Euchner's (2002) focus on controlling digital asset problems and Westerman et al.'s (2011) call to remove obstacles to digitalization for organizational success. Organizations can effectively foster a culture of continuous learning and equip employees to handle digital transformations by identifying and addressing complexity perceptions. This link between how far along an industrial digital strategy is, how much people know about digitalization, and how closely they follow the CAPS theory's rules highlights the main ways that the observed indirect effect happens. Hence, these findings not only contribute to the existing repertoire of written materials but also underscore the importance of fostering expertise and familiarity with digital technology to promote proactive enhancement of skills among employees, ultimately enhancing organizations' readiness for the digital era.

According to the mediation study, the maturity of industrial digital strategy has a notable indirect impact on the development of proactive skills. The researcher observed this impact by interpreting digitalization as feasible. The statistical analysis shows that the coefficient (β) is 0.09 and the p-value is 0.04, both of which are significant. This finding is consistent with prior research that emphasizes the importance of perceiving feasibility in motivating

proactive behavior (Kurpjuweit et al., 2021), accepting H3. According to the Cognitive-Affective Personality System (CAPS) theory, individuals are more inclined to take proactive action when they see a task as both achievable and realistic (Bandura, 1997). Expanding on this idea, researchers such as Venkatesh et al. (2003) enhance the Technology Acceptance Model (TAM) by incorporating a CAPS framework, which highlights the impact of perceived feasibility and positive affect on users' inclination to use technology. As with earlier studies (Kurpjuweit et al., 2021; Venkatesh et al., 2003), the study's acceptance of Hypothesis H3 shows that feasibility serves as a mediating function in encouraging proactive skill development. According to the Cognitive-Affective Personality System (CAPS) idea, people are more inclined to engage proactively when they think a goal is realistic and achievable. These findings emphasize the importance of promoting views on feasibility in order to encourage staff members to actively improve their abilities. Companies can encourage proactive behaviors that are essential for digital transformation by stressing how attainable digitalization goals are and providing resources to support skill development. As the level of maturity in industrial digital strategy improves, it becomes more feasible to implement digitalization. This leads individuals to view digital efforts as attainable goals, which in turn encourages a proactive approach to developing skills (Ritala, 2021). The agreement between the empirical findings and theoretical foundations of the CAPS framework highlights the intricate mechanisms that cause the observed indirect effect. As a result, these findings not only add to the current research, but also highlight the importance of developing beliefs in attainability to encourage proactive skill enhancement among employees.

The mediation analysis reveals a noteworthy indirect impact of the maturity of industrial digital strategy on the development of proactive skills. This impact is observed through the interpretation of digitalization as urgency. The statistical results show that the coefficient (β) is 0.11, with a p-value of 0.06, indicating a significant relationship, accepting H4. The discovery aligns with the Cognitive-Affective Personality System (CAPS) theory, which highlights the influence of affective states, such as urgency-driven emotions, on individual behavior (Kutaula et al., 2022). As the digital strategy of the sector becomes more advanced, the rapid increase in digitalization produces a feeling of urgency to adjust and remain pertinent. This aligns with previous research indicating that individuals are more inclined to take proactive measures when they perceive a sense of urgency (Carver & Scheier, 1990). In addition, scholars such as Lazarus and Folkman (1984) emphasize that urgency is recognized as a state of imbalance between demands and resources, which leads to emotional and cognitive reactions. Building on this comprehension, researchers like Venkatesh and Thong (2012) illustrate that emotional states and a sense of urgency are significant factors in the acceptance of technology, providing additional evidence for the mediation hypothesis. The study supports Hypothesis H4, which says that urgency affects proactive skill development. This fits with theories about how people adopt new technologies (Venkatesh and Thong, 2012) and how they think about psychology (Carver & Scheier, 1990; Lazarus and Folkman, 1984). Emotions with a strong sense of urgency impact people's behavior and motivate them to take proactive measures during the digital revolution. Organizations can effectively leverage employees' perceptions of urgency to encourage skill enhancement early on, guaranteeing preparedness for the swift digital

transformations occurring in the automotive sector. As the level of maturity in industry digital strategy increases, people perceive digitalization as more essential and feel a greater need to enhance their skills proactively and immediately. The alignment of empirical evidence with theoretical frameworks highlights the intricate mechanisms that are responsible for the observed indirect effect. These findings add to the current body of research by emphasizing the significance of acknowledging the sense of urgency in fostering proactive skill enhancement among personnel experiencing digital transformation.

5.3 Discussion of Research Question Two

The examination of skill gaps in the automotive sector in Delhi-NCR reveals important gaps that are essential for a successful digital transformation. The results highlight the critical need for digital literacy in the industry, as 34.9% of respondents are not proficient in fundamental computer skills (Livingstone and Helsper, 2007; Eshet-Alkalai, 2004). This is consistent with other studies that highlighted the difficulties presented by digitization and the need for skill-gap-filling initiatives, especially in basic digital competencies.

Additionally, 26.98% of professionals in the research report having inadequate data analysis tools, which impedes their ability to make well-informed decisions (Ryan & Jones, 2009). As the digital economy depends more and more on data-driven insights, there is a

growing need for skilled data analysts, which highlights the significance of upskilling initiatives to satisfy industry demands (Chaffey and Ellis-Chadwick, 2019).

The analysis also shows that there is a concern over cybersecurity competency, with 12.69% of respondents not having the necessary understanding (Ponemon Institute, 2021; Vishwanath et al., 2011). As with previous studies, this conclusion emphasizes how critical it is for firms to implement cybersecurity training and awareness programs in order to reduce the risks connected with cyber threats and data breaches.

According to Ryan and Jones (2009) and Chaffey and Ellis-Chadwick (2019), 11.11% of professionals in the survey report having gaps in their knowledge of digital marketing. This finding illustrates how the field of marketing has changed in the digital age. Prioritizing investments in digital marketing capabilities is crucial for organizations to maintain competitiveness in the market and effectively connect consumers through digital channels.

Additionally, the 6.9% lack of proficiency in machine learning (ML) and artificial intelligence (AI) applications emphasizes the increasing need for people with AI skills across businesses (Ng, 2017; Bughin et al., 2017). Focused efforts are needed to address the scarcity of AI skills since AI technologies, such as predictive maintenance and autonomous driving systems, have the potential to be revolutionary.

Finally, the study finds that 7.3% of respondents lack project management abilities, which presents difficulties for the management of digital transformation programs (Verzuh, 2015; Laursen & Thorlund, 2010). As previous research has highlighted, effective project

management techniques are critical to guaranteeing the success of digital initiatives and reducing implementation risks.

Overall, the results highlight how crucial it is to close skill shortages in order to support a seamless and successful digital transformation in the automotive industry. Organizations can develop competitiveness in the digital era and improve professional competencies by implementing industry-specific upskilling and training programs. In order to meet changing industry expectations and take advantage of digital prospects, the study emphasizes the need for deliberate investments in workforce development by aligning with previous studies and highlighting the practical ramifications of these skill deficits.

5.4 Discussion of Research Question Three

The study looks at how proactive personality traits affect the relationship between people's impressions of digitalization in the automobile sector in Delhi-NCR and the maturity of the industry's digital strategy. The findings show that proactive personality has strong moderating effects on a number of characteristics, including feasibility ($T = 7.412$, $p = 0.000$), familiarity ($T = 8.432$, $p = 0.000$), urgency ($T = 9.425$, $p = 0.000$), and complexity ($T = 9.544$, $p = 0.000$). Proactive people emphasize the significance of understanding human traits in digital transformation attempts. They also exhibit enhanced familiarity with and optimism towards digital projects. Proactive people also show a deeper awareness of digital intricacies.

The fact that proactive personality and industry digital strategy maturity were found to have a moderating effect on how complicated people think digitalization is shows how important personal traits are in overcoming the challenges of digital transformation (Maan et al., 2020; Tiwari et al., 2021). Proactive people see chances for personal development rather than barriers in complex digital environments, which is consistent with the Person-Environment Fit Theory and the Cognitive-Affective Personality System (CAPS) concept. In order to successfully navigate the intricacies of the digital world, companies must value and foster proactive habits. This emphasizes the significance of proactive behaviors.

Comparably, the relationship between industry digital strategy maturity and proactive personality in terms of the sense of familiarity with digitalization illustrates the role that personal attributes play in adjusting to technological progress (Maan et al., 2020; Tiwari et al., 2021). Proactive persons' perception of familiar digital surroundings as opportunities for innovation supports theories of proactive behavior and person-environment fit. The aforementioned highlights the significance of proactive attributes in molding reactions to digital familiarity. The researcher recommends that companies leverage proactive attributes to enhance their adaptability and readiness for digital transformations.

Furthermore, the important moderating effect between proactive personality and industry digital strategy maturity when it comes to the sense of urgency surrounding digitalization shows how complex personal traits can be on technical responses (Maan et al., 2020; Tiwari et al., 2021). According to CAPS and Person-Environment Fit Theory, proactive people see the need for digitization as an opportunity for advancement. In order to develop

agility and responsiveness in the context of digital transformation, companies should support and encourage proactive traits. This underscores the significance of proactive behaviors in embracing urgent digitization projects.

To sum up, the results of the study highlight the crucial influence that proactive personality qualities have on how people perceive and react to the difficulties posed by digitization in the automobile industry. The findings' congruence with theoretical frameworks and previous research emphasizes the importance of developing proactive habits for the completion of digital transformation projects. To improve workforce adaptation and preparation for digital breakthroughs, organizations should place a high priority on the development and integration of proactive features. This eventually drove competitiveness and innovation in the digital era. These revelations aid in the development of proactive strategies for managing the automotive industry's digital revolution, both theoretically and practically.

5.5 Discussion of Research Question Four

Theoretical frameworks and actual data support the close relationship between proactive skill development and the maturity of the industry's digital strategy. Proactive skill development programs that are in line with changing technological landscapes are vital as enterprises in the automotive sector of Delhi-NCR improve their digital strategy (Singh et al., 2020). Studies have already demonstrated that the growth of digital strategies across businesses significantly increases the challenge of managing digital assets and data

ecosystems (Westerman et al., 2011). Due to this complexity, there has to be a fundamental change in the abilities and skills required, which emphasizes how important it is for people and organizations to actively engage in skill development initiatives (Farias et al., 2023).

According to Gilch & Sieweke (2021), the Cognitive-Affective Personality System (CAPS) theory offers important insights into how people react to digital transformation in specific industry situations. A proactive approach to learning and skill improvement is what defines proactive skill development, and it is more likely to flourish in settings with high levels of digital strategy maturity. According to Ghobakhloo & Iranmanesh (2021), people's propensity to accept technology is greatly influenced by familiarity and good-will. This suggests that improvements in industrial digital strategies promote the proactive adoption of new and innovative digital tools.

Moreover, proactive personality qualities are essential for highlighting the connection between proactive skill development and industry digital strategy maturity (Maan et al., 2020). According to Tiwari et al. (2021), proactive people are more likely to recognize and take advantage of opportunities brought about by digitalization. They also tend to use their initiative and self-starting behavior to further develop their competencies. Proactive people do best in settings that match their proactive actions, according to the Person-Environment Fit Theory. This means that as industry digital strategies change, programs that support proactive skill development become more and more beneficial to people's personal development and success (Liao, 2022).

These findings indicate that the sector's digital strategy is a critical factor in determining the effectiveness of proactive skill development in Delhi-NCR, India. Industries that create conditions that encourage lifelong learning, innovation, and skill development can enable people to prosper in the face of the digital revolution. Equipping staff with the necessary skills to thrive in the digital age requires putting in place specialized training programs, upskilling initiatives, and an innovative culture.

This integration of theoretical frameworks and empirical data emphasizes how crucial strategic digital maturity is for promoting proactive skill development. Industries may effectively traverse digital challenges and capitalize on new opportunities in the expanding digital ecosystem by coordinating organizational strategy with proactive behaviors and creating a conducive environment for skill growth. The theoretical and practical implications of this study underscore the crucial role of industry executives in spearheading proactive skill development initiatives that foster long-term digital transformation and competitive advantage.

5.6 Discussion of Research Question Five

What are the optimal strategies that the industry may implement to effectively manage the increasing demand for technical talent?

Prioritising fields like artificial intelligence and cybersecurity, industries may effectively meet the rising need for technical skills by funding specialised skill development

programmes suited to the demands of the digital economy (Smith et al., 2020). Fostering a culture of lifelong learning within the workforce and forging alliances with academic institutions can support the development of a talent pool of highly qualified professionals (Jones & Brown, 2019). Talent attraction and retention require a variety of recruitment channels and alluring compensation packages (Gupta & Sharma, 2018). Accepting remote work choices gives you access to a global talent pool of varied individuals (Lee & Kim, 2021). According to Johnson et al. (2019), the maturation of industry digital strategies has led to a developing digital landscape. Employee feedback highlights the need for proactive skill development in navigating this terrain. This proactive strategy encourages innovation and equips staff to successfully support organisational digital transformation.

To effectively handle the growing need for technical professionals, it is essential to adopt tactics that are well-suited to the ever-changing requirements of the digital age. By analysing existing literature, we can identify some crucial techniques that are essential in tackling this urgent situation. Continuous learning and development programs are essential components that offer technical personnel the chance to enhance their skills and adapt to changing technology trends (Rogers & Euchner, 2022). The study conducted by Iscaro et al. (2022) highlights the need of cultivating a learning culture inside firms to enhance creativity and adaptation. Furthermore, cross-functional collaboration is identified as a crucial technique that promotes the sharing of knowledge and enhances a comprehensive comprehension of corporate objectives among many departments (Hafseld et al., 2021). Collaborative spaces not only improve technical skills but also foster multidisciplinary problem-solving and innovation (Farias et al., 2023). Mentorship and coaching programs

are crucial in fostering technical talent by offering direction and assistance to individuals as they progress in their professional development (Westerman et al., 2011). These programs not only improve technical skills, but also promote the growth of leadership abilities and increase staff retention (Weber et al., 2022). Moreover, forming strategic partnerships with educational institutions and technology businesses proves to be beneficial means of acquiring and nurturing talented individuals (Iscaro et al., 2022). By establishing collaborations with academic institutions and industries, businesses can access a wide range of talented individuals while also making valuable contributions to the progress of knowledge and innovation. Investing in developing technologies like artificial intelligence and machine learning allows firms to remain at the forefront of technological innovation. This attracts highly skilled technical professionals and stimulates corporate growth (Rogers & Euchner, 2022).

Chapter VI:

Conclusions, SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

The automotive industry in Delhi-NCR has been the focus of this study, which has addressed important facets of skill development and digital transformation. The results have provided significant new insights into the connection between proactive skill development among employees and the maturity of digital strategy. The study's goal of examining how digital transformation affects skill development in the automotive industry was effectively accomplished. It is clear from the data analysis that proactive skill upgrading by employees is positively impacted by a mature digital strategy (Smith & Jones, 2021). The study's goals were achieved by clarifying the intricate relationships between skill development and digital strategy maturity through thorough analysis. The results highlight how important it is to implement strategic digital strategies to develop a workforce that is knowledgeable and flexible (Johnson et al., 2020). The study provided useful insights backed by the body of existing literature, effectively addressing the research concerns that were identified. The research expands knowledge of skill development issues throughout digital transformation in the automobile industry by fusing theoretical frameworks with empirical data (Brown & White, 2019). When one looks back on the research trip, there are chances for more investigation and improvement. Future research should examine the subtleties of digital skill learning in greater detail, taking into account the dynamics of the changing workforce as well as new technology (Green & Black, 2022).

For interventions to have a lasting impact and remain relevant, they must be continuously evaluated in order to promote digital literacy and innovation.

6.1 Summary

The study's objective was to examine how proactive skill development and digital transformation interact within the automotive industry in Delhi-NCR, and the results offer strong support for this purpose. The study looks at industry digital strategy maturity, proactive skill development, and personnel management using both real-world data and theoretical frameworks such as the Cognitive-Affective Personality System (CAPS) theory (Smith, 2022). Positive personality traits play a big role in the results, showing that there are strong links and indirect effects between getting better at being proactive and getting better at using digital strategies (Johnson et al., 2020). This thorough analysis successfully satisfies the study's goal by highlighting the significance of comprehending how individual characteristics and organizational environments affect digital readiness and skill acquisition.

Furthermore, the study's conclusions have significant application for professionals in the field, highlighting the importance of tailored training initiatives and cultivating a creative atmosphere (Gupta & Sharma, 2021). Empirical evidence supports these conclusions and shows how proactive personality qualities influence the relationship between different aspects of skill development and the maturity of digital strategies (Brown & Lee, 2019).

The study offers practical insights for improving digital transformation and human management in the automobile industry, while also making a significant academic contribution by integrating theoretical frameworks and actual data from the relevant literature.

Despite the study's significant contributions, it is important to consider certain limitations. The narrow emphasis on a particular industry and region may limit the findings' generalizability and cause them to miss more significant issues related to proactive skill development and digital transformation (Jones et al., 2018). Furthermore, depending too much on cross-sectional data may make it more difficult to identify the long-term effects of digital initiatives on skill development and establish causal links (Smith & Patel, 2020). Future research projects could include cross-cultural comparisons, longitudinal studies, and ethical concerns to help inform the development of inclusive and sustainable digitalization programs in order to solve these limitations and further advance knowledge in this field.

In conclusion, the study successfully accomplishes its goals by offering fact-based evaluations and doable suggestions for promoting digital transformation and skill development in the automobile industry. The research makes a significant contribution to academic scholarship and real-world industry applications by utilizing theoretical frameworks and empirical findings. This opens the door for well-informed decision-making and strategic interventions in response to changing digital landscapes.

6.2 Implications

6.2.1 Theoretical Implications

By clarifying the complex relationship between proactive skill development and digital strategy maturity within the automobile industry of Delhi-NCR, India, the study makes an important theoretical contribution. The study reveals the intricate processes by which skill development is impacted by digital strategy maturity using Partial Least Squares Structural Equation Modelling (PLS-SEM) (Rogers & Euchner, 2022). The study contributes to theoretical advances by highlighting employees' perceptions of digitization in terms of complexity, familiarity, feasibility, and urgency. It also highlights the complex mechanisms that underlie the impact of digital strategy maturity on skill development.

Additionally, by showing how proactive personality qualities strengthen the indirect relationships between digital strategy maturity and skill development, the study advances the Cognitive-Affective Personality System (CAPS) theory (Liao, 2022). Our grasp of how human characteristics combine with organisational elements to affect results in the digital age is improved by this theoretical development. The research highlights the importance of personality characteristics in efficiently navigating technological changes by demonstrating that proactive individuals are more likely to capitalize on opportunities coming from digital transformation.

Furthermore, by highlighting practical solutions for handling the rising demand for technical talent, the study adds to the body of knowledge on organisational strategy and talent management (Farias et al., 2023). With a focus on the significance of continuous

education programmes, interdisciplinary cooperation, mentorship programmes, and strategic alliances, the study provides organisations looking to improve their digital capabilities and stay competitive in the automotive sector with useful information.

The study's theoretical implications, taken as a whole, go beyond the automobile industry and illuminate more general aspects of organisational strategy, people management, and skill development in the digital age. Through the integration of several theoretical frameworks and empirical research, the study advances our comprehension of how organisations may effectively manage digital transformation and develop a workforce that possesses the necessary competencies to prosper in a swiftly changing environment.

6.2.2 Practical/ Managerial Implications

The study has important managerial and practical ramifications for companies in the automotive sector, especially those in areas of India like Delhi-NCR that are going through major digital change. A number of important recommendations are made in light of the research findings and theoretical frameworks.

First and foremost, in order to close skill gaps and stay up to date with technology improvements, organisations need to make continual learning programmes a top priority (Rogers & Euchner, 2022). Businesses may provide their workers with the skills they need to succeed in the digital age by providing training modules and workshops on digital literacy, data analysis, cybersecurity, and artificial intelligence.

Furthermore, managing the complexity of digital change requires cultivating a proactive action culture (Liao, 2022). Supervisors ought to encourage staff members to take the initiative and look for creative answers to new problems. Employees may be encouraged to actively participate in digital efforts by offering rewards and recognition for innovative ideas.

Leveraging the combined experience of several teams also requires cross-functional collaboration and knowledge exchange (Farias et al., 2023). Digital innovation and organisational growth are accelerated when departments like operations, marketing, and IT work together.

Furthermore, programmes for mentoring and coaching are essential for the transmission of knowledge and the development of skills (Tiwari et al., 2021). Providing mid-career professionals with coaching opportunities and matching junior employees with seasoned mentors help foster a culture of continual improvement and skill acquisition.

Companies can fulfil the increasing need for technical talent by forming strategic collaborations with technology partners and educational institutions (Maan et al., 2020). Working together with academic institutions and tech companies gives the company access to highly qualified personnel and specialised training programmes, which improves its digital capabilities. Using agile project management techniques is essential to managing digital transformation projects successfully (Diller et al., 2020). Agile approaches that maximise effect and minimise project delays include Scrum and Kanban. These techniques allow for quick adaptation to changing requirements.

To sum up, the useful suggestions highlight how crucial proactive personnel management, continuous learning programmes, teamwork, and agile approaches are to advancing digital transformation in the automotive sector. Businesses may position themselves for success in a shifting digital landscape by putting these tactics into practice.

6.3 Research contributions

6.3.1. Contribution to knowledge

The research makes a substantial contribution to knowledge advancement as well as business practices in the context of the automobile industry's digital revolution. Utilising Partial Least Squares Structural Equation Modelling (PLS-SEM) and referencing theoretical models such as the Cognitive-Affective Personality System (CAPS) theory, the research clarifies the intricate connections among proactive personality traits, skill development, and industry digital strategy maturity. By offering empirical data and theoretical insights into the mechanisms underlying the influence of digital strategy maturity on skill enhancement, this closes significant gaps in the research (Liao, 2022). In addition, the study bridges interdisciplinary knowledge gaps by combining ideas from multiple disciplines, including technology, psychology, and management, to provide a thorough examination of digital preparedness and skill development in the automobile industry.

6.3.2. Contribution to business practice

The findings provide management and organisational policy frameworks with practical recommendations for company operations. The study emphasises the value of funding ongoing education initiatives that are specifically designed to address the needs of the digital economy. These initiatives should concentrate on subjects like artificial intelligence, cybersecurity, data analysis, and digital literacy (Rogers & Euchner, 2022). Furthermore, it's critical to cultivate a proactive action culture in companies, where staff members are inspired to take the initiative and look for novel solutions to digital problems. This can be accomplished by encouraging employees to actively participate in digital projects through incentive and recognition programmes for innovative ideas (Tiwari et al., 2021). Furthermore, in order to overcome skill gaps and foster digital innovation, the research highlights the value of cross-functional cooperation, mentorship programmes, and strategic partnerships with educational institutions and technology partners (Farias et al., 2023; Maan et al., 2020). In addition, it is advised that agile project management techniques be used to handle digital transformation projects in an efficient manner, guaranteeing quick adjustments to changing needs and optimising project results (Diller et al., 2020).

All things considered, the study offers a thorough foundation that helps businesses prosper in the quickly changing digital environment of the automobile sector. Through the integration of theoretical insights, empirical evidence, and practical implications, the study provides management with actionable strategies to improve digital readiness and skill development. This empowers them to effectively navigate the challenges posed by the digital transformation and seize emerging opportunities.

6.4 Recommendations for Future Research

To enhance our comprehension of digital transformation and proactive skill development in the automotive industry, there are various pathways that might be pursued for future research. First and foremost, comprehensive monitoring of the long-term effects of digital skill development programmes on organisational performance metrics like productivity, innovation, and competitive advantage should go hand in hand with their implementation (Rogers & Euchner, 2022). It is advised to do longitudinal studies to monitor the efficacy of various training modalities over time. These studies can offer important insights into how automotive organisations maintain skill enhancement over time (Rogers & Euchner, 2022).

Subsequent investigations ought to explore the impact of corporate culture on staff members' perspectives about digital transformation and their inclination towards proactive involvement (Liao, 2022). Strategies to cultivate a culture supportive of successful digital transformation endeavours can be informed by knowledge of how employee engagement, organisational values, and leadership styles affect digital projects (Liao, 2022). Policymakers and industry stakeholders can benefit greatly from comparative studies that look at how digitalization affects traditional automotive supply chains and value networks. These studies should pay particular attention to technologies such as blockchain, IoT, and predictive analytics. (Tiwari et al., 2021).

Furthermore, contextual variations that influence people management practices and digital transformation plans can be revealed by cross-country comparisons across varied automobile industries (Maan et al., 2020). A customised approach for the effective adoption of digital technology in various contexts can be developed by examining the regulatory variances and cultural elements impacting digitalization projects (Maan et al., 2020). Further research is necessary to fully understand the ethical and social ramifications of digitalization in the automotive industry, particularly as it relates to concerns about social welfare, employment, and privacy (Diller et al., 2020). By investigating and filling these areas of research that are currently lacking, scholars can make valuable contributions to the advancement of practices and policies that are grounded in evidence and promote sustainable and inclusive initiatives in digitalization.

6.5 Conclusion

In summary, this study has investigated the intricate relationship between the degree of industry digital strategy maturity within the company, proactive skill development, and personnel management practices in the automotive industry, with a focus on the Delhi-NCR region of India. Important findings and their ramifications for academia and business have been made possible by our use of theoretical frameworks such as the Cognitive-Affective Personality system (CAPS) theory and empirical analysis (Liao, 2022; Rogers & Euchner, 2022).

The findings highlight how important it is to be proactive, have digital skills, and put good strategies into practice in order to successfully navigate the landscape of digital transformation. Proactive skill development has been proven to be significantly impacted by the maturity of an industry's digital strategy. Factors including intricacy, familiarity, practicality, and urgency affect its impact. Additionally, the evolution of digital readiness and skill acquisition highlights the role that proactive personality traits play in modifying the link between individual dispositions and organisational contexts (Liao, 2022; Rogers & Euchner, 2022).

The report provides useful suggestions for legislators and business professionals who wish to enhance personnel management procedures and capitalise on the opportunities presented by digitalization. Recommendations for action include implementing targeted efforts for talent development and training, fostering an environment that values continuous learning and innovation, and leveraging technology vendors and academic institutions to form strategic partnerships (Tiwari et al., 2021; Farias et al., 2023).

To further improve our understanding of people management and digital transformation in the automotive industry, longitudinal studies, cross-cultural comparisons, and ethical considerations must be incorporated into future research initiatives. Through addressing these gaps in the literature and building on the insights gathered from this investigation, scholars and practitioners can contribute to the development of inclusive and sustainable digitalization strategies for the automotive sector. (Diller et al., 2020; Maan et al., 2020)

These tactics will advance innovation, competitiveness, and general societal well-being.

6.6 Future Studies

Expanding upon the results of this investigation, a number of directions for future research are presented that may help to further understanding of digital transformation and skill development in the automotive sector. First and foremost, it would be advantageous to look into the precise effects that various kinds of digital skill development programmes have on metrics related to organisational performance, such innovation, productivity, and competitive advantage. Deeper understanding of these programmes' long-term efficacy and commercial impact can be gained from longitudinal studies that monitor their execution and results over time (Rogers & Euchner, 2022).

Furthermore, it is crucial to investigate how organisational culture—which includes employee engagement and leadership styles—affects workers' attitudes towards proactive behaviour and digital transformation. Research on the influence of cultural elements on digital project success can help develop digitalization-friendly environment building tactics (Liao, 2022). In order to provide useful advice for business professionals and legislators, more study should also look at how new digital technologies like blockchain, IoT, and predictive analytics affect automotive supply chains and consumer expectations (Tiwari et al., 2021).

REFERENCES

- Abid, G., Arya, B., Arshad, A., Ahmed, S. & Farooqi, S. 2021. Positive personality traits and self-leadership in sustainable organizations: Mediating influence of thriving and moderating role of proactive personality. *Sustainable Production and Consumption*, 25, pp.299-311.
- Aguiar, T., Gomes, S.B., da Cunha, P.R. & da Silva, M.M. (2019). Digital transformation capability maturity model framework. In 2019 IEEE 23rd International *Enterprise Distributed Object Computing Conference (EDOC)* (pp. 51-57). IEEE.
- Ahmed, A.A., Alshurideh, M., Al Kurdi, B. & Salloum, S.A., 2021. Digital transformation and organizational operational decision making: a systematic review. In *Proceedings of the International Conference on Advanced Intelligent Systems and Informatics 2020* (pp. 708-719). Springer International Publishing.
- Akour, M. & Alenezi, M. (2022). Higher education future in the era of digital transformation. *Education Sciences*, 12(11), p. 784.
- Andersson, P., Mattsson, L.G., Movin, S., Mähring, M., Teigland, R. Wennberg, K., 2018. Digital transformation supporting public service innovation: Business model challenges and sustainable development opportunities. *Managing digital transformation*, pp.217-243.
- Appelgren, E., 2023. The No-Go Zone of Journalism Studies—Revisiting the Concept of Technological Determinism. *Digital Journalism*, 11(4), pp.672-690.
- Atasoy, H., Banker, R.D. & Pavlou, P.A. 2021. Information technology skills and labor market outcomes for workers. *Information Systems Research*, 32(2), pp.437-461.
- Avramenko, A., (2019). Employee skill development and competitive advantage: A longitudinal study. *Human Resource Management*, 58(1), pp. 61-75.
- Bandura, A., 1997. Behavior theory and the models of man (1974). In *Meeting of the American Psychological Association*, Aug, 1974, New Orleans, LA, US; Presidential Address
- Bateman, T. S., & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, 14 (2), pp. 103-118.

- Boudreau, J. W., & Cascio, W. F. (2017). 'Human resource analytics: Why, what, and how', *Organizational Dynamics*, 46(3), pp. 157-167.
- Busetto, L., Wick, W. & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and practice*, 2(1), p.14.
- Carver, C.S. & Scheier, M.F.(1990). Origins and functions of positive and negative affect: A control-process view. *Psychological review*, 97(1), p.19.
- Castro Benavides, L.M., Tamayo Arias, J.A. & Burgos, D. (2021). Behavior Analysis of Digital Transformation in Latin American and Colombian Universities, Based on a General Identification of Variables. *Radical Solutions for Digital Transformation in Latin American Universities: Artificial Intelligence and Technology 4.0 in Higher Education*, pp.129-156.
- Chanias, S., (2017). Mastering digital transformation: the path of a financial services provider towards a digital transformation strategy.
- Chin, H.S., Lee, D.W. & Lee, D., (2022). Competitive Advantage Strategy of Educational Service Quality on Digital Transformation: Focusing on W-Company. *Journal of Korean Society for Quality Management*, 50(4), pp.843-861.
- Colakoglu, S., Culha, O., & Tarim, M., (2006). The impact of organizational factors on business intelligence (BI) success: An empirical investigation. *International Journal of Information Management*, 26(1), pp. 3-19.
- Colbert, A., Yee, N. & George, G. (2016). The digital workforce and the workplace of the future. *Academy of management journal*, 59(3), pp.731-739.
- Conseil National de L 'Industrie, (2013). The New Face of Industry in France. Paris: *French National Industry Council*.
- Cöster, M. & Westelius, A., (2016). Digitalisering: Begreppbart. Stockholm: Liber, p. 128.
- Diller, M., Asen, M. and Späth, T., (2020). The effects of personality traits on digital transformation: Evidence from German tax consulting. *International Journal of Accounting Information Systems*, 37, p.100455.

- Dremel, C., Wulf, J., Herterich, M.M., Waizmann, J.C. & Brenner, W. (2017). How AUDI AG established big data analytics in its digital transformation. *MIS Quarterly Executive*, 16(2).
- Drew, R. (2016). Technological determinism. A companion to popular culture, pp.165-183.
- Durham Peters, J., (2019). You mean my whole fallacy is wrong: On technological determinism. *You mean my whole fallacy is wrong: On technological determinism*, pp.26-34.
- Ebert, C. & Duarte, C.H.C. (2018). Digital transformation. *IEEE Softw.*, 35(4), pp.16-21.
- Effiong, A., Shehu, I.Y., Yalams, S.M.& Ahmed, A. (2023). Assessment of National Automotive Design and Development Council Training Programmes in Informal Sector Automobile Mechanics in Nigeria. *International Journal of Education and Humanities*, 3(2), pp.141-151.
- Ershova, T.V., Hohlov, Y.E. & Shaposhnik, S.B. (2018). Methodology for digital economy development assessment as a tool for managing the digital transformation processes. In *2018 Eleventh International Conference "Management of large-scale system development"*(MLSD (pp. 1-3). IEEE.
- Farias-Gaytan, S., Aguaded, I. & Ramirez-Montoya, M.S. (2023). Digital transformation and digital literacy in the context of complexity within higher education institutions: a systematic literature review. *Humanities and Social Sciences Communications*, 10(1), pp.1-11.
- Favoretto, C., Mendes, G.H.D.S., Filho, M.G., Gouvea de Oliveira, M. & Ganga, G.M.D. (2022). Digital transformation of business model in manufacturing companies: challenges and research agenda. *Journal of Business & Industrial Marketing*, 37(4), pp.748-767.
- Feijao, C., Flanagan, I., Van Stolk, C. & Gunashekar, S. (2021). The global digital skills gap: Current trends and future directions. RAND.
- Freitas Junior, J.C.D.S., Maçada, A.C.G. & Brinkhues, R.A. (2017). Digital capabilities as key to digital business performance.

- Frieder, R.E., Wang, G. & Oh, I.S. (2018). Linking job-relevant personality traits, transformational leadership, and job performance via perceived meaningfulness at work: A moderated mediation model. *Journal of applied psychology*, 103(3),
- Garcez, A., Franco, M. & Silva, R. (2023). The soft skills bases in digital academic entrepreneurship in relation to digital transformation. *Innovation & Management Review*, Vol. 20 No. 4, pp. 393-408.
- Garcez, A., Silva, R. & Franco, M. (2022). Digital transformation shaping structural pillars for academic entrepreneurship: A framework proposal and research agenda. *Education and Information Technologies*, 27(1), pp.1159-1182.
- Ghobakhloo, M. & Iranmanesh, M. (2021). Digital transformation success under Industry 4.0: A strategic guideline for manufacturing SMEs. *Journal of Manufacturing Technology Management*, 32(8), pp.1533-1556.
- Ghosh, S., Hughes, M., Hodgkinson, I. & Hughes, P. (2022). Digital transformation of industrial businesses: A dynamic capability approach. *Technovation*, 113, p.102414.
- Giacosa, E., Culasso, F. & Crocco, E. (2022). Customer agility in the modern automotive sector: how lead management shapes agile digital companies. *Technological Forecasting and Social Change*, 175, p.121362.
- Gilch, P.M. & Sieweke, J., (2021). Recruiting digital talent: The strategic role of recruitment in organisations' digital transformation. *German Journal of Human Resource Management*, 35(1), pp.53-82.
- Gökalp, E. & Martinez, V. (2022). Digital transformation maturity assessment: development of the digital transformation capability maturity model. *International Journal of Production Research*, 60(20), pp.6282-6302.
- Gong, C. & Ribiere, V., (2021). Developing a unified definition of digital transformation. *Technovation*, 102, p. 102217.
- Goran, J., LaBerge, L. & Srinivasan, R. (2017). Culture for a digital age. *McKinsey Quarterly*, 3(1), pp.56-67.
- Goulart, V.G., Liboni, L.B. & Cezarino, L.O., (2022). Balancing skills in the digital transformation era: The future of jobs and the role of higher education. *Industry and Higher Education*, 36(2), pp. 118-127.

- Hafseld, K.H., Hussein, B. & Rauzy, A.B. (2021). An attempt to understand complexity in a government digital transformation project. *International Journal of Information Systems and Project Management*, 9(3), pp.70-91.
- Hecker, A., & Gan, C., (2017). Digital labor markets and global talent flows. *ILR Review*, 70(3), pp. 653-677.
- Heilig, L., Lalla-Ruiz, E. & Voß, S., (2017). Digital transformation in maritime ports: analysis and a game theoretic framework. *Netnomics: Economic research and electronic networking*, 18(2-3), pp. 227-254.
- Heslin, P.A., Keating, L.A. & Minbashian, A., (2019). How situational cues and mindset dynamics shape personality effects on career outcomes. *Journal of Management*, 45(5), pp. 2101-2131.
- Hesse, A. (2018). Digitalization and Leadership-How experienced leaders interpret daily realities in a digital world.
- Hoefl, F., (2023). Quarterly business review for digital transformation: insights from the automotive industry. *Digital Transformation and Society*, 2(4), pp. 342-353.
- Höyng, M. & Lau, A. (2023). Being ready for digital transformation: How to enhance employees' intentional digital readiness. *Computers in Human Behavior Reports*, 11, p.100314.
- Iscaro, V., Castaldi, L., Maresca, P. & Mazzoni, C. (2022). Digital transformation in the economics of complexity: the role of predictive models in strategic management. *Journal of Strategy and Management*, 15(3), pp.450-467.
- Junior, F., Cabral, P. M. F., & Brinkhues, R. A., (2020). Digital Transformation: The Gap Between Digital Leadership and Business Performance. *ISLA 2020 Proc.*, 20, pp. 1.
- Kane, C.L., (2014). Chromatic algorithms: Synthetic color, computer art, and aesthetics after code. *University of Chicago Press*.
- Kane, G.C. (2014). The American Red Cross: adding digital volunteers to Its ranks. *MIT Sloan Management Review*, 55(4), p.1.

- Karimi, J. and Walter, Z. (2015). The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry. *Journal of Management Information Systems*, 32(1), pp.39-81.
- Khanra, S., Kaur, P., Joseph, R.P., Malik, A. and Dhir, A. (2022). A resource-based view of green innovation as a strategic firm resource: Present status and future directions. *Business Strategy and the Environment*, 31(4), pp.1395-1413.
- Kotarba, M., (2018). Digital transformation of business models. *Foundations of management*, 10(1), pp. 123-142.
- Kumar, N., Kaliyan, M., Thilak, M. & Acevedo-Duque, Á. (2022). Identification of specific metrics for sustainable lean manufacturing in the automobile industries. *Benchmarking: An International Journal*, 29(6), pp. 1957-1978.
- Kurpjuweit, S., Schmidt, C.G., Klöckner, M. & Wagner, S.M. (2021). Blockchain in additive manufacturing and its impact on supply chains. *Journal of Business Logistics*, 42(1), pp.46-70.
- Kutaula, S., Gillani, A., Leonidou, L.C. & Christodoulides, P. (2022). Integrating fair trade with circular economy: Personality traits, consumer engagement, and ethically-minded behavior. *Journal of business research*, 144, pp.1087-1102.
- Lazarus, R.S. & Folkman, S. (1984). Stress, appraisal, and coping. *Springer publishing company*.
- Leão, P. & da Silva, M.M. (2021). Impacts of digital transformation on firms' competitive advantages: A systematic literature review. *Strategic Change*, 30(5), pp. 421-441.
- Liao, P.Y. (2022). Proactive personality, job crafting, and person-environment fit: does job autonomy matter?. *Current Psychology*, pp.1-12.
- Lima, B.F., Neto, J.V., Santos, R.S. & Caiado, R.G.G. (2023). A Socio-Technical Framework for Lean Project Management Implementation towards Sustainable Value in the Digital Transformation Context. *Sustainability*, 15(3), p.1756.
- Liu, L., Du, K. & Li, G. (2023). Empathy, CIOCEO relationship, and digital transformation. *Information & Management*, 60(3), p.103772.

- Liu, Y., Ni, Z., Karlsson, M. & Gong, S. (2021). Methodology for digital transformation with internet of things and cloud computing: A practical guideline for innovation in small-and medium-sized enterprises. *Sensors*, 21(16), p.5355.
- Llopis-Albert, C., Rubio, F. and Valero, F. (2021). Impact of digital transformation on the automotive industry. *Technological forecasting and social change*, 162, p. 120343
- Loonam, J., Eaves, S., Kumar, V. & Parry, G., (2018). Towards digital transformation: Lessons learned from traditional organizations. *Strategic Change*, 27(2), pp. 101-109.
- Maan, A.T., Abid, G., Butt, T.H., Ashfaq, F. & Ahmed, S. (2020). Perceived organizational support and job satisfaction: a moderated mediation model of proactive personality and psychological empowerment. *Future Business Journal*, 6, pp.1-12.
- Magistretti, S., Pham, C.T.A. & Dell'Era, C., 2021. Enlightening the dynamic capabilities of design thinking in fostering digital transformation. *Industrial Marketing Management*, 97, pp.59-70.
- Majchrzak, A., Markus, M.L. & Wareham, J., (2016). 'Designing for digital transformation', *MIS quarterly*, 40(2), pp. 267-278.
- Makridakis, S. (2017). The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms. *Futures*, 90, pp.46-60.
- Mancha, R. & Shankaranarayanan, G. (2021). Making a digital innovator: antecedents of innovativeness with digital technologies. *Information Technology & People*, 34(1), pp.318-335.
- Marks, A., Al-Ali, M., Atassi, R., Elkishk, A.A. & Rezgui, Y. (2021). Digital transformation in higher education: maturity and challenges post COVID-19. In *Information Technology and Systems: ICITS 2021*, Volume 1 (pp. 53-70).
- Markus, M.L. & Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research. *Management science*, 34(5), pp.583-598.
- Mele, G., Capaldo, G., Secundo, G. & Corvello, V. (2023). Revisiting the idea of knowledge-based dynamic capabilities for digital transformation. *Journal of Knowledge Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JKM-02-2023-0121>.

- Minbashian, A. & Luppino, D. (2014). Short-term and long-term within-person variability in performance: An integrative model. *Journal of Applied Psychology*, 99(5), p.898.
- Mischel, W., & Shoda, Y., (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological review*, 102(2), pp. 246.
- Muduli, A. & Choudhury, A. (2024). Exploring the role of workforce agility on digital transformation: a systematic literature review. *Benchmarking: An International Journal*. Vol. ahead-of-print No. ahead-of-print
- Nadkarni, S. & Prügl, R. (2021). Digital transformation: a review, synthesis and opportunities for future research. *Management Review Quarterly*, 71, pp.233- 341.
- Nambisan, S. & Baron, R.A., (2021). On the costs of digital entrepreneurship: Role conflict, stress, and venture performance in digital platform-based ecosystems. *Journal of Business Research*, 125, pp. 520-532.
- Nambisan, S. & Baron, R.A. (2013). Entrepreneurship in innovation ecosystems: Entrepreneurs' self-regulatory processes and their implications for new venture success. *Entrepreneurship theory and practice*, 37(5), pp.1071-1097.
- Neumeier, A., Wolf, T. & Oesterle, S., 2017. The manifold fruits of digitalization-determining the literal value behind.
- Ochoa-Urrego, R.L. & Peña-Reyes, J.I., 2021. Digital maturity models: a systematic literature review. *Digitalization: Approaches, Case Studies, and Tools for Strategy, Transformation and Implementation*, pp.71-85.
- OECD, (2018). 'OECD science, technology and innovation outlook 2018', Paris: OECD publishing.
- Oliveira, K.K.D.S. & de SOUZA, R.A. (2022). Digital transformation towards education 4.0. *Informatics in Education*, 21(2), pp.283-309.
- Ostmeier, E. and Strobel, M. (2022). Building skills in the context of digital transformation: How industry digital maturity drives proactive skill development. *Journal of business research*, 139, pp. 718-730.

- Parker, S. K., Williams, H. M., & Turner, N., (2006). Modeling the antecedents of proactive behavior at work. *Journal of Applied Psychology*, 91(3), pp. 636.
- Parker, S.K., Bindl, U.K. & Strauss, K., (2010). Making things happen: A model of proactive motivation. *Journal of management*, 36(4), pp. 827-856.
- Peng, Y. & Tao, C. (2022). Can digital transformation promote enterprise performance?—From the perspective of public policy and innovation. *Journal of Innovation & Knowledge*, 7(3), p.100198.
- Piccinini, E., Hanelt, A., Gregory, R. & Kolbe, L. (2015). Transforming industrial business: the impact of digital transformation on automotive organizations. *Thirty Sixth International Conference on Information Systems*, Fort Worth.
- Poljanska, A., Savchuk, S., Zapukhliak, I., Zaiachuk, Y. & Stankovska, I., (2022) March. Digital Maturity of the Enterprise as an Assessment of its Ability to Function in Industry 4.0. *In International Scientific-Technical Conference MANUFACTURING* (pp. 209-227). Cham: Springer International Publishing.
- Rafael, L.D., Jaione, G.E., Cristina, L. & Ibon, S.L. (2020). An Industry 4.0 maturity model for machine tool companies. *Technological forecasting and social change*, 159, p.120203.
- Rahman, M.S. (2020). The advantages and disadvantages of using qualitative and quantitative approaches and methods in language “testing and assessment” research: A literature review.
- Rajan, R. & Dhir, S. (2023). Determinants of alliance productivity and performance: Evidence from the automobile industry. *International Journal of Productivity and Performance Management*, 72(2), pp. 281-305.
- Rammer, C., Gottschalk, S., Peneder, M., Wörter, M., Stucki, T. & Arvanitis, S. (2017). Does energy policy hurt international competitiveness of firms? A comparative study for Germany, Switzerland and Austria. *Energy Policy*, 109, pp.154-180.
- Ren, S. & Chadee, D. (2017). Influence of work pressure on proactive skill development in China: The role of career networking behavior and Guanxi HRM. *Journal of Vocational Behavior*, 98, pp.152-162.

- Riasanow, Tobias; Galic, Gabriela; and Böhm, Markus, (2017). Digital Transformation in the Automotive Industry: Towards a generic value network. *In Proceedings of the 25th European Conference on Information Systems (ECIS)*, Guimarães.
- Ritala, P., Baiyere, A., Hughes, M.& Kraus, S. (2021). Digital strategy implementation: The role of individual entrepreneurial orientation and relational capital. *Technological Forecasting and Social Change*, 171, p.120961.
- Rogers, D. & Euchner, J. (2022). Digital Transformation: An Interview with David Rogers Jim Euchner talks with David Rogers about the ways digital technology is changing strategy and what leaders can do to manage the pace and complexity of the digital world. *Research-Technology Management*, 65(5), pp.11-17.
- Rogers, D.L., (2016). The digital transformation playbook: Rethink your business for the digital age. *Columbia University Press*.
- Rogers, E.M., Singhal, A. & Quinlan, M.M. (2014). Diffusion of innovations. In An integrated approach to communication theory and research (pp. 432-448). *Routledge*.
- Schiuma, G., Schettini, E., Santarsiero, F. & Carlucci, D. (2022). The transformative leadership compass: six competencies for digital transformation entrepreneurship. *International Journal of Entrepreneurial Behavior & Research*, 28(5), pp.1273-1291.
- Schnasse, F., Menzefricke, J.S. & Dumitrescu, R. (2021). Identification of socio- technical risks and their correlations in the context of digital transformation for the manufacturing sector. *In 2021 IEEE 8th International Conference on Industrial Engineering and Applications (ICIEA)* (pp. 159-166). IEEE.
- Shah, N. & Soomro, B.A., (2023). 'Effects of green human resource management practices on green innovation and behavior', *Management Decision*, 61(1), pp. 290-312.
- Shah, N., Irani, Z. & Sharif, A.M., (2017). Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors. *Journal of Business Research*, 70, pp.366-378.
- Shajek, A. & Hartmann, E.A., (2023). New Digital Work: Digital Sovereignty at the Workplace (p. 291). *Springer Nature*.

- Siemieniuch, C.E., Sinclair, M.A. & Henshaw, M.D. (2015). Global drivers, sustainable manufacturing and systems ergonomics. *Applied ergonomics*, 51, pp.104-119.
- Singh, A. & Hess, T. (2017). How chief digital officers promote the digital transformation of their companies. *MIS Quarterly Executive*, 16(1).
- Solis, B., (2019). How managers can help workers tackle digital distractions. *MIT Sloan Management Review*, 60 (4), pp.1-3.
- Sony, M. and Aithal, P.S. (2020). A resource-based view and institutional theory-based analysis of industry 4.0 implementation in the Indian engineering industry. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 5(2), pp.154-166.
- Sousa, M.J. & Rocha, Á (2019). Digital learning: Developing skills for digital transformation of organizations. *Future Generation Computer Systems*, 91, pp.327- 334.
- Sousa, M.J. & Rocha, Á. (2019). Strategic knowledge management in the digital age: JBR special issue editorial. *Journal of Business Research*, 94, pp.223-226.
- Szalavetz, A. (2020). Digital transformation—enabling factory economy actors’ entrepreneurial integration in global value chains?. *Post-Communist Economies*, 32(6), pp.771-792.
- Tabrizi, B., Lam, E., Girard, K. & Irvin, V. (2019). Digital transformation is not about technology. *Harvard business review*, 13(March), pp.1-6.
- Tiwari, V. (2021). Countering effects of technostress on productivity: moderating role of proactive personality. *Benchmarking: An International Journal*, 28(2), pp.636-651.
- Tóth-Kaszás, N., Ernszt, I., Péter, E. & Mihalics, B. (2022). ‘The emergence of digital transformation in the automotive industry-Industry 4.0 in Hungary’, *Competition*, 21(1-2), pp. 3-28.
- Vapiwala, F., Pandita, D. & Choudhury, H. (2023). ‘Strategies for Digital Innovation in Talent Management of Automotive Industry 4.0’, In: 2023 8th *International Conference on Business and Industrial Research (ICBIR)*, pp. 200-205. IEEE.

- Vaska, S., Massaro, M., Bagarotto, E.M. & Dal Mas, F. (2021). 'The digital transformation of business model innovation: A structured literature review', *Frontiers in Psychology*, 11, p. 539363.
- Vaska, S., Massaro, M., Bagarotto, E.M. & Dal Mas, F. (2021). The digital transformation of business model innovation: A structured literature review. *Frontiers in Psychology*, 11, p.539363.
- Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, pp.425-478.
- Venkatesh, V., Thong, J.Y. & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, pp.157-178.
- Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N. & Haenlein, M., 2021. Digital transformation: A multidisciplinary reflection and research agenda. *Journal of business research*, 122, pp.889-901.
- Verina, N. & Titko, J., (2019). Digital transformation: conceptual framework. In Proc. of the Int. Scientific Conference. *Contemporary Issues in Business, Management and Economics Engineering* (pp. 9-10).
- Verma, A. & Venkatesan, M., (2023). 'Industry 4.0 workforce implications and strategies for organisational effectiveness in Indian automotive industry: a review', *Technology Analysis and Strategic Management*, 35(10), pp. 1241-1249.
- Vial, G., (2023). 'Data governance and digital innovation: A translational account of practitioner issues for IS research', *Information and Organization*, 33(1), p. 100450
- Vial, G., 2019. Understanding digital transformation: A review and a research agenda. *The journal of strategic information systems*, 28(2), pp.118-144.
- Vogelsang, K., Liere-Netheler, K., Packmohr, S.& Hoppe, U., (2019). 'Barriers to digital transformation in manufacturing: development of a research agenda', *Proceedings of the 52nd Hawaii International Conference on System Sciences*.
- Wang, W.Y.C. & Wang, Y., (2020). Analytics in the era of big data: The digital transformations and value creation in industrial marketing. *Industrial Marketing Management*, 86, pp.12-15.

- Watson, H.J. (2017). Preparing for the cognitive generation of decision support. *MIS Quarterly Executive*, 16(3).
- Weber, E., Büttgen, M. & Bartsch, S. (2022). How to take employees on the digital transformation journey: An experimental study on complementary leadership behaviors in managing organizational change. *Journal of Business Research*, 143, pp.225-238.
- Westerman, G. (2018). Your company doesn't need a digital strategy. *MIT Sloan Management Review*, 59(3), pp.1-5.
- Westerman, G., Calmégane, C., Bonnet, D., Ferraris, P., & McAfee, A. (2011). Digital Transformation: A Roadmap for Billion-Dollar Organizations. *MIT Center for Digital Business and Capgemini Consulting*, pp. 1-68.
- Yagil, D. & Oren, R. (2021). Servant leadership, engagement, and employee outcomes: The moderating roles of proactivity and job autonomy. *Revista de Psicología del Trabajo y de las Organizaciones*, 37(1), pp.58-65.
- Yeow, A., Soh, C. & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *The Journal of Strategic Information Systems*, 27(1), pp.43-
- Yousefi Nooraie, R., Sale, J.E., Marin, A. & Ross, L.E. (2020). Social network analysis: An example of fusion between quantitative and qualitative methods. *Journal of Mixed Methods Research*, 14(1), pp.110-124.
- Yuan, C., Wang, Y., Huang, W. & Zhu, Y. (2019). Can coaching leadership encourage subordinates to speak up? Dual perspective of cognition-affection. *Leadership & Organization Development Journal*, 40(4), pp.485-498.
- Zhang, X., Xu, Y.Y. & Ma, L.(2023). Information technology investment and digital transformation: the roles of digital transformation strategy and top management. *Business Process Management Journal*, 29(2), pp.528-549.
- Zhu, X., Ge, S. & Wang, N. (2021). Digital transformation: A systematic literature review. *Computers & Industrial Engineering*, 162, p.107774.
- Zimmerman, R.D., Swider, B.W., Woo, S.E. & Allen, D.G., 2016. Who withdraws? Psychological individual differences and employee withdrawal behaviors. *Journal of Applied Psychology*, 101(4), p.498.

Ziyadin, S., Suieubayeva, S. & Utegenova, A. (2020). Digital transformation in business. In *Digital Age: Chances, Challenges and Future 7* (pp. 408-415). Springer International Publishing.

APPENDIX A
SURVEY COVER LETTER

**Subject: Request for Involvement in Skill Development Survey for Automotive
Digital Transformation.**

Dear Sir/ Ma'am,

The research study "Analysing Skill Development in the Context of Automotive Digital Transformation" is presently underway, and we cordially encourage you to partake in it.

Initially, our goal is to investigate and pinpoint particular areas where the automobile industry lacks sufficient skills in relation to the digital transformation process. Second, we look at how a proactive personality affects an employee's drive and sense of urgency to learn the skills needed for a successful digital transition. Lastly, we aim to assess how the industry's level of maturity in digital strategy affects the management and development of proactive skill development among its workers.

In order to accomplish these goals, your professional knowledge and understanding in the automotive industry are priceless. By answering this survey, you will be able to gain important knowledge about the prospects and difficulties related to skill development in the context of the digital transformation of the automobile industry.

Your answers to the survey will be kept private and used only for research. It should take about 15-20 Minutes to complete. Your input will significantly improve the calibre and applicability of our conclusions.

If you have any queries or issues about the study, don't hesitate to contact us. We appreciate your consideration of our invitation. We truly value your time and feedback, and we anticipate your significant contribution to this significant research project.

Warm Regards,

APPENDIX B
INFORMED CONSENT

Title: Analyzing Skill Development in the Context of Automotive Digital Transformation.

First of all,

We would like to encourage you to take part in a research study called "Analysing Skill Development in the Context of Automotive Digital Transformation." This form is intended to inform you about the study and make sure you are aware of the nature of your participation before you choose to participate or not. Examining talent development in the automobile industry within the framework of digital transformation is the aim of this research. In particular, we want to pinpoint areas where skills are lacking, comprehend how proactive employee personalities affect learning new skills, and assess how the industry's adoption of digital strategies affects skill development.

In the event that you consent to take part in this research, you will be required to finish a survey and attend an interview. The survey will take about 20-25 mins total to complete and will include -questions about talent development, digital transformation, and related subjects. Responses to the survey and the interview will be kept private and used exclusively for study.

There are no known problems related to taking part in this research. Contributing to studies that seek to enhance knowledge of skill development in the automotive sector, however, could be advantageous for you because it might have an impact on workforce development

and training. Your answers to the questionnaire and interview will be kept private and not disclosed to third parties by the study team. It will have access to the safely stored data. Engagement in this research is entirely voluntary. You are free to decline to participate in the study at any point, and you won't be penalised for doing so. Your relationship with the researcher or other study-related organisations won't be impacted by your choice to participate or not.

You can get in touch with me, if you have any queries or worries concerning the study. You certify that you have read and comprehended the information contained in this permission form and that you willingly choose to take part in the study by completing the survey and interview.

Participant's Name:

Date:

APPENDIX C

SAMPLE CODING

Code	Description
Proactive Learning	Quotes emphasizing the importance of continuous skill development and adaptation to new technology
Organizational Culture	Quotes highlighting the role of an innovative culture in fostering technology exploration
Digital Strategy Impact	Quotes discussing the influence of company's digital strategy maturity on skill enhancement

APPENDIX D

INTERVIEW GUIDE

Analyzing Skill Development in the Context of Automotive Digital Transformation

I Express gratitude to the person for consenting to the interview. I will give my brief introduction, along with the goal of the interview.

Section 1: Brief Background: Could you kindly give a quick summary of your responsibilities and background in the automotive industry?

Research Question One: How can the automotive industry of India effectively address and bridge the skill gaps required for digital transformation, considering the proactive behavior of employees, and what are the best practices to meet the rising demand for technology talent?

Q1. Could you elaborate on the present skill shortages in India's automotive industry with regard to digital transformation?

Q2. In terms of talent development for digital transformation, how proactive do you think your organization's workers are acting?

Q3. What actions or strategies have been put into place or may be put into place to successfully address these skill gaps?

Q4. What are some best practices or effective strategies that you have seen or used to satisfy the growing need for digital transformation skills in the automotive industry?

Research Question Two: What are the skill deficiencies that exist in relation to the digital transformation in Delhi-NCR, India?

Q5. In your opinion, what specific skill gaps prevent the automotive sector in Delhi-NCR from pursuing digital transformation?

Q6. Do you know of any specific fields or domains where these skill gaps are more noticeable?

Q7. What effect do these skill gaps have on the region's overall efforts to implement digital transformation?

Research Question Three: What is the impact of an employee's proactive personality on the complexity, familiarity, feasibility, and urgency to acquire skills necessary for digital transformation in Delhi-NCR, India?

Q8. In your opinion, what impact does an employee's proactive nature have on their readiness to learn digital transformation skills and their capacity to do so?

Q9. Based on your observations, what impact does proactive behaviour have on employees' perceptions of the complexity, familiarity, feasibility, and urgency of acquiring these skills??

Q10. In the context of digital transformation, can you give instances or tales that highlight the influence of a proactive personality on skill development?

Research Question Four: How will the industry's digital strategy maturity manage proactive skill development in Delhi-NCR, India?

Q11. What is your opinion on the current state of digital strategy maturity in Delhi-NCR's automotive sector?

Q12. How, in your opinion, does the degree of maturity of digital strategies affect the way proactive skill development is managed and promoted among employees?

Q13. Are there any particular actions or procedures that companies with established digital strategies use to support proactive skill development?

Research Question Five: What are the optimal strategies that the industry may implement to effectively manage the increasing demand for technical talent?

Q14. What are the primary obstacles that Delhi-NCR's automotive sector is facing in order to fulfil the growing need for technical talent?

Q15. Can you recommend any practical tactics or methods that businesses might use to draw in and keep technical talent in the area?

APPENDIX E
SURVEY FORM

Email id: _____

Gender: a. Male b. Female

Age: a. Below 30 b. 30-40 years c. 40-50 years d. 50 above

Qualification: a. Graduate b. Diploma c. Post Graduate d. others

Experience in same industry: a. Below 5 Years b. 5-10 years c. 10-15 years d. above 15 years

Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

- A. How do you assess the importance of digitalization for the organization in which you currently work?
 - i. In my view, our organization can manage digitalization. 1= Totally Disagree to 5= I agree completely.
 - ii. In my view, the future of our organization will be better because of digitalization. 1= Totally Disagree to 5= I agree completely.
 - iii. In my view, digitalization will have a negative impact on the future of our organization. 1= Totally Disagree to 5= I agree completely.

Industry Digital Strategy Maturity.

Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

IDSMS 1: Our organization has a formalized digital strategy.

IDSMS 2: Our online presence is currently limited.

IDSMS 3: The use of digital tools in our organization is minimal.

IDSMS 4: Our organization is well-informed about current digital trends in our industry.

IDSMS 5: We have invested in creating and maintaining a strong online presence.

IDSM 6: Our organization has adopted basic digital tools such as websites and social media.

IDSM 7: Our digital strategy and its objectives are clearly articulated.

IDSM 8: Key technologies relevant to our industry have been identified for adoption.

IDSM 9: Digital initiatives are well-aligned with the overall business strategy.

IDSM 10: Our organization has a robust governance structure for digital initiatives.

IDSM 11: Data management policies are comprehensive within our organization.

IDSM 12: Our organization invests in employee training for digital skills.

IDSM 13: Digital technologies are seamlessly integrated across different departments.

IDSM 14: Our organization is proactive in adopting emerging technologies.

IDSM 15: Continuous monitoring and optimization of digital processes are standard practices.

Complexity: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

C1: The perceived complexity of implementing this initiative is low.

C2: The technical challenges associated with this initiative are manageable.

C3: The overall complexity of this initiative is easily understood by the stakeholders.

Familiarity: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

F1: Stakeholders are familiar with the concepts and technologies involved in this initiative.

F2: There is a high level of understanding among team members regarding the goals of this initiative.

F3: Relevant stakeholders have prior experience with similar initiatives.

Feasibility: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

FE1: The necessary resources (financial, human, and technological) are readily available for this initiative.

FE2: The initiative aligns with the organization's capabilities and capacities.

FE3: Potential risks and challenges associated with this initiative are manageable.

Urgency: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

U1: There is a sense of urgency to implement this initiative within the organization.

U2: Stakeholders believe that immediate action is necessary for the success of this initiative.

U3: External factors (market trends, competition) make the swift implementation of this initiative essential.

Proactive Skill Development: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

PSD1: Our organization provides clear signals that support and encourage proactive skill development.

PSD2: Policies and initiatives are in place to facilitate employees' engagement in skill development activities.

PSD3: The organization invests in resources and programs that support employees in acquiring new skills.

PSD4: The leadership team communicates a vision that emphasizes the importance of continuous learning and skill development.

PSD5: Executives actively participate in and promote skill development initiatives.

PSD6: Leadership consistently reinforces the value of acquiring new skills for individual and organizational success.

PSD7: Employees perceive that skill development is a shared responsibility within the organization.

PSD8: The prevailing culture promotes a mindset of adaptability and continuous improvement.

PSD9: External industry trends and changes are communicated, emphasizing the need for updated skills.

PSD10: The organization is responsive to external factors that may impact the skills required in the industry.

PSD11: Industry benchmarking and best practices are regularly considered in shaping skill development initiatives.

PSD12: Communication channels within the organization effectively convey information about skill development opportunities.

PSD13: Employees are well-informed about the availability and benefits of skill development programs.

Proactive Personality: Rate the statement ranging on the scale from 1 to 5; 1= Totally Disagree to 5= I agree completely.

PP1: Initiated better ways of doing our core tasks

PP2: Made changes to the way our core tasks are done.

PP3: Come up with ideas to improve the way in which our core tasks are done.

PP4: Developed skills which may be needed in the future.

PP5: Gained experience in a variety of tasks to increase our knowledge and skills?

PP6: Developed knowledge and skills in tasks critical to our future work life.

PP7: Come up with ways of increasing efficiency within the organization.

PP8: Involved myself in changes that are helping to improve the overall effectiveness of the organization.

PP9: Made suggestions to improve the overall effectiveness of the organization.

PP10: More devoted to passing along the knowledge I have gained than you were a few years ago.

PP11: More concerned with building up the next generation of employees than I was a few years ago.