

2026-02

Unveiling the Nexus: Analysing the Impacts of Industry 4.0-Digital Transformation and Agility on Multinational Enterprises: A case study of LG Electronics

Novakidou, Marianna

þý Master s Degree in Information Systems and Digital Innovation, School of Computer Science, Neapolis University Pafos

<http://hdl.handle.net/11728/13401>

Downloaded from HEPHAESTUS Repository, Neapolis University institutional repository



**SCHOOL OF
ECONOMICS, ADMINISTRATION AND
COMPUTER SCIENCE**

**DEPARTMENT
OF COMPUTER SCIENCE**

**Unveiling the Nexus: Analysing the Impacts of
Industry 4.0-Digital Transformation and Agility
on Multinational Enterprises: *A case study of
LG Electronics***

MARIANNA NOVAKIDOU

FEBRUARY/2026



**SCHOOL OF ECONOMICS, ADMINISTRATION
AND COMPUTER SCIENCE**

DEPARTMENT OF COMPUTER SCIENCE

**Unveiling the Nexus: Analysing the Impacts of
Industry 4.0-Digital Transformation and Agility
on Multinational Enterprises: *A case study of
LG Electronics***

**This thesis was submitted for distance acquisition of
a postgraduate degree in Information Systems and
Digital Innovation at Neapolis University**

MARIANNA NOVAKIDOU

FEBRUARY/2026

Copyrights

Copyright © Marianna Novakidou, 2026

All rights reserved.

The dissertation's approval by Neapolis University Pafos does not necessarily imply acceptance of the author's views by the University.

RESPONSIBLE STATEMENT

Marianna Novakidou, knowing the consequences of plagiarism, I declare responsibly that this paper entitled **"Unveiling the Nexus: Analysing the Impacts of Industry 4.0-Digital Transformation and Agility on Multi-National Enterprises: A case study of LG Electronics"**, the points where I have used ideas, text and/or sources of other authors are clearly mentioned in the text with the appropriate reference and the relevant reference is included in the section of the bibliographic references with a full description.

The Denotation

Marianna Novakidou

Table of Contents

Chapter 1 - Introduction	9
1.1 Problem Statement and Research Gap.....	9
1.2 Research Objectives	10
1.4 Research Questions	10
1.5 Significance and Contribution of the study	12
1.6 Structure of the Dissertation.....	13
Chapter 2 – Literature Review	14
2.1 Introduction to the Literature Review.....	14
2.2 Industry 4.0	14
2.2.1 Definition and Evolution	14
2.2.2 Core Technologies	14
2.2.3 Opportunities and Challenges.....	16
2.2.4 Industry 4.0 in Multinational Enterprises	17
2.3 Industry 5.0	17
2.3.1 Emergence and Key Principles	18
2.3.2 Human-Machine Collaboration.....	18
2.3.3 Implications for Strategy and Sustainability	19
2.4 Digital Transformation.....	19
2.4.1 Definitions and Theoretical Foundations	20
2.4.2 Strategic Role of Digital Transformation	20
2.4.3 Organisational and Cultural Enablers	21
2.4.4 Barriers and Challenges	22
2.5 Organisational Agility	22
2.5.1 Definitions and Foundations	22
2.5.2 Dimensions of Agility.....	23
2.5.3 Industry 4.0 and Digital Transformation as Drivers of Agility	24
2.5.4 Agility in Multinational Enterprises.....	25
2.6 CRM, Big Data and Salesforce Analytics	26
2.6.1 CRM Systems in Digital Transformation	26
2.6.2 Salesforce and Analytics Capability	27
2.6.3 Role of Analytics in Agility	28
2.7 Integration of Industry 4.0, Digital Transformation and Agility	30
2.7.1 Interdependencies	30
2.7.2 Technology-Strategy-Agility Alignment	31
2.7.3 Theoretical Gaps	31
Chapter 3 -Research Methodology	33

3.1	Research Background	33
3.2	Research Philosophy	34
3.3	Research Method and Data Collection	35
3.4	Research Sample Rationale	37
3.5	Data Analysis	39
3.6	Validity and Reliability	40
3.7	Research Ethics	41
Chapter 4 – Case Study: <i>The case of LG Electronics</i>		42
4.1.	Introduction	42
4.2.	LG Electronics -Company's Background	43
4.3.	I4.0 & Digital Transformation at LG Electronics	44
4.4.	SFDC Implementation, Integration with IS, Big Data, Analytics	45
Chapter 5 – Findings and Analysis		50
5.1.	The relationship between the implementation and integration of Industry 4.0 technologies in multinational organizations and LG Electronics and the influence of these technologies in shaping the company's strategic initiatives, culture and interpretations by key stakeholders.	50
5.2.	The role of digital transformation at LG Electronics and how the interrelation of organizational agility, flexible structures, organizational culture is shaped, whereas risk-averse practices and rigid hierarchies may impede the successful application of I4.0 technologies. The alignment of IT strategy with business strategies, the company's capabilities and cultural context as key factors for the successful implementation of I4.0 technologies.	51
5.3.	The interconnection between the adoption of Industry 4.0 technologies and digital transformation initiatives and their contribution to organizational agility, and how this is reflected on multinational companies and LG Electronics specifically.	53
Chapter 6 - Discussion & Recommendations		54
6.1.	Discussion	54
6.2.	Recommendations and Best Practices	56
Chapter 7 Conclusion		57
Bibliography / References		59
Appendices		69

Name: Marianna Novakidou

Postgraduate Thesis Title: Unveiling the Nexus: Analysing the Impacts of Industry 4.0-Digital Transformation and Agility on Multinational Enterprises:

A case study of LG Electronics

This Master's Thesis was prepared during the studies for the distance master's degree at Neapolis University and was approved on.....

[date of approval] by the members of the Examination Committee.

Examination Committee:

First Supervisor (Neapolis University Pafos).....[name, rank, signature]

Member of the Examination Committee:[name, rank, signature]

Member of the Examination Committee:[name, rank, signature]

Thesis Acknowledgements

To my supervisor professor, *Dr. Avgousta Kyriakidou-Zacharoudiou*, I thank you for your invaluable guidance, patience, insights and support in this journey. Thank you to the School of Economics, Administration, and Computer Science for the programme coordination and communication. I sincerely thank the interview participants whose insights assisted with the completion of this study.

Abstract

This dissertation delves into the interrelation of Digital Transformation (DX) and the successful adoption of Industry 4.0 and its integrated technologies, like Internet of Things (IoT), Artificial Intelligence (AI), Augmented Reality (AR), Big Data-Analytics, and Customer Relationship Management (CRM) systems – in multinational organisations with a focused study of LG Electronics. The thesis explores how organizational agility develops and leveraged through the adoption and utilization of advanced digital technologies and examines the extent to which LG Electronics responses to technological advancements, digital transformation and agility have become embedded in operational and managerial processes.

Additionally, the aim of this study is to identify the impact of those technologies on Key performance Indicators (KPIs) such as innovation capability, competitive edge in the marketplace, and operational efficiency. The selected research methodology encompasses interviews with industry experts from various departments such as Sales, IT/CRM operations specialists, senior executives, and Service department within LG Electronics as well as observations, case studies and secondary data including annual reports, and organisational documents.

The study's findings reveal a strong correlation between the adoption of advanced technologies and successful digital transformation in multinational companies (MNCs) highlighting improvements in operational efficiency, adaptability, risk mitigation, innovation capabilities, competitiveness and key stakeholder satisfaction. It offers a nuanced understanding of the opportunities as well as the challenges and limitations associated with the integration of Industry 4.0 technologies, digital transformation, and organisational agility in multinational enterprises.

The dissertation concludes with recommendations underpinning the significance of agile governance, strategic planning, and stakeholder engagement to facilitate effective technology implementation, mitigate resistance to change, and enhance organisational adaptability and resilience in rapidly evolving digital environments.

These insights provide guidance for both academic research and corporate audiences with practical applications in multinational companies.

Keywords: Information Technology, Digital Transformation, Organisational Agility, Multinational Enterprises, Industry 4.0, Industry 5.0, Big Data, Analytics, CRM systems, Salesforce (SFDC)

Chapter 1 - Introduction

1.1 Problem Statement and Research Gap

Although there is rapid development of Industry 4.0 technologies (I4.0), the interrelation of digital transformation (DT) and organizational agility (OA) in multinational organisations which undertake large-scale digital transformation initiatives is limited in scientific research and lacks a single analytical framework and empirical evidence. Enterprises encounter challenges when they should define the appropriate IT strategy and align it with their business strategy, select the proper IT infrastructure and governance framework, design the right business processes to achieve efficiency, productivity, scalability, global connectivity, sustainability and enhanced products and services (Vial, 2019).

According to Zaoui & Suissi (2020) the current literature review fails to provide concrete evidence and theoretical frameworks regarding the specific processes that should be followed by the companies considering significant factors like size, digital maturity, activity, target, and financial condition. Moreover, thoroughly the design of the processes has not been examined, and how applicable they are in real-world examples. The lack of defining concrete processes before the implementation of the DT is of paramount importance and often leads to failure of IT and DT projects. On the other hand, Zolkover *et al.* (2022) argue that many studies concentrate only on one aspect of the business operations (e.g. the manufacturing, supply chain) or on a specific geographical area. Davenport (2006) highlights the importance and the benefits of big data analytics in organisations without integrating this concept into the broader DT strategy and OA of the companies, whilst Kraus *et al.* (2021) notes that many studies focus either on DT and I4.0 or OA and analytics without combining these topics under a united research framework. In the same token, Hanelt *et al.* (2021) outline the alignment of IT strategy with the broader business strategies without incorporating the importance of CRM/cloud computing technology, data governance and presenting empirical evidence of the research. As such, it is evident that there is a gap in the multidimensional nature of digital transformation initiatives in companies that operate in complex, global, and highly competitive environments like LG Electronics. In this vein, this study seeks to bridge the gap of the existing

theoretical frameworks with empirical evidence of the LG Electronics case study and provide practical recommendations for companies who try to adopt and implement DT as well as open avenues for future academic research.

1.2 Research Objectives

The purpose of this dissertation is to investigate the interrelationships among Industry 4.0 technologies, digital transformation processes, and organisational agility within the context of a large multinational enterprise. More specifically:

1. To analyse the current literature and theoretical concepts of Digital Transformation, Organisational Agility, Industry 4.0, Industry 5.0, and how these are interrelated with CRM systems, Big Data and Analytics.
2. To investigate how these different frameworks and technologies influence the performance and success of LG Electronics providing simultaneously other actual paradigms of multinational institutions.
3. To determine the key success factors and limitations/challenges by adopting these technologies by large multinational companies and how it is affected its digital transformation strategy.
4. To offer practical recommendations to enterprises seeking to reinforce their Digital Transformation, Organisational Agility by adopting these technologies.

By analysing these objectives, the study aims to provide invaluable insights into digital transformation, organizational agility with the adoption of technological advancements (I4.0/I5.0, CRM systems, big data analytics) along with useful guidelines and recommendations for multinational organisations that aim to achieve successful and sustainable digital transformation results and agility.

1.4 Research Questions

The research questions of this thesis will provide direction for examining and analysing the impact of digital transformation and organizational agility in multinational companies, facilitating a thorough comprehension of the topic (Punch, 2000). The questions will also enable the effective accomplishment of the stated objectives.

The research questions are:

1. How are Industry 4.0 technologies strategically integrated into organisational processes and decision-making structures?
2. How does LG Electronics strategically integrate Industry 4.0 technologies into its operational framework?
3. What organisational capabilities, structures, and cultural conditions enable or constrain successful digital transformation?
4. What is the role of digital transformation in LG Electronics and what are the challenges and opportunities of Industry 4.0?
5. In what ways do Industry 4.0 technologies and digital transformation initiatives contribute to the development of organisational agility and how does this manifest in LG Electronics adaptability?

Research Hypotheses

Based on the research questions, there are research hypotheses that can be formulated. The aim is to explore, analyse and validate the intricate relationship and consequences of Industry 4.0 technologies, digital transformation and organizational agility in multinational companies with a particular focus on LG Electronics. These hypotheses serve as the foundation for this study are as follows:

RHQ1-2: The relationship between the implementation and integration of Industry 4.0 technologies in multinational organizations and LG Electronics and the influence of these technologies in shaping the company's strategic initiatives, culture and interpretations by key stakeholders.

RHQ3-4: The role of digital transformation at LG Electronics and how the interrelation of organizational agility, flexible structures, organizational culture is shaped, whereas risk-averse practices and rigid hierarchies may impede the successful application of I4.0 technologies. The alignment of IT strategy with business strategies, the company's capabilities and cultural context as key factors for the successful implementation of I4.0 technologies.

RHQ5: The interconnection between the adoption of Industry 4.0 technologies and digital transformation initiatives and their contribution to organizational agility, and how this is reflected on multinational companies and LG Electronics specifically.

1.5 Significance and Contribution of the study

The role of I4.0 novel technologies, digital transformation, organizational agility in multinational corporations is of great importance for various reasons. To begin with, the I4.0 cutting-edge technologies require large investment capitals for their acquisition, implementation and IT governance and strategy should be aligned clearly with the company's business strategies, vision and goals. Therefore, informed decision-making is of paramount importance (Shao, 2025). The case study of LG Electronics presents the digital transformation initiatives of a multinational company, the benefits of I4.0 adoption (Salesforce/CRM cloud computing and big data analytics (dashboards/reporting)) as well as the limitations and challenges the organization encountered and how these have shaped its business model, operations, productivity, responsiveness and revenue increase. Consequently, other companies can take advantage of the lessons learnt and practical recommendations to strengthen their digital transformation journey, enhance data-driven decision-making and improve their governance (Madsen, 2019).

The research gives an overview of the advantages, challenges, limitations and implications from the adoption of I4.0 technologies, and their impact on the digital transformation and organizational agility of LG Electronics that can be applied to other (multinational) companies. Organisational resistance, change management, gap of skilled workers, data quality, security and privacy, along with challenges in the integration of legacy systems with the disruptive technologies and misalignment of the IT strategy with the business strategies are key themes of LG Electronics digital transformation path. Therefore, by understanding these concepts, enterprises can mitigate the risks associated with the adoption of these technologies and frameworks.

Identification and elimination of potential risks and challenges of the adoption of I4.0 technologies and the correlation of digital transformation and organizational agility, leadership, IT managers, and management can achieve revenue streams, resilience, competitiveness, efficiency, cost-savings, create value, attract new customers, and market expansion for the organization (Malewska *et al.*, 2022).

Furthermore, the importance of the study is based on equipping organisations with insights, knowledge and practical guidance to steer their digital transformation

strategy and implementation of innovative technologies successfully. In the growing digital age corporate managers, executives, IT specialists, academic researchers could make more informed decisions derived from the practical applications and recommendations of this research provide further directions of future research.

1.6 Structure of the Dissertation

In the next chapters the research will delve into thorough exploration and examine the interdependence between I4.0 technologies, digital transformation and organizational agility and how multinational corporations utilize these concepts. Chapter two focuses in depth on the literature review and the theoretical frameworks of these topics and adoption and implementation of these on different multinational companies. It analyses the core principles and practices, mentioning the interconnection of these frameworks from the literature review and applicable examples. Thereafter, it is presented the research methodology used in the research. It is employed mainly qualitative research methods through interviews, scientific journals, and company's reports. The intricacies of data collection, sample rationale of the data as well as the analytical techniques to extract insights from them are articulated. Chapter four emphasizes for the specific multinational corporation; LG Electronics and how the implementation of I4.0 technologies affected its digital transformation path to become more agile, competitive and sustainable. After the discussion of this specific case, chapter five presents the analysis and findings of the specific company. The results are interpreted and discussed from different perspectives. This section draws a comparison between the findings of the interviews with the existing research frameworks to provide a comprehensive understanding of the broader context of I4.0, digital transformation and organizational agility. Moreover, the challenges, limitations and implications are outlined as well. Chapter six addresses the best practices, lessons learnt and contributions of the theoretical frameworks and the specific case study as practical guidance to other companies and academic researchers. The research objectives, hypotheses and questions are linked to the larger goals of reinforcing the I4.0 technologies with digital transformation, organisational agility for multinational enterprises. Additionally, future research direction is presented to enable comprehensive conclusion of the research study.

Chapter 2 – Literature Review

2.1 Introduction to the Literature Review

This chapter examines the theoretical frameworks and the key themes of the literature review, covering the broad spectrum of I4.0 and I5.0 main technologies, the importance of digital transformation and the organizational agility achieved in multinational companies that employ this novel technology. Additionally, it is discussed from different angles the challenges and limitations that these technologies impose.

2.2 Industry 4.0

2.2.1 Definition and Evolution

According to Hermann *et al.* (2016), “**Industry 4.0** is a collective term of technologies and concepts of value chain organization. Within the modular structured Smart Factories of I4.0, Cyber-Physical Systems (CPS) monitor physical processes, create a virtual copy of the physical world and make decentralized decisions. Over the Internet of Things (IoT), both internal and cross-organisational services are offered and utilized by participants of the value chain.” Madsen (2019) extends I4.0 as the fourth Industrial revolution in manufacturing with social and economic effect through the emergence of new technologies, ideas, and policies that lead to artisanal production techniques, automation, flexibility, agility, real-time decision making, and digitalization whilst Coehlo *et al.* (2023) present in their study, that many countries utilised the concept of Industry 4.0 as part of their development programmes. More specifically, in 2011 Germany presented the “Industry 4.0” programme, whereas China used the “Made in China 2025” vision to signal the adoption of the disruptive technologies in manufacturing.

2.2.2 Core Technologies

I4.0 encompasses a suite of technologies that aim to transform traditional manufacturing into more intelligent, autonomous and connected systems. I4.0 incorporates key technologies such as Internet of Things (IoT) where advanced interconnected sensors or software that detect and measure key properties from the environment by translating and communicating this real-time data to machines, products, humans and applications. In this regard, the use of this technology has transformed traditional factories into smart factories enabling interoperability

(Hermann *et al.*, 2016). The plethora of IoT applications for humans and public services like transportation, energy generated the term of smart cities enabling real-time connection between physical and digital realms. Furthermore, another core technology of I4.0 is the Cyber-Physical Systems. This term refers to advanced systems that connect physical processes with computational algorithms in real-time data to develop processes, automation, and facilities. Augmented Reality (AR) refers to smart technology that augments or supplements the real-world objects using 3D, whereas Virtual Reality (VR) refers to recreation of reality and it can be either similar or different from the real-world experience. These technologies have many applications in manufacturing, retail marketing, and gaming (Zheng *et al.*, 2021).

Artificial Intelligence (AI), along with Big Data analytics, and Machine Learning (ML), use large amounts of datasets to support manufacturing and business operations enabling superior quality, better production-planning and improved decision-making. As such, this creates a new level of visibility, predictability, automation in operations as well as in business processes that mitigates the risk of siloed information and operations. Cloud computing is the foundation of I4.0 technologies. The National Institute of Standards and Technology (NIST) states that “cloud computing is a model that enables convenient, on-demand network access to a shared pool of configurable computing resources like networks, servers, storage and services that can be rapidly provisioned and released with minimal management effort or service-provider interaction “(Sharda *et al.* 2018). It facilitates the exchange of large amounts of information from manufacturing, supply chain, sales, distribution and service through its interconnectivity and integration with other systems. Data can be stored, analysed and processed fast and efficiently.

Blockchain technology supports secure transactions and storage of information through its secure ledger and on-peer-to-peer network. When a block is added to the chain, it is safely stored and cannot be altered unilaterally. It can be also digitized and eliminates intermediaries and does not allow third party access to this information and systems. Therefore, it ensures secure and transparent data sharing across business units, and industrial ecosystems (Zheng *et al.* 2017).

Lastly, the advanced robotics as well as the autonomous systems used in manufacturing are cornerstone of I4.0 technologies. They allow manufacturing of customized products and offer greater flexibility and decentralization of the production. It is evident that all these technologies aim to improve productivity, efficiency, automation, and digitalization (Madsen, 2019).

2.2.3 Opportunities and Challenges

The adoption of these technologies creates numerous advantages for organisations as well as limitations and challenges. First, advanced technologies boost automation, by eliminating repetitive tasks, minimizing the production life cycle, reducing waste and saving energy which leads to improved profitability, resource efficiency and faster decision-making process for the firms. Additionally, it enables the design of innovative products and services that meet the needs of the customers. In this way, companies can remain competitive in the global changing market.

On the other hand, Anshari *et al.* (2019) diverge that firms should have significant investment capital to acquire and implement these technologies. The lack of expertise from employees restricts the understanding and use of these technologies. There is also limited interaction between humans and machines as automation prevails that may lead to accidents or errors as humans cannot intervene on time and prevent them. It is observed often that the misalignment between the IT strategy, and business vision of the company along with the lack of understanding from the leadership in these technologies causes further issues in the organizations. This may lead to adoption of wrong strategy for technology and eventually purchase inadequate technologies which impact directly the revenue of the company. Data security and privacy concerns are another challenge that should be overcome along with the inadequate legal framework around AI and the ethical issues raised (Kouroupis *et al.* 2021). The quality of data plays a crucial role especially if they derive from multiple and different systems. Having noisy, heterogenous and inaccurate data can lead to misinterpretation and misrepresentation of them in analysis and reporting impacting significantly the decision-making process and the actions taken by the leadership of the organization.

While the core technologies of I4.0 support automation, flexibility, productivity, quality, they lack the connection between human-machines in a harmonized way that foster sustainability, adaptability, responsiveness, positive working environment and well-being of the people (Rame *et al.*, 2024). This gap is filled by the evolution of I5.0 and its key concepts that will be explored in 2.3 subsection.

2.2.4 Industry 4.0 in Multinational Enterprises

There are many multinational enterprises that exploit the benefits of I4.0 technologies to remain competitive, improve their production, operations and business processes as well as increase their revenue. Below there are presented some examples of multinational companies and how I4.0 assisted them in achieving competitiveness, efficiency, productivity, innovation, improved yields and quality.

The large enterprise **Bosch** welcomed the I4.0 since 2011 in its manufacturing and logistics with the adoption of the CPS, robots and its own IoT cloud services to turn data into knowledge. It uses also AI to detect anomalies and malfunctions in production which led to generation of four billion euros of revenue in total the last decade (Bosch, 2026).

Another multinational company that uses I4.0 is **Siemens**. The company implements IoT smart sensors in its factories. In Siemens campus in Erlangen Augmented Reality (AR) is utilized with robots to check components and test code automation. As such, the company gains competitive advantage in the market while it boosts its sales (Siemens, 2026).

Nestle optimized its business through the use of AI for demand forecasting and IoT for its factories. In the R&D sector AI is utilized to improve its production and product development. Moreover, it uses chatbots and virtual assistants for its customer experience and to personalize recommendations for the consumers. In this way, it reduces its operational costs, creates innovation, and customer loyalty (Nestle, 2022).

2.3 Industry 5.0

In this section is analysed the theoretical framework of Industry 5.0 along with the key principles as well as the interaction and collaboration of humans and machines to achieve greater efficiency, productivity, enhanced quality, tailored

customer-experience, safety, sustainability, cost-saving, innovation and better social responsibility. In the end, the challenges of adopting these technologies are presented briefly.

2.3.1 Emergence and Key Principles

Wolniak (2023), states that Industry 5.0 is the evolution and successor of Industry 4.0. It is acknowledged that industry 4.0 focuses on automation, advanced technologies like AI, IoT, cloud computing, as well as data-driven technologies and their integration into manufacturing and business operations. However, Taverner et al., (2021) emphasizes that Industry 5.0 establishes the foundation for the interaction and collaboration between machines and human creativity, intuition to achieve a more human-centric, sustainable, flexible manufacturing and business environment. On the other hand, Rame et al., (2024) highlights the transition from I4.0 to I5.0 enhances the viability and performance on three levels; economic, social and environmental.

Machines and humans work together to leverage productivity, enhanced products, quality control, gain real-time insights from data, and socially responsible manufacturing environments. It reinforces the social impact and promotes a circular economy through the cutting-edge technologies that empower human capabilities. Industry 5.0 mitigates the environmental impact by reducing waste and creates more positive socially responsible communities through the advanced adaptable systems. Furthermore, it promotes work safety, reduces downtime in manufacturing, and allows companies to remain competitive and increase their customers satisfaction and loyalty (Aslam *et al.*, 2020).

2.3.2 Human-Machine Collaboration

In Industry 5.0 the role of humans is essential. Humans and machines are complimentary rather than separate entities compared to Industry 4.0. In this way, it is created a more collaborative, positive, responsible manufacturing environment to meet the constant demands of the market and lead to more customized products. Human insights and critical thinking can bring meaningful changes into the collaborative robots (cobots), Augmented Reality (AR), Virtual Reality (VR), 3D printing, and advanced digital assistants and generate new ideas and design of products, lead to intelligent automation and predictive maintenance. This

symbiosis promotes employees' well-being, work-life balance, and job satisfaction. They feel seen, valued and engaged rather than isolated in the working environment (Ma *et al.*, 2022). The human-centered approach underpins empathy and experimentation. As such, it leads to more innovative, responsive and adaptable manufacturing environments. Moreover, the meticulous analysis of the customer data with the assistance of machine learning and artificial intelligence lay the groundwork for designing customized products and services to meet the needs and wants of the customers (Aslam *et al.*, 2020).

2.3.3 Implications for Strategy and Sustainability

Industry 5.0 influences the strategy of the businesses by the human-machine collaboration and the investment in advanced technological tools. It focuses on value creation and individualization of products and services to increase customers satisfaction and loyalty. As such, it allows workers to focus on strategy, and innovation as repetitive tasks have been automated. Industry 5.0 introduces the concept of the circular economy. This means that there is a focus on designing products that can be reused and recycled. The use of advanced technologies aims to optimize the resources, reduce energy consumption, and minimize waste. This leads to sustainability for businesses and manufacturing through the significant reduction in carbon footprint along with the use of renewable energy like solar, wind and hydroelectric power (Adel *et al.*, 2022).

On the flipside of the coin, it is worth noting that there are hurdles by adopting the industry 5.0 framework and technologies. There are increased costs for the usage of these technologies and potential lack of investment in infrastructure from the enterprises. It is needed skilled workforce and experts for this technology. Hence, upskilling and reskilling programmes are crucial for enterprises. However, it may collide with cultural resistance and change management in organisations. Similarly, there are integration challenges with the existing systems or ethical concerns associated with the replacement of some type of jobs with machines along with regulatory barriers. (Bozic, 2024).

2.4 Digital Transformation

The exponential growth of I4.0 technologies along with the emerging I5.0 concepts leads to a digitalized and globalized world. Furthermore, the constant competitive

environments force enterprises to adopt disruptive technologies to achieve organizational agility and competitiveness (Kraus *et al.*, 2021). This subsection discusses the frameworks of DT and its role in enterprises as well as the limitations and challenges included.

2.4.1 Definitions and Theoretical Foundations

According to Fitzgerald *et al.* (2014) “Digital Transformation (DT) is the use of new digital technologies such as social media, mobile technology or embedded devices to major business improvement including enhanced customer experiences, streamlined operations, or new business models”. Similarly, Zaoui and Suissi (2020) point out the high correlation between DT and I4.0 technologies. Technology is a key driver for change in organisations to achieve a competitive edge, value creation, better supply chain management, strategy and economies of scale. DT has multidimensional role for corporations and affects many segments of the businesses. It redefines relationships between organisations, stakeholders and customers to improve products and services. Additionally, it creates value networks, value chains, and value shops especially to consumer-centric sectors and increase the customer-engagement and loyalty through the intermix of digital and physical arenas (Hagberg *et al.*, 2016).

2.4.2 Strategic Role of Digital Transformation

The successful implementation of DT enhances the organizational agility, resilience, long-term competitiveness, leads to strategic outcomes and the companies differentiate from their competitors. What's more, companies are prepared to face uncertainty, challenges and disruptive changes created in the dynamic environments they operate. DT allows companies to seek new opportunities that direct new redesigned business models, enhanced value proposition increased business agility and building digital capabilities (Jadertrierveler *et al.*, 2019).

Data analytics enhance customer value proposition through the design of innovative tailored products and services, flexibility in production, proliferation of transactions, new forms of distribution along with the introduction of new e-commerce platforms that offer a wide range of new options of buying for customers. In this regard, companies can be more commercially and service-

oriented (Kathan *et al.*, 2016). Based on the analysis of the customer data, purchase history, and behavioural patterns firms can design better offerings and improve the organizational performance while they are able to advantageously remain in the market.

2.4.3 Organisational and Cultural Enablers

In every organization culture plays a crucial role in the success of its DT.

Barney (1986) defines organizational culture as “a complex set of values, beliefs, assumptions, and symbols that define the way in which a firm conducts its business”. In other words, organizational culture is the way that people think, which in turn has a direct effect on how they behave and conduct their work. Organisational culture supports the change in every firm. However, in the light of the digital era, Caro *et al.*, (2020) diverge and propose a new term for the organizational culture, the *digital organizational culture*. DOC is defined “as a set of shared assumptions and understanding about organization’s functioning in a digital context”.

Malewska *et al.*, (2024) extend the model proposed by Caro *et al.*, (2020) and argue that flexible culture shapes the behaviour of the members, affects process management, increases transparency, accountability, innovation and collaboration. This shift in turn creates value systems, and it remodels the lifecycle of business as well as reformulates the traditional business strategies and structures.

Nevertheless, companies that heavily rely on hierarchies are risk-averse and hesitant to adapt to new digital technologies; they cannot sustain their competitive advantages in the long term. The top management teams should support proper communication regarding the vision, the strategic goals and investments in technology, foster cross-functional collaboration and data-driven decision-making. In this way, the company becomes more agile, overcoming any resistance, ensures preparedness for the uncertainties caused by external factors (e.g. COVID19 pandemic) and abandons silo working and isolation of information and knowledge. Employees should be also encouraged and empowered to take initiative as well as participate in training sessions, so the company can improve its performance and generate value from its digital tools (Plekhanov *et al.*, 2023).

2.4.4 Barriers and Challenges

Adopting and implementing DT may be challenging for enterprises, as it is a complex and revolutionary process. Companies require to proceed with fundamental changes in the business systems and their organizational structure. There are barriers to integrate DT successfully into their multiple business strategies and align with their vision (Vidal *et al.*, 2022). Another important aspect is the efficient and successful identification of internal business situation along with the external trends and demands to define new objectives, processes and finally the action plan for DT implementation. If leadership fails to identify on time the appropriate business processes, and the methodology, that align with the business strategy and its technological strategy that may lead to reduction in productivity, loss of the capital invested in technology, and the processes will become obsolete, distracting and lead to confusion for the end-users/workforce (Butt *et al.*, 2024)

Moreover, there are limitations on how firms can deliver seamless customer experience across multiple channels (online and offline) as interconnectivity, interface and systems' integration can cause issues. Another implication may be the data governance. The quality of data and the expertise of the employees define the success of the organization's DT. This demands organizational capabilities and agile intra-organisational collaboration along with the integration of the adopted technologies. Another significant factor is the resistance to change from the employees that leads to further implications for the implementation of DT, creating numerous risks for the firms (Zaoui & Souissi, 2020).

2.5 Organisational Agility

In this section the interrelation between digital transformation and organizational agility will be investigated. It presents the foundations and dimensions of organizational agility along with the correlation of I4.0 technologies and DT as key enablers of digital agility.

2.5.1 Definitions and Foundations

According to Mrugalska and Ahmed (2021) organizational agility (OA) is defined as “the capability of an organization to manage uncertainties, changes and pressure occurring in the market and its environment”. While Hagen *et al.* (2024) underscore the capacity of the organization to respond to these changes in a

timely manner to avoid future tensions, secure fast growth and stability. OA plays a critical role in an enterprise, as it facilitates the digital transformation through the implementation of Industry 4.0 technologies as well as measurable results in production, supply chain, customer service, management, increase business performance and maintain its competitive advantage. Enterprises should assess the internal and external changing environment, the global and local demand, their short and long-term horizons to strategically adapt and guarantee performance. However, OA can be seen as double edged as on the one hand, it may assist companies to respond to external volatility, uncertainty, complexity and ambiguity but, on the other hand, it may create internal disruptions of the existing processes, structures and strategies (Vaszoun & Sziraki, 2023).

2.5.2 Dimensions of Agility

Agility plays a pivotal role for an organization, as it enables them to adopt highly sophisticated I4.0 technologies and cope with uncertainty and challenges. However, this adoption leads to changes in the culture, operations, management and work system of the company.

Depending on the framework there are several different dimensions of agility. Mrugalska and Ahmed (2021) define as agility dimensions the workforce, supply chain, strategy, information systems, facilities and processes. Another framework of agility is the LARG referring to lean, agile, resilient and green that enables enterprises to reinforce supply chain performance, competitiveness and sustainability.

According to Hagen *et al.* (2024) organizational agility emphasise on the *paradox theory*. This refers to the situation in which the business should change and adapt to remain competitive but simultaneously this change may disrupt the status quo of the organization. OA encompasses flexibility, responsiveness, stability, continuity, and speed and time dimensions.

Flexibility is a key characteristic for organisations and signals the alternatives a company explores to generate resources and opportunities. Flexibility paves the way for the generation of new and different products/services, business models, operations and manufacturing alternatives. It can be cognitive, relational and structural.

Responsiveness is related to the organisation's performance through the interrelation and interaction with the markets, customers, partners and the internal

environment of the business. It is connected to the alternatives that a firm employs to achieve efficiency and effectiveness to respond and adapt to market change like the term “*glocalise*” which means for an enterprise to blend the local demands with the international trends.

Stability is crucial and it is associated with the vision and the identity of the company to remain true to its goals and its core values. Stability is intertwined with flexibility, so the organization can seize the opportunities and improve its growth. Important aspects of stability are the collaboration, and the continuous learning of the company’s personnel.

Continuity refers to the risk mitigation and management that may affect the business processes and operations while recovery is feasible without threatening the vitality of the organization. In other words, the company can thrive, innovate, its business model, operations, products and services through automation, streamlining, and standardisation to achieve efficiency and effectiveness.

Lastly, **speed & time** consider to be key factors of OA. More specifically, in this context the term speed is related to decision-making, action and adaptation, while the time is linked to acting at the right-time that leads to opportunity identification, evaluating the conditions, understanding the markets, anticipate challenges, uncertainties and limitations as well as internationalising and growing fast.

2.5.3 Industry 4.0 and Digital Transformation as Drivers of Agility

Undoubtedly I4.0 and DT have become key drivers of organizational agility in organisations, as they facilitate successful navigation of uncertainties and unforeseen events in high complex, dynamic and globalized environments (Butt *et al.* 2024). OA is a capability that enables firms to recognize and respond to changes, and it is correlated with the emergence of I4.0 technologies that allow firms to enrich their productivity, decision making, flexibility and improving their operations. Besides DT heightens the agility occurred by the implementation of I4.0 by reshaping the business structures, models, cultures, strategies, processes and operations leading companies to reallocate resources, and reconfigure capabilities to achieve efficiency, adaptability, flexibility and competitiveness (Sasmita *et al.*, 2025). This can be achieved through the leadership that aligns digital strategy and business strategies. Hence, I4.0 and DT are interrelated with organizational agility, as they can be considered drivers for improved structures

and better processes, allowing enterprises to maintain their performance, especially in turbulent conditions (Malewska *et al.*, 2024).

2.5.4 Agility in Multinational Enterprises

Many multinational companies incorporated into their strategies agility to efficiently and effectively redirect their resources, create value, capture higher revenues, overcome internal turbulence, and manage external challenges. For instance, **Netflix** initially a DVD-by-mail rental company with traditional hierarchies and standard business processes evolved to streaming and content production. The company had to reassess its business model and organizational needs as well as the external environment to adapt and respond to the challenges from their competitors. The organization redirected its organizational capabilities, and decision-making processes of sharing information along with its culture to innovate with new products by leveraging the I4.0 technologies like cloud computing and becoming adaptable to the new market trends. It has been adopted the data-driven decision-making. Data, AI and ML are used to analyse the customer behavioural patterns and trends and create tailored recommendations and services leading to profit growth. The organization welcomed flexibility, and fast responsiveness to a constantly changing environment to secure continuity, stability, resilience, and competitiveness. Nevertheless, there were challenges like the internal resistance of the new culture and direction of the organization from its employees who preferred predictability over flexibility and security over freedom (Cleff, 2025).

On a different note, the example of the **SAP** corporation illustrates how a large European software company is affected by the rapid growth of AI technology, witnessing sharp stock decline and Q4 revenue, as it did not manage successfully to incorporate on time the I4.0 technologies in its strategic planning, and adapt to the external environment and digital age landscape early. The company originally offered on-premises software and licences to its customers, while the last few years tried to differentiate its products and services and embed AI into its cloud business to meet the needs of the customers and anticipate the new market trends like other multinational companies (**Microsoft, Amazon, Salesforce**). However, due to cloud order backlog and the initial higher growth expectations, the company should balance now its long-term strategy along with the adoption and

implementation of I4.0 technologies to be competitive, sustainable and resilient (Mueller, 2026). The delayed responsiveness of SAP to the market led to weak strategic positioning fragmented efforts, lack of cohesive progress and reduced its capacity to remain flexible and ensure operational and financial stability (Shao, 2025).

2.6 CRM, Big Data and Salesforce Analytics

In this section the key topics of CRM, Big Data and the interconnection with Salesforce (SFDC) Analytics are explored from different perspectives.

2.6.1 CRM Systems in Digital Transformation

Customer Relationship Management (CRM) systems, play a pivotal role in digital transformation (DT) as they allow companies to collect, store, integrate and analyse customer data across multiple touchpoints. The latest technological advancements of CRM systems offer more than traditional sales and marketing support to enterprises as they are data-driven hubs by enabling sales, marketing, customer service operations while they support real-time data insights, fast decision making for management and facilitate personalised, tailored customer experiences (Uloma *et.al.*, 2024). By integrating the latest technological advancements like Artificial Intelligence (AI), cloud computing, Internet of Things (IoT), Blockchain, Business Intelligence (BI), and analytics, CRM systems reinforce customer insights, improve business operations by automating business processes and enhance stronger customer engagement which are core capabilities in digitally transformed enterprises (Lampropoulos *et al.*, 2022).

Blockchain technology facilitates decentralised transactions because these transactions can be stored within a chain of interconnected blocks. The transactions into these blocks can be validated through network and by using cryptography. This novel technology characterised by transparency, anonymity, persistency and auditability. In CRM systems, blockchain can be utilised to improve security and efficiency (Zheng *et al.*, 2017). It can reinforce the digital transformation of the company due to the decentralisation, security, trust and increase the customer satisfaction and loyalty. It is noteworthy the digital transformation paradigm of **Lamborghini** company which exploits the Salesforce Blockchain for the certificate authentication, and to trace its luxury vehicles

securely. This information can be stored securely and safely by protecting the vehicles against counterfeits. The company secure its luxury cars and its high-profile clients ensuring safety, satisfaction, customer loyalty and competitiveness (Salesforce, 2019).

What's more, CRM systems support strategic agility of organisations by enabling faster adaptation to customer expectations and market environment (Hermenegildo *et.al.*, 2020). As such, they move the needle to competitiveness and creation of long-term value to firms. CRM systems are recognized as underlying technologies that empower organisational transformation from product-centric to customer-centric strategies and business operations in the digital era (Chen & Popovic, 2003).

2.6.2 Salesforce and Analytics Capability

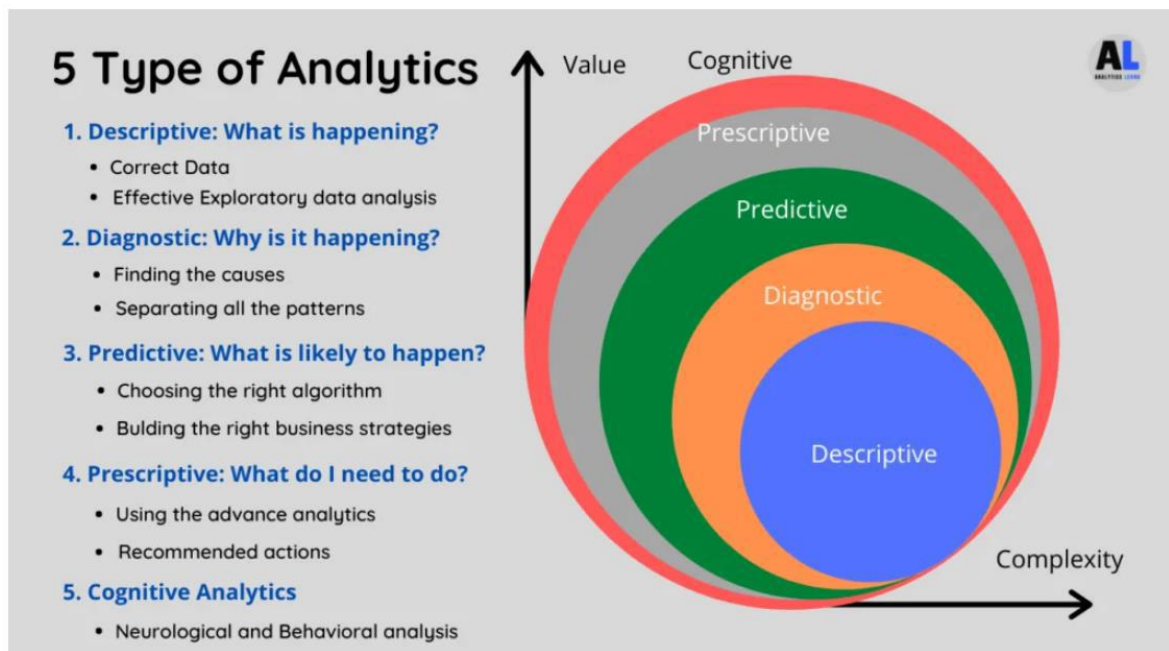
Salesforce (SFDC) is a market leader of CRM systems having been chosen by large multinational enterprises for their operations and digital transformation. This is achieved by embedding advanced analytics capabilities through the latest technology like Einstein (AI) as well as the integration of Tableau (BI). Einstein drives SFDC analytical capabilities by using machine learning and predictive analytics to customer data allowing companies to generate live insights, provide recommendations, automate operations, and streamline business processes, as well as supporting forward decision-making across sales. At the same time, the integration of Tableau fortifies Salesforce's analytics ecosystem by supporting advanced data visualisation, *exploratory data analysis* (EDA), enabling businesses and users to analyse complex data interactively and identify patterns in customer and sales data. These capabilities reinforce a change from *descriptive* analytics (what's happening) to *predictive* (what will happen?) and *prescriptive* (what can we make it happen?) analytics enabling firms to develop customer-centric strategies and improving organizational agility. Salesforce seamlessly employs analytics and artificial intelligence within its ecosystem and workflows facilitate companies to leverage data as strategic asset and refine the effectiveness of digital transformation initiatives (Salesforce, 2026).

The global multinational pharmaceutical company **Merck AG** employs SFDC as a cornerstone for its analytics strategy and digital transformation. The firm boosts its

efficiency through workflows automation, optimising its sales operations and more specifically through the Opportunity object and cleaning up data. As a result, this generates high quality and reliable data. Consequently, this data lay the foundation for its dashboards and Analytics, allowing improved forecasting and pipeline management across sales and service. Hence, leadership can make informed decisions, automate and streamline its operations and increase its competitive edge. This makes SFDC a digital transformation tool and data-driven business performance (Salesforce, 2023).

2.6.3 Role of Analytics in Agility

Based on the analytical capabilities provided by CRM platforms like Salesforce, firms can exploit and leverage data-driven insights to improve their agility and digital transformation journey. There is an exponential growth of customer data that forces companies to adjust their business and digital strategies to accommodate this phenomenon while remaining competitive in the constant changing market. This data is called Big Data, and it comes in high volume from different sources and forms. It can be structured or unstructured stored in relational databases. Their key characteristics are the *velocity*, *volume*, *veracity* and *variety*. At the other end of the spectrum, Analytics is characterised the process of developing actionable decisions or recommendations based on insights created by historical data to solve real problems (Sharda *et al.*, 2018). The combination of predictive and prescriptive analytics from CRM systems along with the real-time data from IoT devices and other enterprise systems allow companies to anticipate market challenges, operations optimisation, customer personalisation and engagement dynamically as well as improved decision-making for leadership. The linkage between analytics, I4.0 technologies enables faster, better business operations and informed decision-making for management (Bakator *et al.*, 2021).



Source: *Types of Data Analytics Learn* (2023).

A real-world example of exploiting the *Salesforce Analytics* is the global pharmaceutical company **Fresenius Kabi**. For Fresenius *Salesforce Analytics* is the cornerstone of its *Pulse* project to unify and optimise customer engagement across its global business. The firm implements the *Salesforce Life Science Cloud*, with the *Data Cloud* to centralise and harmonise its data from multiple sales sources, marketing touchpoints, and field service operations. This enables the company to define standardised global processes, improves operational efficiency as it allows the fast tracking of its service cases along with the customer field operations and performance which in return provides actionable insights to its sales. For Fresenius advanced analytics pave the way to usage of *Agentforce Sales Coach* allowing the company to have proactive customer-support, lower customer churn, and have data-driven decisions. (Salesforce, 2025).

Nevertheless, it should be mentioned the challenges that the companies may face to successfully implement these technologies and the utilisation of Analytics. In many cases it has been observed that there is noisy data, or there are not structured data cleansing processes/activities, which leads to use of low-quality data. That affects the value generated and impacts the decision-making process. In case of usage of in-house developed systems and the adoption of new technologies that could create integration incompatibilities that lead to major

issues associated with data mismatch and therefore limited utilisation. The overreliance of automation and AI along with the limited or lack of proper training of the workforce may lead to another friction in the operations and affect the overall harmony of the business operations in a company (Akter *et al.*, 2016). Even though disruptive technologies and CRM systems facilitate organisations to achieve their business and operational goals through the analytics-enabled agility, their efficiency and effectiveness is heavily dependent on the alignment of this technology with the business strategy, processes, and the employees' expertise.

2.7 Integration of Industry 4.0, Digital Transformation and Agility

2.7.1 Interdependencies

Currently, the literature review envisions I4.0 technologies as primary catalysts of digital transformation that, in turn, reinforces organisational agility especially in volatile environments and the fierce competition on a global scale in which multinational organisations operate. The novel technology of AI, IoT, Big Data, Analytics, and cloud computing, assist in the generation of real-time information and enhances automation. I4.0 technologies boost production, supply chain, productivity, business operations, data-driven decision making, revenue growth, resilience and competitiveness when integrated with the organisation's broader business strategies and align with the vision of the company rather than when they are implemented solely as technological upgrades (Iribaren *et al.*, 2024). Besides, a review of the I4.0 frameworks underpins that the digital maturity of the organisation is reliant on proper governance, alignment of different strategies, capabilities development, bolstering the view that technology alone is not sufficient to produce agile outputs (Alfaqiyah *et al.*, 2025).

Further theoretical findings reveal that I4.0 technologies positively affect the organisation's agility leading to improved performance, innovation, customer experience enhancement and creation of customized products and services. The analysis of the literature demonstrates wide consensus that I4.0 technologies function as enablers for better structures within the enterprise, while digital transformation indicates the strategic and organizational reshaping of the business models, processes and operations and agility endorses a dynamic capability outcome for better responsiveness to dynamic and challenging markets of multinational corporations (Vial, 2019).

2.7.2 Technology-Strategy-Agility Alignment

The alignment of I4.0 technology and strategy to achieve organizational agility and digital transformation within an organisation is highlighted in many theoretical frameworks. The strategic alignment framework demonstrated that companies could outperform when technological initiatives like CRM systems are consistent with the business strategy of the enterprise, making certain that technological investments are coherent with the strategic objectives (Sasmita *et al.*, 2025). Additionally, it is of paramount importance when the IT-strategy of the organization aligns with the business processes through proper governance, sharing knowledge and decision-making as well as understanding the goals of the company for the successful adoption of the I4.0. The CRM system, big data and analytics act as mediating and enabling mechanisms by promoting real-time data and feedback, predictive insights, improved customer-centric approach, and reporting for data-driven decision-making. It links technological capabilities with strategic actions and agile outcomes for companies (Caro *et al.*, 2020).

Regarding the organizational capabilities the main characteristics are the sensing, seizing, reallocating and reconfiguring the resources (Zolkover *et al.*, 2022). CRM and analytics facilitate the company to understand the market trends, customer wants, purchases and behavioural patterns to create opportunities through innovative products and services that meet the needs and demands of the customers. In alignment with the company's processes CRM and analytics act as enablers of agile responsiveness and adaptation to the unforeseen changes of the markets. In this regard, the triad of technology, digital transformation and organizational agility appears as multidimensional capability that ensures strategic alignment with appropriate capital investments in the correct IT-infrastructure to guarantee improved business operations and revenue increase. Overall, all these explain that I4.0 and more specifically CRM systems and analytics translate data into actionable insights, are key factors for the digital transformation and organizational agility of the company (Jadertrierveler *et al.*, 2019).

2.7.3 Theoretical Gaps

Davenport (2006) argues that embedding analytics into business processes can enhance competitive advantage of an organization as it leverages customer data for improved decision making for the management, whilst Kraus *et al.*, (2021)

found that many studies focused on either I4.0 technologies and digital transformation of a company or analytics and organizational agility without merging these elements to present a cross-functional perspective that jointly examines I4.0, digital transformation and CRM analytics with organizational agility in depth. Similarly, Zaoui and Suissi (2020) state that there are not enough theoretical frameworks and empirical evidence in the literature regarding the processes that companies should follow considering parameters like size, activity, target, digital maturity and financial situation. In line with this, Zolkover *et al.* (2022) state the lack of cross-functional studies (e.g the combination of I4.0, DT, OA theoretical frameworks) and how these are adopted and implemented on multinational companies.

Moreover, there are theoretical concepts regarding the strategic alignment of IT-strategy and how this should be aligned with the broader organizational strategies there is not as unified framework for the integration of CRM and big data, analytics as mechanisms to link technology, business processes, and adaptation of the company (Hanelt *et al.*, 2021). Additionally, there are insufficient empirical studies demonstrating the DT, OA and CRM analytics of real examples in enterprises, which operate in highly competitive and complex environments with digital heterogeneity, interdependencies and cross-border challenges.

Lastly, there is not enough evidence in the literature on how these global organisations align their strategies to improve their operations and business processes to achieve DT and OA. To address these topics, it requires a holistic-approach, and cross-functional research to understand thoroughly the correlation between technologies, strategy and organizational agility especially in multinational organisations like the case study of LG Electronics.

Chapter 3 -Research Methodology

3.1 Research Background

The methodology chapter will offer insight into how research has been conducted to achieve the dissertation's goal of accentuating the complex relationship and consequences of Industry 4.0 and the evolution of 5.0 technologies, along with digital transformation and agility in LG Electronics.

Particularly, it is aimed to examine the company's adoption and integration of 4.0 and the extension of 4.0 technologies and their impact on strategic initiatives, while exploring how these technologies enhance the company's strategy, addressing challenges and opportunities. Lastly, the company's adaptability and agility in responding to Industry 4.0 changes and leveraging new opportunities was looked at through a magnifying glass.

To facilitate this, the below three questions have been formulated.

1. How does the company strategically integrate Industry 4.0 technologies into its operational framework?
2. What is the role of digital transformation in LG Electronics and what are the challenges and opportunities of Industry 4.0?
3. How does organisational agility manifest in LG Electronics' adaptability to Industry 4.0-driven changes?

With question 1, the researcher attempted to find out the level of adoption and integration of 4.0 technologies and integrated industry 5.0 within the company, along with the way the company's strategic initiatives have been affected. Question 2 investigates how these technologies offer leverage to its strategy, while clarifying the company's response to the challenges and opportunities brought by Industry 4.0. The question also allowed for the initiatives taken in business and model innovation, customer engagement and process optimization to be explored. Question 3 brings attention to the adaptability and agility of the company through an examination of the dynamic changes created by Industry 4.0, along with the

influences brought to the enterprise's ability to navigate through challenges and capitalise on opportunities.

The research philosophy will be presented before going deeper into the research methods used and how the data collection was conducted. The researcher has chosen to proceed with qualitative research, using a mixture of questionnaires and interviews to extract information. Next, the data analysis method is described along with its suitability. The chapter also answers the question of validity and reliability of data, offering reassurance regarding consistency and suitability of data for answering the research questions. Lastly, limitations will be discussed relating to the time, scope of research and access to data.

3.2 Research Philosophy

Through this research, new knowledge is being developed regarding Industry 4.0 technologies and LG Electronics. Understanding research philosophy is crucial in this context, as they encompass the beliefs and assumptions about how knowledge is developed and utilised (Saunders, Lewis, and Thornhill, 2009). By acknowledging these philosophies, we can better grasp the process of knowledge creation and application in the study of Industry 4.0 and its impact on LG Electronics. Epistemology deals with the nature, justification, and scope of knowledge, focusing on how we know what we know. Ontology, on the other hand, concerns itself with the nature of being and existence, examining what entities exist and how they can be categorised across different contexts such as material, social, cultural, and political. The two fields intersect in discussions about the expression of facts and values (Ejnavarzala, 2019).

The ontology of this study is represented by the existence of Industry 4.0, digital transformation, and organizational agility within a dynamic environment, particularly in the context of LG Electronics. Industry 4.0 technologies serve as the foundation for other phenomena, influencing and interacting with them. To gain knowledge about how these elements are interconnected, the study employs epistemological methods and criteria to justify its knowledge claims and research questions. This involves using qualitative data from both primary and secondary sources, such as interviews, informal discussions, and secondary research. To

ensure validity and reliability, while mitigating the risks of subjective views and biases, the study uses method triangulation and member checking.

There are four main research philosophies: pragmatism, realism, positivism and interpretivism. The choice among them heavily depends on the practical implications of the research. While pragmatism and realism can be used in both quantitative and qualitative, interpretivism is typically associated with qualitative data collection (Saunders, Lewis and Thornhill, 2012). The research of Industry 4.0 and LG Electronics involves in-depth investigations through interviews, observations, and secondary qualitative data collection, making interpretivism the most appropriate choice (Saunders, Lewis and Thornhill, 2012).

3.3 Research Method and Data Collection

The chosen method is qualitative research. This allows for in depth analysis and greater detail compared to quantitative research, as the “how” and “why” are addressed, leading to a deeper understanding of the research questions (Cleland, 2017; Flick, 2009). It is used in situations where it is investigated the underlying motives to analyse various factors related to a specific topic (Kothari, 2004). Quantitative research focuses on measurement and generalisation, however, it fails to properly evaluate causality (Harding, 2013), while qualitative research allows the exploration of complex themes by benefiting from the holistic approach of open questions and semi-structured conversations (Bryman and Burgess, 1994). Furthermore, qualitative research gives new perspective as respondents get to guide the researchers through their eyes (Bryman and Burgess, 1994). Lastly, availability of participants has also influenced the choice, since there were not enough participants to consider a quantitative approach, hence qualitative is more appropriate according to Harding (2013).

To collect the necessary qualitative data, interviews were utilised along with secondary data. To ensure a thorough understanding of the subject and the situation, articles and journals with similar cases and systems were researched.

Secondary data has many practical uses such as faster collection and a larger pool of information which has been collected over a long period of time, adding to the efficiency of the study (Sylvia and Terhaar, 2018). Since it has already

undergone processing, secondary data can offer a great starting point to any research and can be used for alternative viewpoints and comparison of results (Mazhar *et al.*, 2021). When it comes to analysing secondary data, the general methods are very similar to those used for primary data sources (Golden, 1976; Wallgren and Wallgren, 2007), making it easy to combine these two types of qualitative data. Secondary data also has the benefit of reducing the costs and the administrative burden of respondents in primary data collection (Statistics Netherlands, 2012). The secondary data collection includes the extraction of information relevant to the research objectives from organisational documents, reports and scientific journals. It is adopted two approaches the document analysis and the literature review.

Document analysis encompasses gathering insights from white papers, organisational documents, and numerous industry publications. This data will be categorised based on the themes and the case examples of other multinational companies mentioned. What's more, an extensive literature review will be completed to serve as the main body of knowledge for the existing frameworks, theories on digital transformation, organisational agility and industry 4.0 technologies. For this, it is imperative a critical analysis and synthesis of scientific articles, conference papers, books to be developed further the theoretical framework of the research.

For the primary data collection, the selection criteria were strict, meaning that only certain key stakeholders participated. The selection was done based on the knowledge of the topic and role within the company. The participants included executives and technology leaders as well as operational managers, each offering different perspectives through their professional background and role within the company. These interviews focussed on gathering qualitative data relating to the company's challenges, strategies, and results regarding Industry 4.0, digital transformation, and organizational agility. All data collection was conducted at the LG Electronics offices.

A semi-structure informal approach was used for the interviews. To clarify the process, the interviews took the form of informal discussions which allowed participants to feel comfortable when it came to revealing information. This is due to the informal setting that allowed participants to feel relaxed, as observed in the

“after-the-interview interactional strip” analysed by Warren *et al.* (2003). These types of discussions frequently generate more naturalistic in data since it allows for smoother communication between the researcher and the participants of the study who often goes into more depth about the subject revealing new information (Swain and King, 2022). This effect is achieved in this thesis by not recording conversations to remove pressure, but rather noting down what was said separately after the conversation has taken place. The danger would be forgetting certain details, but this can be avoided by ensuring that the conversation is typed down in a timely manner. Rutakumwa *et al.* (2020) suggest that not recording an interview might even be the most fruitful approach, rather than ‘second best’, since it produces the most genuine data of all through its richness and high level of detail. Furthermore, not using a recorder improves the focus of participants as it eliminates distractions, creating less artificial conversations that benefit from better flow (Abell *et al.*, 2006).

3.4 Research Sample Rationale

A significant part of the research methodology is the sample of the interviews and under which criteria the participants are chosen in the organization as well as the analysis of the interview information. It is pivotal to ensure that the appropriate interviewees have been selected for this research, and they are relevant and familiar with the topic. To achieve this, specific criteria for sampling of the participants have been used. This strategy of sampling is called purposeful sampling because it highlights subjective experiences, insights and perspectives shared. In this regard, rich and extensive data is collected (Creswell, & Creswell 2017).

The participants have daily exposure to technologies (e.g. SFDC/CRM, I4.0, AI and BI), and shape through their positions the digital transformation of the firm. **Nineteen participants** (eighteen men and one woman) have been selected to ensure proper representation of the sample from various departments (Sales, IT/CRM, Commercial) and to ensure proper representation of different perspectives spanning across commercial, technical and strategic views (Patton, 2015). The sample consisted of senior leaders and executives, technical/operational employees, and sales teams. The age range of the participants were 30-55 years old and reflected European, American and Asian nationalities, allowing to emerge different and multi-cultural views regarding the

digital transformation of the company. The interviews included open-ended questions, in the form of informal conversations (one on one), duration of thirty-to sixty minutes to motivate their experience-based reflections ensuring data protection and confidentiality simultaneously. This sampling strategy is aimed at discussions with in-depth insights to understand thoroughly the organisation's transformation and its processes.

The purpose of the interviews was to explore the perception of the SFDC/CRM Sales Cloud system that supports the sales and business operations, decision-making and digital initiatives within the company. The interview questions are presented in Appendix A. The main themes of discussions centered on:

- **System integration, implementation & digital initiatives:** *What is your opinion regarding the strategic use of SFDC and if it supports the digital initiatives of the company?*
- **Their roles and usage of the system:** *What is your role in the company, and how SFDC Sales cloud supports the sales processes and decision-making? Could you please walk me through your day-to-day activities in the system, and which functions/features do you use most frequently, and which are underutilized?*
- **System features, data quality and training:** *Do you think that scheduled training sessions need to be organized to support you better in the use of the system, when changes in the workflows/features occur?*
- **Organisational capabilities, dashboards/reporting, analytics:** *Have you identified any challenges regarding the business processes in the system that impact on the use of the system or need further improvement? What is your opinion regarding the data quality in the system and how it can be used for operational reasons? Do you use the dashboards created in the system and what other reports can be added or adjusted to support decision making, tracking and performance discussions?*
- **Benefits and limitations of the system:** *What are the benefits and the disadvantages from the implementation of the SFDC?*
- **Collaboration, information and knowledge sharing:** *Does the system promote information sharing, coordination across sales*

operations, strategies, and collaboration between the sales teams, back-office team and order desk management?

At the other end of the spectrum, the sample size can be considered limited, but it achieved thematic saturation which is key in the qualitative research as new themes or topics did not emerge in the interview process. However, it is pivotal to acknowledging the limitations of this sample strategy. There was a limitation regarding the gender as there were eighteen males and only one female, which may restrict the views of women in the digital transformation as well as in the decision-making processes. The roles of the participants were very specific and may be omitted by participants from other departments and roles that affect directly or indirectly the digital transformation and organizational agility of the company. Considering these limitations, it is important to mention that the findings should be interpreted as specific, highly specialised rather than general conclusions for the research topic (Guest *et al.* 2006).

Roles of Interviewees	No. of participants	Ethnicity
Key Account Managers/Sales Representatives	10	European
Senior Sales Director	1	European
Head of Sales	2	European
IT/CRM operations experts	4	Asian
Senior Executives	2	American/Asian

3.5 Data Analysis

A critical component of the research process is the data analysis. It facilitates the access, understanding and validation of research findings generated by interviews, observations and secondary data. This part elaborates the data analysis methodology that is chosen for the dissertation.

3.5.1.1 Qualitative Data Analysis

According to Creswell (2017), qualitative data analysis refers to the interpretation of text, audio or visual data with key focus on context, depth and subjective experiences to interpret themes, patterns as well as meanings. The *analysis of*

themes contributes to identification, analysis and interpretation of patterns in qualitative data. It uses data segmentation and divides it into categories for reaching in depth understanding and insights.

Content analysis provides a systematic approach of in-depth analysis of written, visual and audio content. The aim is to identify recurrent patterns, categories and themes in the analysed content which is quite applicable to interview transcripts and organisational document. In this research the analysis of organisation's reports, case studies and documents falls into this specific category (Krippendorff, 2018).

Narrative analysis is a well-established method for interviews interpretation. Its focus is on how people construct meaning through their experiences, interpretations and stories. It examines perceptions, context and sense-making. In this specific case, narrative analysis was employed to interpret the interview data, allowing in-depth exploration of how industry experts and managers construct meaning around digital transformation, technological adoption and organisational agility (Clandinin, & Connelly, 2000).

For this dissertation, qualitative data will be analysed through a mix of techniques including content, narrative and thematic analysis. As such, it will be provided context through the extensive analysis in-depth and breadth of the data regarding the digital transformation, Industry 4.0/5.0, organizational agility, CRM systems and Big Data/Analytics. Lastly, it will secure the respective insights, conclusions and recommendations from those data.

3.6 Validity and Reliability

While validity and reliability methods are straightforward and well developed in quantitative research, they have proved more complex and prone to frequent criticism when it comes to qualitative data collection (Yonge and Stewin, 1988; Noble and Smith, 2015). Such criticism includes deficiency in the transparency regarding analytical procedures, the methods adopted having a poor rationale, while the findings tend to be under threat from subjective views and biases (Rolfe, 2006; Sandelowski, 1993; Miles and Huberman, 1994). To ensure that these

issues were limited as much as possible, the researcher used triangulation in the research stage to develop an extensive understanding of the subject at hand and increase confidence in the results (Carter et al, 2014; Bryman, 1988). The researcher has used method triangulation which demands using multiple methods of data collection about the topic as this allows conclusions to be confirmed in more than one way and perspective (Denzin, 1978). To further validate data and increase reliability, member checking was also used. This means that the researcher practised returning the interview to the participants while also presenting the analysed data to them. This allows to double check the gathered data and confirm the results to enhance trustworthiness (Birt et al, 2016; Stahl and King, 2020).

The interview questions were formulated with the research questions in mind; therefore, the answers and data gathered from them has been helpful in formulating a consistent response to the hypotheses. However, due to the difference in the roles of the participants, the interview discussion was adjusted accordingly while the main points remained similar to ensure the necessary information is gathered for the research questions. Each participant received the exact same questionnaire with the same wording and questions, allowing data to be standardised.

3.7 Research Ethics

Research quality is closely related to ethics as per Rosenthal (1994), who claims that inferior quality research designs are less likely to meet the right ethical standards for approval. This goes for all the stages of research: conduct, data analysis, as well as the final stage of presenting the results (Rogelberg, 2004). Typically, ethics are defined as the standard for conduct which helps differentiate the unacceptable from the acceptable through certain procedures or perspectives that ensure fair treatment for the most complex of issues (Resnik, 2015). Hence, is it crucial to follow the local standards for research practice.

Since this research took place in Germany, a European Union country (European Union, n.d.), the *European Code of Conduct for Research Integrity* applies (ALLEA, 2023), the *General Data Protection Regulation* (GDPR), (European Union, 2018), as well as the German *DFG Code of Conduct Guidelines* for

Safeguarding Good Research Practice (DFG, 2019). Moreover, there is the *Bundesdatenschutzgesetz (BDSG)/Federal Data Protection Act* (Federal Ministry of the Interior, 2018). These regulations are very strict in terms of managing, restoring, processing personal data, data privacy and protection, therefore, to abide by the local laws, it has been decided that informal conversations are most appropriate. This has helped the participants feel more relaxed throughout and resulted in more detailed conversations without the pressure a structured recorded conversation holds (Rutakumwa et al, 2020). Attention was given to avoiding the disclosure of sensitive or proprietary organisational information. The research design aimed to minimise any potential harm or discomfort to participants.

Chapter 4 – Case Study: *The case of LG Electronics*

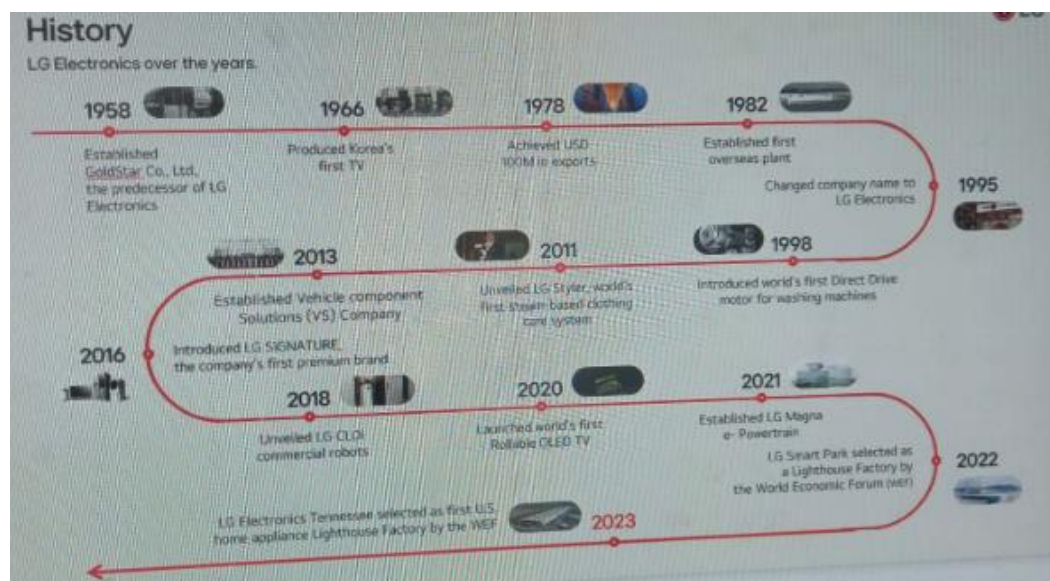
4.1. Introduction

The purpose of this chapter is to present the digital transformation initiative of LG Electronics, its organizational agility undertaken through the adoption of Industry 4.0 technologies. It is outlined how the company utilized revolutionary technology in R&D, product development, manufacturing, supply chain management, procurement operations as well as in its business operations and more specifically the use of cloud computing in its CRM -Salesforce system to reinforce data-driven decision-making. The subsections outline how organization employs the SFDC system for its sales, marketing and service operations on a global scale for its businesses and other technological components part of its digital transformation strategy, and organizational agility. In particular, the leverage of Artificial Intelligence (Einstein) integrated in the SFDC, the Business Intelligence (BI) for the Analytics/Big Data dashboards and reporting to name a few. This chapter lays the foundation for the subsequent chapter of Findings and Analysis where the outcomes and the challenges will be presented thoroughly and in relation to the objectives of this research.

4.2. LG Electronics -Company's Background

LG Electronics is a multinational corporation, founded in 1958 by Koo In-Hwoi in Seoul, South Korea, and it was a pioneer with advanced technological products initially under the name Goldstar. The company is part of the conglomerate LG Group. The firm transformed the way people worldwide experience their routines through its divisions (B2C) Home Entertainment, Home Appliances, Air Solution, and for tailored high-quality products for the businesses (B2B), the Business (Media) Solutions division, which includes the Vehicle Solutions (VS), IT Solutions, and Information Display (ID) products. The organisation operates on a global scale while it maintains its Korean philosophy and culture reflected on the advanced technological products to accommodate the increasing customer demands, and the need to deliver exceptional digital services. (LG Electronics, 2026).

Initially, LG Electronics developed, its own, in-house business systems to meet the needs of its business operations. However, over the years, the rapid evolution of the digital era along with the market trends made it imperative for the organisation to modernise its information systems that were fragmented and with limited integration and interconnection of the internal enterprise systems and the customer facing platforms, leading to dependencies and bottlenecks of analysing and leveraging the customer data impacting its strategic management, increase of revenue, organisational agility, efficiency, and maintaining its competitive edge.



Source: LG Electronics; History and Evolution of the company (2025).

4.3. I4.0 & Digital Transformation at LG Electronics

The organisation adopted the I4.0 state of the art technologies into its production, manufacturing as well as in business operations. The organisation realised the significance of the AI and its purpose to go beyond technology and help customers to add value to their lives. The organisation fostered collaboration, cross-functional work, data and knowledge sharing. It gathered its top employees from different departments and disciplines to cooperate along with external partners to utilise technology to improve the organization's competitive edge and assist customers to add value to their lives. Digital transformation for LG is defined the conversion of analogue to digital to improve efficiency.

The company has established its own AI research centre in which it has been developed the Exaone 3.5 open-source generative model in 2024 with significant lower costs. It has similar performance with the global open-source model without relying on big external technology. Exaone solves complex corporate, manufacturing and industrial issues. Its implementation and application innovate manufacturing and create solutions fostering the organization's productivity. It has achieved automation in manufacturing through the smart factory concept, and improved quality of the products through quality inspections with the assistance of AI technology.

The LG Smart Park utilises, IoT, robots undertake complicated and dangerous tasks, big data for its supply chain operations to achieve efficiency and boosting by 17% its productivity for the Home Appliance division (LG, 2022). Additionally, the company migrated almost 90% of its IT systems into cloud for better data management, utilisation and standardised software solutions. Its LG Academy launched specific courses about AI, and big data to educate and upskill its workforce (LG, 2024).

What's more, LGenie is the internal AI assistant that aims to be expanded to enterprise AI agent platform to support the B2B division of the business. It is integrated with external partners such as MS Azure AI, ChatGPT, and Google Gemini and the organisation aims to enhance the customer experience, create better processes, and revenue increase (LG, 2026).

4.4. SFDC Implementation, Integration with IS, Big Data, Analytics

From the business operations sector, the adoption of the CRM platform in its B2B division occurred in 2021 with full deployment within 2022-2023. The company started improving and modernising its business operations enabling Salesforce Sales Cloud to automate and streamline its Sales, Service processes and Marketing Cloud for its Marketing activities. By replacing its legacy systems, SFDC creates a more unified platform to manage its sales, customer and marketing data as part of its digital transformation strategy towards more data-driven insights and operations (Redtag, 2024). The SFDC is integrated with the Order Management enterprise system to support the order management processes and check the progress and the order status (booked, oh-hold, closed/delivered, cancelled). In turn, the Order Management system is integrated with the ERP system where the actual sales booking occurs. However, the CRM system is not integrated with the ERP system which is a major drawback that affects the business operations, processes and sales updates.

This misalignment presents fragmented information and prohibits a comprehensive overview of the management and monitoring of the whole sales journey, from entering the data into the CRM system to final delivery of the products. Information is missed especially in case of order amendments (model, quantity change or cancellation), as well as in the status of the orders due to the absence of notifications to the users. This creates delays and disruptions, while time is a critical factor in bookings, delivery, and actualisation of sales.

Moreover, the sell-out data management system is also not integrated into the CRM system leading to complications in monitoring and tracking the sell-out data that is critical to the channel sales part of the business. As such, there is lack of data harmonisation, that in turn increases the manual work, it is human error-prone, and time-consuming. The data for the report purposes is heterogeneous, and its quality and accuracy play a pivotal role in the whole process and impacts on the decision-making process from the management.

Nonetheless, the CRM system is integrated into the profit and loss (P&L) system to calculate automatically the pricing and profitability of the highly customized and complex LED products. This information is reflected in the SFDC under the Opportunity object and it important for the accuracy of the pricing and profitability

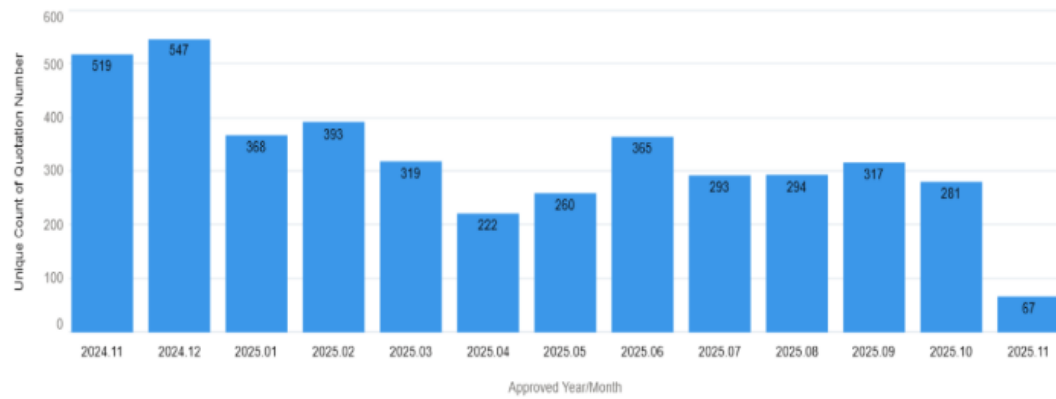
data. Although, SFDC has integrated the Tableau (Business Intelligence) for enhanced visualisations, the company does not exploit its capabilities for the creation of analytical dashboards with real-time data, extensive datasets, instead it utilizes the standard SFDC Reports object for dashboards creation. Without the assistance of the Einstein (AI), the company cannot leverage the positive effects of predictive/generative analytics, due to budget constraints. Apart from the standard analytics reports in SFDC, there is the Power BI tool use for reporting. In 2025, the company used it for first time to streamline and automate the reporting process, integrate data from different sources seamlessly and increase efficiency, and productivity. In the same vein, the monitoring and tracking of sales pipeline and KPIs is more effective and reporting downtime is minimised.

Below are examples of these dashboards illustrating their utility in monitoring pipeline and sales performance. The first two charts demonstrate the record count of the approved quotations in the pipeline as well as the amount generated in a specific timeframe (per month). In addition, charts with key profitability metrics (Margin Profit, Operating Income per model and Key Account Manager) provide further insights into the healthiness of the organisation, sales status, and monitoring sales pipeline KPIs. As such, it has been designed a new analytical framework that accelerates the analytical maturity of the organisation by providing multidimensional view, because it combines margin discipline, data structure, commercial strategy and reporting visibility. As a result, these key insights to management reinforce strategic decision making, faster approvals, improvements in pricing strategy, operational intelligence and indirect revenue growth.

Approved Quotations

DG ID_# of Approved Quotations

Last 12 Months (By Month)

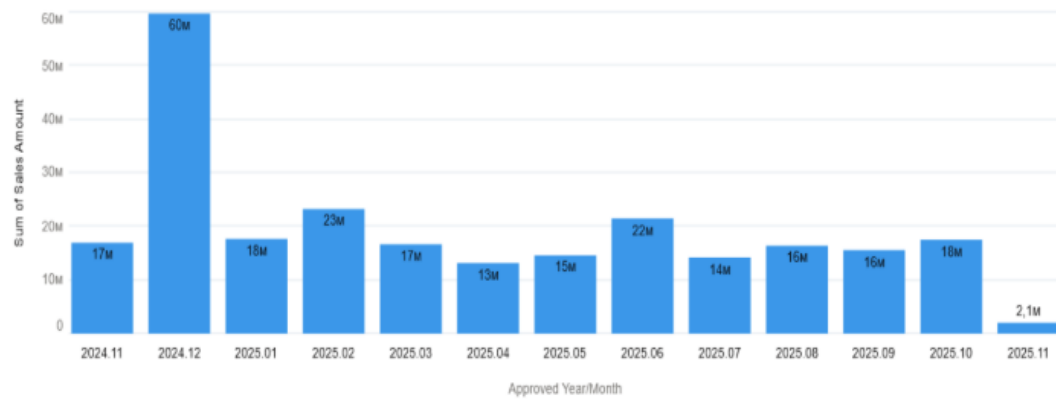


[View Report \(DG ID Quotation List\)](#)

As of 11.11.2025, 17:25

DG ID_Amount of Approved Quotations

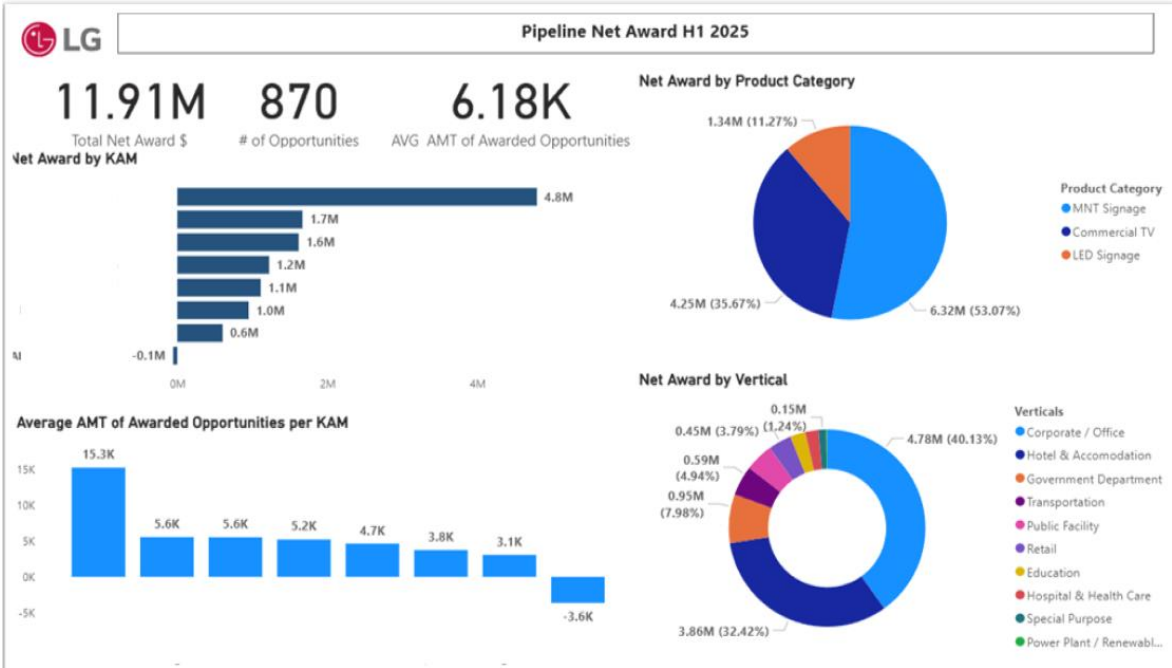
Last 12 Months (By Month)



[View Report \(DG ID Quotation List\)](#)

As of 11.11.2025, 17:25

Power BI dashboards showing key sales pipeline metrics and KPIs



LG Pipeline Net Award (M\$) W.

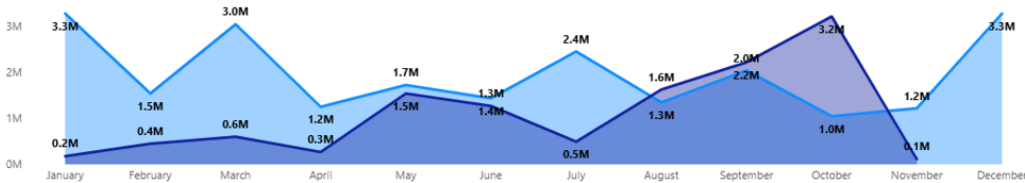
KAM	January	February	March	April	May	June	July	August	Sept	KAM	Commercial TV	LED Signage	MNT Signage	Total	KAM	MTD	QTD	YTD
	-0.01	0.00	-0.05								-0.05			-0.05		-0.05	-0.05	-0.05
	0.00	0.05	0.00	0.07	0.05	0.24	0.14	0.02			0.46	0.11	0.65	1.22		-0.01	0.40	1.22
	0.01	0.06	0.06	0.00	0.09	0.36	0.03	0.27			0.34	0.10	0.67	1.11		0.00	0.12	1.11
	0.01	0.05	-0.10	0.42	0.38	0.18	0.02	0.33			0.28	0.15	1.19	1.62		0.06	0.32	1.62
	0.01	0.21	0.21	0.00	0.06	0.18	0.08	0.27			0.15	0.36	1.15	1.67		0.50	0.50	1.67
	0.02	0.02	0.17	-0.23	0.10	0.21	0.01	0.02			0.55	0.16	0.24	0.95		0.01	0.19	0.95
	0.12	0.08	0.22	0.01	0.73	0.05	0.19	0.58			2.26	0.40	2.13	4.79		0.05	1.69	4.79
	0.01	-0.02	0.04	0.05	0.12	0.04	0.03	0.14			0.25	0.06	0.29	0.60		0.10	0.10	0.60
Total	0.17	0.45	0.59	0.27	1.53	1.26	0.49	1.62		Total	4.25	1.34	6.32	11.91	Total	0.11	3.31	11.91

Division	2024	2025	Total
Commercial TV	4.8	4.2	9.0
LED Signage	4.0	1.3	5.4
MNT Signage	14.8	6.3	21.1
Total	23.6	11.9	35.5

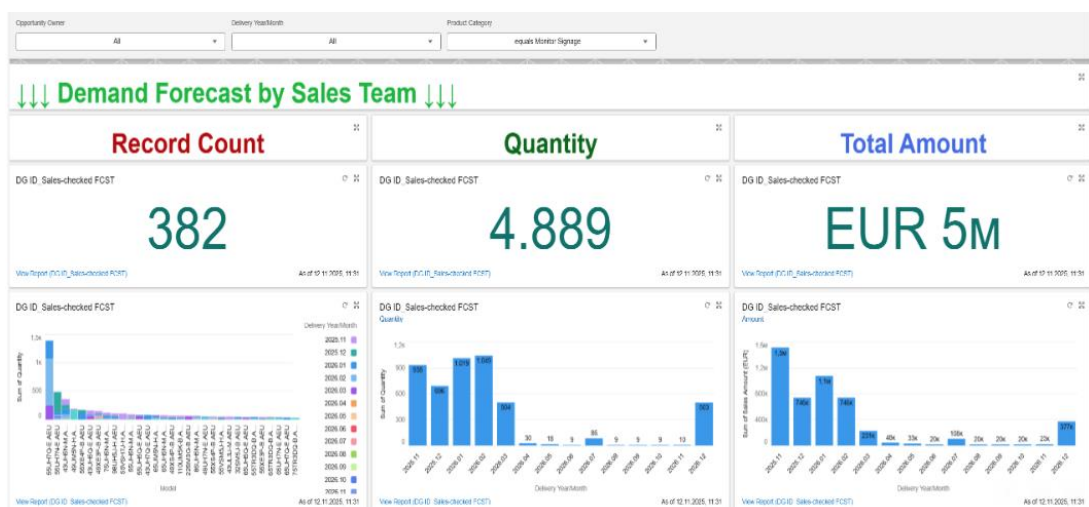
Division	January	February	March	April	May	June	July	August	September	October	November	Total
MNT Signage	0.06	0.35	0.42	0.05	0.94	0.77	0.15	0.83	0.85	1.80	0.11	6.32
Commercial TV	0.10	0.03	0.25	0.03	0.49	0.35	0.24	0.29	1.30	1.17	0.00	4.25
LED Signage	0.02	0.07	-0.07	0.20	0.10	0.15	0.09	0.50	0.06	0.23		1.34
Total	0.17	0.45	0.59	0.27	1.53	1.26	0.49	1.62	2.21	3.20	0.11	11.91

Net Award vs PY

Year 2024 2025



The *Forecast* dashboard below combines multiple reports that enhance visibility of historical data and projecting future trends allowing actionable insights to leadership and management. It enables accurate customer demand predictions, operational efficiency based on the forecasted revenue, while underpinning anomalies and deviations from expected patterns. It supports, resource allocation through the forecasted models, sales planning and strategic decision making by providing key insights of different business conditions. The forecast dashboard translates complex datasets into clear, data-driven guidance, enhancing organisational agility, and sales operations.



Next, there is integration between SFDC and the MS Outlook along with the assistance of Einstein (AI) to centralise the customer communication and streamline the activities. All the interactions between the company, and the customers are automatically listed under the specific Contacts, Accounts, and Opportunity records. Consequently, it is improved the user experience, and it is ensured that all customer communication is available in one place.

Lastly, there is interconnection between the sales and the service department in the SFDC especially for the customers that have purchased extended warranties and to monitor the maintenance appointments. Under the Opportunity object the extended warranties records are entered and interconnected with the service object in the system. In this way, all the customer data, purchase history and maintenance activities are stored successfully and managed by the service workforce. The company remains committed to high service quality standards, enhanced customer-centric strategies and initiatives while it maintains its customer

satisfaction and loyalty. Based on that data it can offer highly customised and personalised offers and products to its customers and remain flexible, sustainable and competitive.

Chapter 5 – Findings and Analysis

5.1. The relationship between the implementation and integration of Industry 4.0 technologies in multinational organizations and LG Electronics and the influence of these technologies in shaping the company's strategic initiatives, culture and interpretations by key stakeholders.

Cloud computing is a core part of I4.0 technology. Salesforce SFDC is a key player in the market for a cloud CRM system. LG Electronics employed this technology to improve its B2B sales operations as the system is accessible everywhere and it can be also used offline from the mobile app. This is especially crucial for the sales team as they are often on business trips. It also provides real-time data insights and scalable reporting to the management for data-driven decision making (Q1). The findings from the interviews highlighted that SFDC aligned strategically with the broad sales operations of the organization and its business processes compared to the previous rigid in-house developed system. Similarly, the participants from the sales teams reported that the system supports their daily activities of recording key customer data in Accounts and Contacts objects as well as tracking the progress of their deals under the Opportunities object. In this manner, the system is a focal point for information sharing and coordination of their key activities (Q2).

The CRM system is integrated with the Order Desk system to reflect real-time updates of the deals in pipeline to support and coordinate the direct sales and deliveries of the products of the company (Q3). The participants reflected their views that it is part of a broader digital ecosystem of the enterprise as its adoption is on a global scale for the sales operations of the company. As such, it aligns strategically and is perceived as an organizational unity (Q10).

The findings assist the research hypothesis one and two and underscore a positive attempt of the company to integrate I4.0 technologies, accelerate its operations' framework, reshape its business models and processes to improve its competitiveness, and digital strategy. Although the main perception is positive

regarding the adoption of the system as a strategic asset, the CRM/IT specialists expressed their opinions that the capabilities of the system are not fully exploited and the fact that the adopted global business model in its processes prohibits further customization and adaptation to local sales needs and operations (e.g. USA vs Europe regions).

5.2. The role of digital transformation at LG Electronics and how the interrelation of organizational agility, flexible structures, organizational culture is shaped, whereas risk-averse practices and rigid hierarchies may impede the successful application of I4.0 technologies. The alignment of IT strategy with business strategies, the company's capabilities and cultural context as key factors for the successful implementation of I4.0 technologies.

The frequent use of core functionalities of the system from the sales teams demonstrates key insights into the organizational capabilities and the exploitation of I4.0 technologies for its digital transformation. Nevertheless, it has been noticed the underuse of the *Activities* (e.g. logged phone calls, meetings, notes) feature to capture properly the interactions with the (B2B) customers and the progress of the deals in the sales pipeline lead to lack of critical insights regarding the success factors of a closed deal and probably a willingness from the customer to repurchase specific models and services in the future, as well as the loss factors of a deal to understand the customer's needs and improve the sales and pricing strategy of the division (Q2).

In 2024, there was introduction of B2B CRM *Activities* index on a global scale rating the subsidiaries per region. Nevertheless, this index lasted only few months due to absence of proper introduction to the target audience (sales users, admins of the system, management) to understand its importance, forcing the company to discontinue it. In this regard, there was a misalignment between the IT strategy and the business strategy of the organization along with the fragmented information and knowledge shared from the IT/CRM department, creating silos across functions within the enterprise (Q11).

"I use SFDC every day to track my opportunities entered in the system and the progress of them. I monitor my KPIs in the dashboards available. I believe that there is more visibility of the sales pipeline to the leadership that facilitates

strategic decision making and respective actions” (Sales Representative) (Q2, Q6).

However, the absence of advanced features such as the Analytics studio component for refined visualisations along with the AI features (Einstein) for predictive analytics reporting and dashboards for more precise demand forecasting recommends lack of awareness of its relevance to the business processes of the company as well as it indicates absence of expertise, knowledge in those skills in the workforce and budget constraints. Based on the interviewees responses, these results underpin how organizational capabilities and the top-down culture may hurdle digital transformation initiatives and present limited experimentation with the adopted technology. *“Our estimates regarding the Analytics component along with the budget constraints led to the decision to not acquire this component and instead use the standard reporting object in SFDC.”* (Senior executive (Q6)).

Furthermore, there are organizational restrictions, specific business processes and system design that impede limitations in the value of digital technologies. Participants highlighted the importance of additional training and distribution of information in a timely manner and support when changes in the workflows occur, and additional features are introduced (Q7). *“I use the Opportunities, Accounts and Contacts modules in the system, when changes in the workflows occur, I would like to be informed on time through a scheduled training session to understand the changes.”* (Sales Representative). Nevertheless, the company offered structured training modules and material on its online LMS system for better user adoption and understanding of the system, despite the delay in the creation of those training courses.

What’s more, there are advantages and drawbacks in the system which mirror different aspects of I4.0 technologies in SFDC adoption such as the resistance in changes from the users when new rigid processes introduced from the HQ IT/CRM department. In the same way, the administrative time in the system is increased for the sales representatives, whilst timing is a critical factor in sales operations (Q9). *“The system has improved the sales operations significantly, but*

it also requires a significant amount of time to enter all these records in the system, the administrative work has been increased” (Senior Sales Director).

5.3. The interconnection between the adoption of Industry 4.0 technologies and digital transformation initiatives and their contribution to organizational agility, and how this is reflected on multinational companies and LG Electronics specifically.

There is positive correlation between the implementation of SFDC and the organisational agility of the firm. Interviewees processes enhancements and workflow improvements show a willingness of continuous process refinement and adaptation of the system (Q4). This outcome demonstrates that I4.0 technologies such as cloud computing (SFDC) act as enablers of automation to operational routines of the organisation and the changing conditions of the environment.

Moreover, the data quality in the system and its operational use has been discussed further in the interviews (Q5). Good data quality leads to accurate and reliable reporting that in turn affects the strategic and data-driven decision making for leadership. Moreover, high quality of data can facilitate better understanding of the customer needs, trends, and anticipate any market changes successfully. The interviews indicate improved cross-functional collaboration and sharing information of different teams (sales, system admins, demand planning and order desk) facilitated by the adoption and implementation of the system in the organisation and reinforce structural dimensions of the OA. *“SFDC enhanced collaboration as everyone is aligned by working on the same information system. (CRM admin).* However, to ripe the fruits of the platform the organisation should consider the data quality and governance along with the process flexibility. *“SFDC provides agility to the organisation, but it also relies on the consistent use from the people” (IT/CRM expert).*

Chapter 6 - Discussion & Recommendations

6.1. Discussion

Based on the findings of chapter 5 it is evident that embedding SFDC cloud CRM system in its operations, LG Electronics had to reconfigure its business model, managerial processes, culture and strategies confirming the impact that I4.0 technologies have on the digital transformation and agility in a multinational organization. The system supports the operational part as well as the business and managerial aspects of the firm, leading to data-driven decision-making, improving the organisation's performance, sales-KPI monitoring, forecasting, and enhancing collaboration across functions.

The company adopted a robust digital strategy that aligned with its broader business strategy and perception regarding the I4.0 technologies. The top management supported on time the digital initiative of the SFDC system adoption and implementation to streamline and automate its commercial/sales operations and remain competitive in the global market (Butt *et al.*, 2024).

Initially, it has been identified the internal phase of the organization and outlined the requirements for upgrading its IT-infrastructure. However, it is noteworthy to mention that the current workflows in the system are based on the sales operations of the USA region, thereby limiting any customization option needed for other geographical areas of the company. For instance, the operations in the European region differ, and the company lacks the flexibility to provide customized workflows and processes to meet their needs. This challenge derives from the adoption of I4.0 technology without defining holistically the requirements needed before deciding to deploy and implement them in other regions. Hence, there is limited flexibility in this area of the system which affects the time and workload - for end-users and admin staff. Another limitation is the lack of integration with its ERP, sell-out and other enterprise systems, therefore the data from different sources is not harmonized, homogenous and compatible for reporting purposes.

The adoption of cloud computing affected its organizational culture and agility. It reduced the maintenance costs, increased visibility and seamless cross-functional collaboration across departments. Additionally, the company created a digital organizational culture and remodeled the lifecycle of its business by reformulating traditional processes and reducing manual work that prevailed with the previous enterprise ecosystem by automating several business processes and its sales operations (Malewska, 2024, Caro *et al.*, 2020). In other words, the organization sustained its agility and managed to respond to market changes (e.g. the exponential growth of big data and analytics), uncertainties and challenges (e.g. COVID-19 pandemic and the increase of the digital services and operations) (Mrugalska and Ahmed, 2021).

Nevertheless, there were challenges and resistance to change from the workforce as the new technology created internal disruptions in the organization and the existing processes (Plekhanov *et al.* 2023). The company managed through structured training modules and material to support its employees and ensure usability increase of the CRM system across distributed teams and enhance collaboration (Vaszkou & Sziraki, 2023).

In terms of the big data and analytics aspect, the organization exploits the standard reporting object in the system and the embedded analytics through the creation of scalable dashboards with real-time data to extract sales pipeline and customer insights. This initiative elevates the analytical maturity and agility of the organization. By providing live pricing and profitability intelligence, which often is a blind spot for many commercial teams, the company achieves a multidimensional view. There is strategic clarity, delivering value through the data that assists leaders to monitor several pipeline metrics, improves data-driven decision making, pricing, sales strategy and increase the revenue through cross-selling and up-selling (Davenport, 2006). Nevertheless, data quality plays a crucial role in this context, and it is imperative for the organisation to have data governance, validation processes and rules to safeguard its accuracy. Moreover, the absence of the Analytics studio due to budget constraints impedes the exploitation of advanced analytics (predictive, generative) and visualisations. An aspect that the leadership could evaluate and reconsider in the future to maintain the company its competitive edge and adaptability in changes.

6.2. Recommendations and Best Practices

In this section are outlined the main lessons learned from the digital transformation of LG Electronics. The company adopted the I4.0 technologies and more specifically, the cloud computing/SFDC CRM system to leverage its business operations and model as well as the exploitation of big data analytics for data-driven decision making, product and services optimization, customization and revenue growth. As such, other organisations can benefit by adopting these recommendations and best practices as well as further academic research can be conducted in the future.

- It is essential the strategic alignment of the IT- strategy with the business strategies, and objectives, to achieve enhanced performance, value creation and measurable outcomes.
- The management should support digital initiatives and have positive attitude towards change and technology. Communication regarding the IT- strategy should be clear across all departments and levels in the organisation.
- Companies can leverage digital platforms for cross-functional collaboration, communication and visibility.
- It is imperative to plan a unified system architecture, specify clearly the requirements needed for the business operations to develop appropriate workflows and processes in the system(s). In addition, experts and IT teams should ensure compatibility of the new systems with the existing/legacy (e.g. CRM, ERP, Order Management system, Analytics/BI tools) systems to mitigate risks of siloed implementations, communication that may jeopardise the digital initiatives of the company.
- Secure seamless data flows between the systems to ensure interoperability across functions and regions.
- Allow flexibility in the design of the features in the system that can be scalable and adapt to other functions and regions. This will guarantee responsiveness to changes in the environment and adaptability to the business operations.
- It is critical to have structured and continuous training programmes of the digital platforms to create expertise, digital literacy, and upskilling initiatives for the workforce.

- Planning and establishment of clear data governance to ensure high-quality that can be extracted to create value, provide real-time data insights for reporting and faster, data-driven decision making.
- Design data-entry standardisation and monitoring processes to retain the data quality across systems and elevate the analytical maturity of the company.
- Adjust technological initiatives to the organizational culture, hierarchy and to external environmental changes to ensure flexibility and sustainability of the company.
- Refine processes to achieve adaptation and fortify collaboration and coordination of the operations.
- Cultivation of innovation-oriented and positive to change organizational culture.

Chapter 7 Conclusion

The study of LG Electronics and the adoption of the cloud SFDC CRM system is a paradigm of how a multinational organization integrates I4.0 technologies within its broader business and IT framework. The thesis endorses that adopting and implementing such systems does not affect only the IT-infrastructure of the company but its business strategies, objectives, models and redefines them.

The SFDC implementation underscores that although the company successfully implemented and created value from the data that led in turn to data-driven decision making and improved its collaboration across functions, it also revealed the struggles between global and local business operations and regional organizational agility. The dependency on designing the workflows of the system based on the USA market and region, cost the flexibility of the system and explained the reason that a digital transformation in an organization should be a holistic approach rather than localised to eschew siloed operations and processes. Moreover, the absence of integration with the ERP and other key enterprise systems as well as the Analytics studio component reflects a 'glass ceiling' effect on the company and how it influences to a certain degree its analytical maturity.

Finally, the study illustrates that organizational agility is achieved in the company when there is alignment of the IT-strategy with the positive and supportive acknowledgment and communication from the top management across functions and in combination with prompt change management. LG Electronics and other

companies can benefit from digital transformation initiatives when the approach remains flexible and aligns with a global digital strategy alongside with a digital organizational culture and data governance.

Bibliography / References

1. Abell J, Locke A, Condor S, Gibson, S. and Stevenson, C. (2006) 'Trying similarity, doing difference: the role of interviewer self-disclosure in interview talk with young people', *Qualitative Research*, 6 (2), pp. 221-244.
2. Ahmed, V., Opoku, A., Olanipekun, A. and Sutrisna, M. (2022) *Validity and Reliability in Built Environment Research*. 1st ed. Abingdon: CRC Press.
3. ALLEA (2023) *The European Code of Conduct for Research Integrity REVISED EDITION 2023*. (Online). Available at: <https://allea.org/wp-content/uploads/2023/06/European-Code-of-Conduct-Revised-Edition-2023.pdf> [Accessed: 11.07.2024].
4. Birt, L. Scott, S., Cavers, D., Campbell, C. and Walter, F. (2016) 'Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation?', *Qualitative Health Research*. 26 (13). Available at: DOI:10.1177/1049732316654870. [Accessed: 11.07.2024].
5. Bryman, A. and Burgess, R. (eds) (1994) *Analyzing Qualitative Data*. London: Routledge.
6. Bryman, A. (1988) *Quantity and Quality in Social Research*. London: Unwin Hyman
7. Cleland, J. A. (2017) 'The qualitative orientation in medical education research', *Korean J Med Educ*, 29(2), pp. 61-71. Available at: doi:10.3946/kjme.2017.53 [Accessed:26.07.2024].
8. Denzin, N. (1978) *Sociological Methods: A Sourcebook*. NY: McGraw Hill.
9. DFG (2019) *Implementation of the Guidelines*. (Online) Available at: <https://wissenschaftliche-integritaet.de/en/code-of-conduct/implementation-of-the-guidelines/> [Accessed: 11.07.2024].
10. European Union (n.d) *Germany* (Online). Available at: https://european-union.europa.eu/principles-countries-history/eu-countries/germany_en [Accessed: 12.07.2024].
11. Ejnavarzala, H. (2019) 'Epistemology–Ontology Relations in Social Research: A Review', *Sociological Bulletin*, 68 (1), pp. 94-104.
12. Flick, U. (2009) *An introduction to Qualitative Research*. 4th ed. London: SAGE.

13. Golden, M.P. (1976) *The research experience*. USA: F.E. Peacock Publishers Inc.
14. Harding, J. (2013) *Qualitative data analysis from start to finish*. London: Thousand Oaks
15. Kothari, C.R. (2004) *Research methodology: Methods and techniques*. New Age International.
16. Marshall, G. (2005) 'The purpose, design and administration of a questionnaire for data collection', *Radiography*, 11 (2), pp. 131-136. Available at: <https://doi.org/10.1016/j.radi.2004.09.002> [Accessed: 09.07.2024].
17. Miles, M. B., and Huberman, A. M. (1994) *Qualitative Data Analysis: An Expanded Sourcebook*. CA: Sage Publications.
18. Noble H. and Smith J. (2015) 'Issues of validity and reliability in qualitative research', *Evidence-Based Nursing*, 18 (2), pp. 34-35. Available at: <https://doi.org/10.1136/eb-2015-102054> [Accessed: 18.07.2024].
19. Mazhar SA, Anjum R, Anwar AI, Khan AA. (2021) 'Methods of Data Collection: A Fundamental Tool of Research', *Journal of Integrated Community Health*, 10(1), pp. 6-10.
20. Rosenthal, R. (1994) 'Science and Ethics in Conducting, Analyzing, and Reporting Psychological Research'. *Psychological Science*, 5(3), pp. 127-134. Available at: <https://doi.org/10.1111/j.1467-9280.1994.tb00646.x> [Accessed: 25.07.2024].
21. Rogelberg, S.G. (2004) *Handbook of Research Methods in Industrial and Organizational Psychology*. 2nd ed. Oxford: Blackwell Publishing.
22. Rutakumwa R., Mugisha J. O., Bernays S., Kabunga E., Tumwekwase G., Mbonye M., Seeley J. (2020) 'Conducting in-depth interviews with and without voice recorders: A comparative analysis', *Qualitative Research*, 20(5), pp. 565–581. Available at: <https://doi.org/10.1177/1468794119884806> [Accessed: 23.07.2024].
23. Sandelowski, M. (1993) 'Rigor or rigor mortis: The problem of rigor in qualitative research revisited', *Advances in Nursing Science*, 16 (2), pp. 1-8. Available at: <http://dx.doi.org/10.1097/00012272-199312000-00002> [Accessed: 22.07.2024].

24. Saunders, M., Lewis, P. and Thornhill, A. (2009) 'Understanding research philosophies and approaches', *Research Methods for Business Students*, 4 (1), pp. 106-135.
25. Saunders, M., Lewis, P. & Thornhill, A. (2012) *Research Methods for Business Students*. 6th ed. Harlow: Pearson Education Limited.
26. Seale, C. (2012) *Researching Society and Culture*. 2nd ed. London: SAGE.
27. Sylvia, M. L. and Terhaar, M. F. (2018) *Clinical Analytics and Data Management for the DNP*. United States: Springer Publishing Company.
28. Stahl, N. and King, J. (2020) 'Expanding Approaches for Research: Understanding and Using Trustworthiness in Qualitative Research', *Journal of Developmental Education*, 44 (1), pp. 26-28.
29. Statistics Netherlands (2012) *Secondary data collection*. (Online). Available at: <http://pietdaas.nl/beta/pubs/pubs/2012Secondarydatacollectionart.pdf> [Accessed: 22.07.2024].
30. Swain, J., & King, B. (2022) 'Using Informal Conversations in Qualitative Research', *International Journal of Qualitative Methods*, 21. Available at: <https://doi.org/10.1177/16094069221085056> [Accessed:22.07.2024].
31. Wallgren, A. and Wallgren, B. (2007) *Register-based Statistics: Administrative Data for Statistical Purposes*. Chichester: John Wiley & Sons Ltd.
32. Warren C. A. B., Barnes-Brus T., Burgess H., Wiebold-Lippisch L., Hackney J., Harkness G., Kennedy V., Dingwall R., Rosenblatt P. C., Ryen A., Shuy R. (2003) 'After the interview', *Qualitative Sociology*, 26(1), pp. 93–110. Available at: <https://doi.org/10.1023/a:1021408121258> [Accessed: 22.07.2024].
33. Yonge, O. and Stewin, L. (1988) 'Reliability and Validity: Misnomers for Qualitative Research', *Canadian Journal of Nursing Research Archive*, 20 (2), pp. 61-67.
34. Clandinin, D. J., & Connelly, F. M. (2000). *Narrative Inquiry: Experience and Story in Qualitative Research*.
35. Krippendorff, K. (2018) *Content Analysis: An Introduction to Its Methodology*. 4th ed. London: SAGE
36. European Union (2018) *What is GDPR* Available at: <https://gdpr.eu/what-is-gdpr/> [Accessed: 25.01.2026].

37. Bundesministerium des Intern (2018) *Bundesdatenschutzgesetz*. Available at: <https://www.bmi.bund.de/EN/topics/constitution/data-protection/federal-data-protection-act/federal-data-protection-act-node.html> [Accessed: 25.01.2026].
38. Punch, K. F. (2000). *Developing Effective Research Questions*. *International Journal of Social Research Methodology*, 3(3), pp.203–210.
39. Hermenegildo G.G, Navarro, V.G., Oltra-Badenes, R. & Lozano-Quilis, J.A. (2020) Customer relationship management: digital transformation and sustainable business model innovation, *Economic Research-Ekonomska Istraživanja*, 33(1), pp.2733-2750, Available at: DOI: 10.1080/1331677X.2019.1676283 [Accessed: 27.01.2026].
40. Uloma S., Nwabekee, Oluwatosin Yetunde A.Z. Agu,E.A., and Tochukwu I., (2024), Digital transformation in marketing strategies: The role of data analytics and CRM tools. *International Journal of Frontline Research in Science and Technology*, 2024, 03(02), pp. 055–072 Available at: https://www.researchgate.net/profile/Tochukwu-Ijomah-2/publication/383847607_Digital_transformation_in_marketing_strategies_The_role_of_data_analytics_and_CRM_tools/links/66dc42e464f7bf7b199c79c5/Digital-transformation-in-marketing-strategies-The-role-of-data-analytics-and-CRM-tools.pdf [Accessed:27.01.2026].
41. Chen, I. J., & Popovich, K. (2003) Understanding customer relationship management (CRM): People, process and technology. *Business Process Management Journal*, 9(5), pp. 672–688.
42. Salesforce (2023) *How Merck is making its sales processes significantly more efficient*. Available at: <https://www.salesforce.com/de/blog/trailblazer-merck/> [Accessed:27.01.2026].
43. Salesforce (2025) *How Fresenius Kabi harmonises its global customer engagement on a central platform*. Available at: <https://www.salesforce.com/de/blog/fresenius-kabi-trailblazer/> [Accessed: 27.01.2026].
44. LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. *MIT Sloan Management Review*, 52(2), pp. 21–32.
45. Salesforce (2026) *Sales Analytics* Available at: <https://www.salesforce.com/sales/analytics/> [Accessed:27.01.2026].

46. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), pp. 118–144.
47. Redtag (2024) *Transforming Sales with Salesforce Solution for LG Electronics*. Available at: <https://www.redtag.pro/our-stories/transforming-sales-with-salesforce-solution-for-lg-electronics> [Accessed: 27.01.2026].
48. Chakraborty, S., Madaan, N., & Kumar, A. (2020) Industry 4.0 and digital transformation: Enabling data-driven decision-making. *Journal of Manufacturing Technology Management*, 31(7), pp. 1455–1474 Available at: https://www.researchgate.net/publication/371064036_Industry-40-Enabled_Digital_Transformation_Prospects_Instruments_Challenges_and_Implications_for_Business_Strategies [Accessed: 27.01.2026].
49. Akter, S., Bandara, R., Hani, U., Wamba, S. F., Foropon, C., & Papadopoulos, T. (2016) Analytics-based decision-making for service systems: A qualitative study and agenda for future research. *International Journal of Information Management*, 36(6), pp. 1110–1122 Available at: <https://www.semanticscholar.org/paper/Analytics-based-decision-making-for-service-A-study-Akter-Bandara/3a3eae425c61d349bd89cf8617240cb59c85654a> [Accessed: 27.01.2026].
50. Lampropoulos, G., Siakas, K., Reinhold, O., Viana, J. (2022) Artificial Intelligence, Blockchain, Big Data Analytics, Machine Learning and Data Mining in Traditional CRM nad Social CRM: A Critical Review. *International Joint Conference on Web and Intelligent Agent Technology*.
51. Zheng, Z., Xie, S., Chen, X., Wang, H. (2017) *An overview of blockchain technology: Architecture, consensus and future trends*. Available at: doi:10.119/bigdatacongress.2017.85 [Accessed: 29.07.2024].
52. Salesforce (2019), *Lamborghini Accelerates Trust and Authenticity with Salesforce*. Available at: <https://www.salesforce.com/news/press-releases/2019/11/19/lamborghini-accelerates-trust-and-authenticity-with-salesforce-2/> [Accessed: 27.01.2026].
53. Kouroupis, K., Vagianos, D., Totka, A. (2021) Artificial Intelligence and Customer Relationship Management: The case of Chatbots and Their Legality Framework. *East European Yearbook on Human Rights* 4(1), pp. 1-20

54. Kumar, V. & Reinartz, W. (2018) *Customer Relationship Management: Concept, Strategy and Tools. Third edition, Berlin:Springer*
55. Hein, R. (2023) *The Salesforce data fiasco: Some public sites exposing sensitive information.* Available at: <https://www.cmswire.com/customer-experience/the-salesforce-data-fiasco-some-public-sites-exposing-sensitive-information/> [Accessed: 25.07.2024].
56. Bakator, M., Đorđević, D., Čočkaló, D., Čeha, M., & Bogetić, S. (2021). CRM and customer data: Challenges of conducting business in digital economy. *Journal of Engineering Management and Competitiveness*, 11(2), pp.85–95. Available at: <https://doi.org/10.5937/jemc2102085b> [Accessed:27.01.2026].
57. LG Electronics (2026) *History: A tale of challenge and ceaseless innovation* Available at: <https://www.lgcorp.com/about/history/1> [Accessed: 03.02.2026].
58. Patton, M.Q (2015) *Qualitative research and evaluation methods*.4th ed. London:SAGE.
59. Guest, G., Bunce, A, Johnson, L. (2006) How many interviews are enough? *Field Methods*, 18(1), pp. 58-82
60. Creswell, J.W., & Creswell, J.D. (2017) *Research Design: Qualitative, quantitative and mixed methods approaches.* London: SAGE
61. Wolniak, R. (2023) *Industry 5.0-Characteristics, Main Principles, advantages and disadvantages.* Silesian University of Technology Publishing House, Organisation and Management Series No.170
62. Taverner, C., Trojan, L., Simion, O., Szukudlarek, E., (2021) Design culture in the era of Industry 5.0: A review of skills and needs. *Cultural Management: Science and Education*, 5(1), pp. 41-58
63. Adel, A. (2022) Future of Industry 5.0 in society: human-centric solutions, challenges, and prospective research areas. *Journal of Cloud Computing*, 11(1), p.40
64. Aslam, A. Euresiti, D. Luna,S., Ankobia, W. Lopes, A., Edinaborough, I. (2022) State of Industry 5.0-Analysis and Identification of Current Research Trends. *Applied System Innovation*, 5(1), Available at: DOI:10.3390/asi5010027 [Accessed: 03.02.2026].

65. Ma, N., Yao, X., Chen, F., Yu, H., Wang, K. (2022) Human-centric Smart Manufacturing for Industry 5.0. *Journal of Mechanical Engineering*, 58(18), pp.88-102.
66. Bozic, V. (2024) Industry 5.0: A future of Human-Machine Collaboration and Sustainability. *General Hospital Koprivnica*. Available at: https://www.researchgate.net/publication/379515319_Industry_50_A_Future_of_Human-Machine_Collaboration_and_Sustainability [Accessed: 03.02.2026].
67. Hermann, M., Pentek, T., Otto, B. (2016) Design Principles for Industry 4.0 Scenarios. *Proceedings of the Annual Hawaii International Conference on System Sciences* pp.3928-3937
68. Madsen, D.O. (2019) The Emergence and Rise of Industry 4.0 Viewed through the Lens of Management Fashion Theory. *Journal of Administration Science* 9(71). Available at: doi:10.3390/admsci9030071 [Accessed: 03.02.2026].
69. Sharda, R., Delen D., Turban, E. (2018) Business Intelligence, Analytics and Data Science: A Managerial Perspective. 4th ed. London: Pearson
70. Bosch (2026) *Happy 10th birthday, Industry 4.0!* Available at: <https://www.bosch.com/stories/10-years-industry-4-0-at-bosch/> [Accessed: 05.02.2026].
71. Siemens (2026) *Why are there still so many jobs?* Available at: <https://www.siemens.com/global/en/company/stories/industry/why-are-there-still-so-many-jobs.html> [Accessed: 05.02.2026].
72. Nestle (2022) Accelerating our data-driven digital transformation. Available at: <https://www.nestle.com/sites/default/files/2022-11/investor-seminar-2022-digital-transformation.pdf> [Accessed: 03.02.2026].
73. Rame, R., Purwanto, P., Sudarno, S. (2024) Industry 5.0 and sustainability: An overview of emerging trends and challenges for a green future. *Innovation and Green Development* 3, 100173 Available at: https://www.sciencedirect.com/science/article/pii/S294975312400050X?ref=pdf_download&fr=RR-2&rr=9c95e4e84e7bd27e [Accessed: 03.02.2026].
74. Barney, J. (1986) Organisational Culture: Can it Be a Source of Sustained Competitive Advantage? *The Academy of Management Review*, 11(3), pp.656-665. Available at: <https://www.studeersnel.nl/nl/document/rijksuniversiteit->

[groningen/international-strategic-management/barney-jb-organizational-culture-can-it-be-a-source-of-sustained-competitive-advantage/1155366](https://www.groeningen.nl/en/themes/onderzoek-milieubehoud/international-strategic-management/barney-jb-organizational-culture-can-it-be-a-source-of-sustained-competitive-advantage/1155366)

- and cultural antecedents. *Society and Economy* 45 (4), pp.393-410. Available at: <https://akjournals.com/view/journals/204/45/4/article-p393.xml> [Accessed: 04.02.2026].
83. Brohan, M. (2026) *LG Electronics continues focus on B2B, AI as core growth strategy*. Available at: <https://www.digitalcommerce360.com/2026/01/08/lg-electronics-b2b-ai-growth-2026/> [Accessed: 30.01.2026].
84. Mrugalska, B., & Ahmed, J. (2021) Organisational agility in Industry 4.0: A systematic Literature Review. *Sustainability*, 13(15), pp. Available at: <https://www.mdpi.com/2071-1050/13/15/8272> [Accessed: 04.02.2026].
85. Zheng, T., Ardolino, M., Bacchetti, A., Perona, M. (2021) The applications of Industry 4.0 technologies in manufacturing context: a systematic literature review. *International Journal of Production Research*, 59(6), pp.1922-1954 Available at: <https://www.tandfonline.com/doi/citedby/10.1080/00207543.2020.1824085?scroll=top&needAccess=true> [Accessed: 01.02.2026].
86. Shao, W. (2025) The Role of Digital Transformation in Enhancing Organisational Agility and Competitive Advantages: A strategic Perspective 3rd International Conference of Financial Technology and Business Analysis Available at: https://www.researchgate.net/publication/387806349_The_Role_of_Digital_Transformation_in_Enhancing_Organizational_Agility_and_Competitive_Ad_vantages_A_Strategic_Perspective [Accessed: 03.02.2026].
87. LG Electronics, (2022) *LG Smart Park Named 'Lighthouse Factory' for Futuristic Manufacturing Technology*. Available at: <https://www.lg.com/global/newsroom/news/home-appliance-solution/lg-smart-park-named-lighthouse-factory-for-futuristic-manufacturing-technology/> [Accessed: 06.02.2026].
88. LG (2024), *LG Focuses on Digital Transformation to Create Differentiated Customer Value*. Available at: <https://www.lgcorp.com/media/release/27533> [Accessed: 06.02.2026].
89. Zolkover, A., Petrunenk, I. Iastremska, O., Stashkevych, O., Mehdizade, M. (2022) Benefits and Risks of Digital Business Transformation: The Example of Eastern Europe Countries. *Journal of Eastern European and Central Asian Research* 9(2), pp.344-356 Available at:

<https://ieeca.org/journal/index.php/JEECAR/article/view/910/389>

[Accessed: 04.02.2026].

90. Jadertriervailer, H., Sell, D., Santo N. (2019) The Benefits and Challenges of Digital Transformation in Industry 4.0. *Global Journal of Management and Business Research: Administration and Management*. 19(12), pp.27-40 Available at: https://www.researchgate.net/profile/Heron-Triervailer/publication/346429448_The_Benefits_and_Challenges_of_Digital_Transformation_in_Industry_40/links/5fc16cb192851c933f696b2a/The-Benefits-and-Challenges-of-Digital-Transformation-in-Industry-40.pdf Accessed: 04.02.2026].
91. Sasmita, Y. Aditya, K. Purnamasari, S., Nor, N. (2025) Transformational Leadership and Organizational Agility in the Era of Industry 4.0. *Journal of Economics and Management* 3(2), pp.69-76 Available at: <https://ejournal.publine.or.id/index.php/ecoma/article/view/250/243> [Accessed: 01.02.2026].
92. Iribarren, M.Z., Rondero, C.L., Aguilar, I.S., Garcia, R.E.P. (2024) A Review of Industry 4.0 Assessment Instruments for Digital Transformation. *Applied Sciences* 14(5), pp.1-38. Available at: <https://www.mdpi.com/2076-3417/14/5/1693> [Accessed: 01.02.2026].
93. Alfaqiyah, E., Alzubi, A., Aljuhmani, H.Y., Oz, T. (2025) How Industry 4.0 Technologies Enhance Supply Chain Resilience: The Interplay of Agility, Adaptability, and Customer Integration in Manufacturing Firms. *Sustainability* 17, pp.1-30. Available at: <https://www.mdpi.com/2071-1050/17/17/7922> [Accessed: 01.02.2026].
94. Kraus, S., Jones, P., Kailer, N., Weinmann, A. Banegas, N., Tierno, N.R. (2021) Digital Transformation: An Overview of the Current State of the Art of Research. *Sage Open*, 11(3). Available at: <https://journals.sagepub.com/doi/pdf/10.1177/21582440211047576> [Accessed: 01.02.2026].
95. Davenport, T. (2006) Competing on Analytics. *Harvard Business Review* pp.1-12. Available at: <https://www.strimgroup.com/wp-content/uploads/pdf/competing%20on%20analytics.pdf> [Accessed: 04.02.2026].
96. Hanelt, A. Bohnsack, R. Marz, D. Marante, C.A. (2021) A Systematic Review of the Literature on Digital Transformation: Insights and Implications

for Strategy and Organisational Change. *Journal of Management*, 58(5), pp.1-39. Available at: <https://onlinelibrary.wiley.com/doi/pdf/10.1111%2Fjoms.12639> [Accessed: 06.02.2026].

Appendices

Appendix A: Interview Questions

Part A: How are I4.0 technologies strategically integrated into organizational processes and decision-making structures?

1. What is your role in the company, and how SFDC Sales cloud supports the sales processes and decision-making?
2. Could you please walk me through your day-to-day activities in the system, and which functions/features do you use most frequently, and which are underutilized?

Part B: How does LG Electronics strategically integrated I4.0 technologies into its operational framework?

3. Is SFDC system integrated with other enterprise systems/digital platforms in the company?
4. Do you have any suggestions of what processes/workflows can be improved/discontinued in the system to support organisations' agility?
5. What is your opinion regarding the data quality in the system and how it can be used for operational reasons?
6. Do you use the dashboards created in the system and what other reports can be added or adjusted to support decision making, tracking and performance discussions?

Part C: What organizational capabilities, structures, and cultural conditions enable or constrain successful digital transformation?

7. Have you identified any challenges regarding the business processes in the system that impact on the use of the system or need further improvement?
8. Do you think that scheduled training sessions need to be organized to support you better in the use of the system, when changes in the workflows/features occur?

Part D: What is the role of digital transformation in LG Electronics and what are the challenges and opportunities of I4.0?

9. What are the benefits and the disadvantages from the implementation of the SFDC?
10. What is your opinion regarding the strategic use of SFDC and if it supports the digital initiatives of the company?

Part E: In what ways do I4.0 technologies and digital transformation initiatives contribute to organizational agility and adaptability in LG Electronics?

11. Does the system promote information sharing, coordination across sales operations, strategies, and collaboration between the sales teams, back-office team and order desk management?