**National College of Ireland**

**Project Submission Sheet**

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# *Title: Financial and Technology Management Implications on Contemporary Business Settings*

Author Name: Shibangini Dutta

Degree: MSc. in Finance

College: National College of Ireland

"Submitted to the National College of Ireland,

(August) (2025)"

## Abstract

The research on ***"Financial and Technological Management Implications on Contemporary Business Settings***" leads to the exploration of operational efficiency and competitiveness within the European manufacturing SMEs. The increased digitisation with evolving market demands and a strong influence on the SMEs led to the significant development of the study. The focus on the role of financial management and operational decision-making together with impact of technology adoption on the European manufacturing SMEs are addressed within the research. The case study analysis with focus on 3 SMEs from pharmaceutical, chemical and steel industries within the European manufacturing sector along with qualitative data analysis lead to exploring of the financial metrics. Moreover, the inclusion of annual reports and financial statements with analysis of financial metrics such as ROE, ROCE and WACC leads to the evaluation of technological adoption strategies and its impact on long-term sustainability within the evolving market. The findings reveal a short-term financial strain for the SMEs at an initial stage with significant long-term gains in profitability and stakeholder value when accompanied by the digital transformation. The research further highlights the importance of strategic financial planning with technological adoption contributing towards the increased efficiency driving SMEs despite early earnings pressure. Thus, the study leads to outlining the opportunities in financial and technical integration for manufacturing SMEs navigating in a highly competitive industrial landscape.

***Keywords:*** Technical, Financial, ROE, ROCE, WACC, SME, manufacturing, Europe, digital transformation, R&D

# Thesis Declaration Page

## Submission of Thesis and Dissertation

## National College of Ireland

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## Acknowledgements

I want to thank each and every person who has helped me complete the research by offering constant support and direction. I would like to express my gratitude to my university professor for providing helpful suggestions that enabled me to carry out the study.

The key lessons that I gained from the dissertation will help me perform better and give me the opportunity to use the lessons in other academic settings. I also want to express my gratitude to my parents, friends, and other esteemed faculty members for their unwavering support in helping me finish the study successfully.

**Name: Shibangini Dutta**

**Date: August 15, 2025**

**Place:** National College of Ireland.

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# List of Abbreviations

IoT - Internet of Things

ROE - Return on Equity

ROCE - Return on Capital Employed

WACC - Weighted Average Cost of Capital

EU - European Union

AI - Artificial Intelligence

FinTech - Financial Technology

SME - Small and Medium Enterprises

ERP - Enterprise Resource Planning

ML - Machine Learning

ICT - Information and Communications Technology

R&D - Research and Development

ECCC - European Cybersecurity Competence Centre

PEOU - Perceived Ease of Use

PU - Perceived Utility

TAM - Technology Acceptance Model

DCT - Dynamic Capabilities Theory

EBIT - Earnings Before Interest and Tax

NCI - National College of Ireland

JAK1 - Janus Kinase 1

BIM - Building Information Modelling

# 1. Introduction

## *1.1 Research Background*

Financial management refers to making decisions regarding the acquisition and utilisation of funds effectively by organisations to achieve its goals. The evolution of financial technologies (FinTech) and Industry 4.0 technologies leads to exploring the increased potential of blockchain and Internet of Things (IoT) adoptions to enhance transparency and market integration within organisations (Manta, 2024). Thus, digital transformation with continuous financial management in modern business settings of the European manufacturing sector leads to operational efficiency of the SMEs. For instance, the deployment of manufacturing robots reduces margin of error and has led to an automation surge within the manufacturing sector of Europe post-COVID-19 from 79,000 units in 2020 to 87,000 units in 2022 (Mordor Intelligence, 2025) ***[Refer to Figure 1]***. Hence, after the pandemic due to extensive digital and automation adoption has led to the embodying of technology with financial discipline within the organisations. Thus, financial technology within the European manufacturing sector leads to significant upfront investment and maintenance of cost-cutting measures.

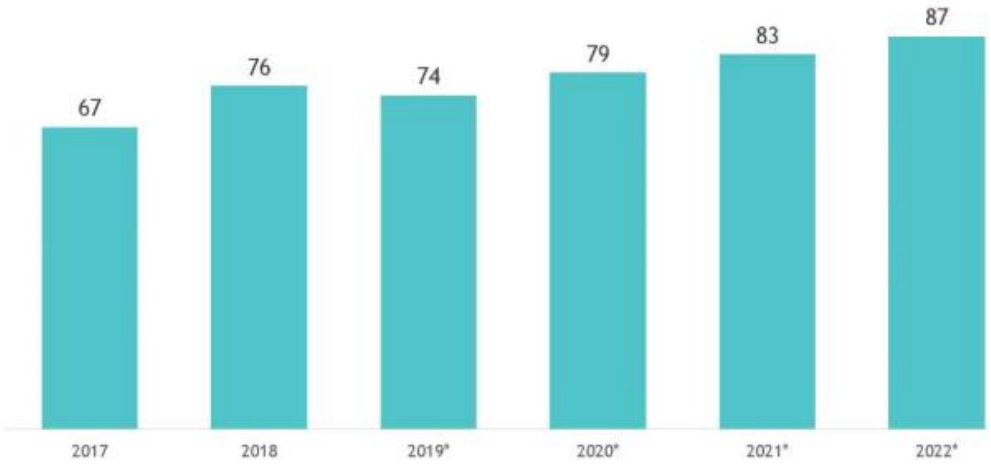


***Figure 1: Annual Installation of Industrial Robots in European Manufacturing Sector***

(Source: Mordor Intelligence, 2025)

In the European manufacturing sector, the technological adoption within the chemical, pharmaceutical, construction and steel industries has led to the balancing of short-term earnings with long-term investments in innovation. As Mattila, Pang and Ahbab (2024) states, innovation leads to market differentiation and long-term

competitiveness for disruptive growth with short-term gains significantly boosting stock price and providing immediate financial benefits. The use of advanced technology within organisations leads to offering of new products and increases efficiency with short-term investments allowing for rapid adjustments and providing a scope for future expansion.

The European Commission launched the ***FinTech Action Plan in 2018*** to support the rapid growth of the EU FinTech Industry accompanied by policy efforts (Fast *et al.*, 2024). Hence, the several industries within the manufacturing sector of the EU aimed at bolstering the Fintech ecosystem through financial management. The use of advanced technology leads to opening of profitable new revenue streams and cash flow generation for the European SMEs. Therefore, financial technology management within the European manufacturing sector focused the growth of companies with a boost to shareholder expectations.

## *1.2 Research Problem*

The integration of advanced financial technologies is observed to have a crucial role in boosting operational efficiency and opening of revenue streams in contemporary business settings. However, Wu (2024) states that, the application of such technologies often leads to threats of privacy, system vulnerabilities and biases for innovation. This hinders the overall effectiveness of SMEs in the business settings with financial losses due to system failure and delayed delivery of products. Moreover, the slow adoption of modern technologies with inadequate financial planning within the manufacturing sector leads to difficulty in remaining competitive within the markets (Dhiaf *et al.*, 2022). The application of advanced financial technologies leads to operational inefficiency within the European manufacturing SMEs due to limited availability of resources and inadequate financial planning. As Hughes, Seddon and Dwivedi (2023) mentioned, the manufacturing firms due to lack of internal digital finance and the strict regulatory environment within Europe lead to difficulties in the adoption of fintech tools. The problems related to slow adoption of technological advancements combined with lack of financial resource allocation led to lowered performance of the manufacturing sector in financial technological management. Thus, the current research focuses on investigation of the identified problem context and question areas

for making better decisions and leading to the strategic development of FinTech adoption within the European manufacturing SMEs.

### *1.3 Research Rationale*

Adequate technological management leads to enhanced security, reduced costs and generation of new opportunities with long-term growth of organisations and creation of a dynamic environment (Harsono and Suprapti, 2024). The research with focus on the European manufacturing sector showcases that investment in modern technology such as blockchain, Artificial Intelligence (AI), and IoT leads to a boost in financial infrastructure with significant contribution to employment and innovation. However, the limited knowledge about FinTech and Industry 4.0 technologies management within the sector leads to limited competitiveness and an increased need for digital transformation within the global market.

As Iman (2020) states, the adoption of FinTech within large enterprises has led to significant reduction in complexity of innovation with stimulation of economic growth. The technological adoption within the SMEs measuring through the financial metrics such as Return on Equity (ROE), Return of Capital Employed (ROCE) and cost of capital lead to enhancement of the study with improved budgeting accuracy and expenditure planning for management. For instance, the Digital Europe Programme provides strategic funding to SMEs for widening the use of technology and focus on the enhancement of industrial competitiveness within the European Union (European Commission, 2021b). The focus on digital transformation with the rise of Industry 4.0 within the manufacturing sector has led to effective resource allocation and governing of financial management. Therefore, the study despite in-depth analysis of technological adoption and financial management leads to challenges due to the limited funding for SMEs and implementation challenges within the industry. Thus, the examination of key aspects evaluates the effective financial planning by SMEs and technology integration to influence operational efficiency, adaptability, and long-term sustainability.

### *1.4 Key Literature and gap to address*

The technological adoption with financial management in the manufacturing sector led to invoice automation with the reshaping of the traditional methods. As Ionascu *et*

*al.* (2022), mentioned digitalisation within the Listed Companies of the European Union leads to the generation of higher cash flows with close relation to increased revenue and reduced costs leading to optimal use of resources. The transformation of business enables superior financial performance within the business settings with improved market position as opposed to the expectations of investors. Furthermore, the new industrial revolution known as Industry 4.0 within the manufacturing sector enables IoT successfully for industrial automation with increasing ROE and boosting corporate financial outcomes (Chen, 2021). The technological innovation within the manufacturing SMEs involves data analytics and improved financial management for capital expenditures. Thus, financial and technological management adoption leads to effective decision-making and evolution of the SMEs within the manufacturing sector. The existing literature focused on the benefits for large enterprises often leads to a gap in understanding the impact of technological improvements for SMEs and its financial benefits. The lack of financial metrics such as ROCE and cost of capital along with detailed audit reporting leads to limited exploration of the financial aspects within the sector. The study addresses that gap by effectively examining financial planning and technological integration for operational efficiency and long-term sustainability within the manufacturing sector. Hence, the findings of this research lead to strengthening of the European manufacturing sector with rapid technological changes and improved financial decision-making for the SMEs.

## *1.5 Structure of the Dissertation*

| Chapters | Description |
|---|---|
| Introduction | The research background, problems along with key gaps in literature are presented in the chapter along with the role of financial and technological management in the European manufacturing sector. |
| Literature Review | This chapter examines the viewpoints of various authors with leverage on innovation and financial decisions within the industry as well as finding the gaps for future research. |
| Research Question(s) | This chapter states the questions as well as aims and |

| | |
|---|---|
| | objectives with proper reasons for the study. |
| Research Methodology | The methodology chapter provides the data collection techniques with analysis and the limitations possessed within the study. |
| Findings & Analysis | The chapter focuses on the analysis and findings of the research with practical implications and limitations in the methodological approach. |
| Discussion | The evaluation of the various financial metrics and technological adoption lead to presentation of the discussion chapter. |
| Conclusions | The last section highlights the key findings with research questions and states the future research possibilities. |

***Table 1: Dissertation Structure***

# 2. Literature Review

## *2.1 Introduction*

The literature review section provides an understanding about the various studies for the development of detailed knowledge on the particular research. According to Snyder (2023), the literature review leads to establishment of the context with identification of potential knowledge gap and allowing the development of new research approaches in the field. The section focuses on evaluating the technological advancements within the European manufacturing sector and its implications on financial management. Moreover, the challenges faced in the implementation along with benefits of technical adoption with financial integration on contemporary business settings are explored within the section. Therefore, addressing gaps based on existing literature along with theoretical frameworks leads to the development of the current research based on technical and financial management in the European manufacturing sector.

## *2.2 Overview on Financial and Technological Management*

Financial management entails making informed choices about budgets, investments, and resource allocation, while technology management concentrates on the acceptance, integration, and optimisation of digital tools and systems in contemporary business settings. Abad-Segura *et al.* (2020), stated that financial technology is essentially the term for cutting-edge software, algorithms, and digital tools that improve and streamline financial services, procedures, and transactions. Financial and technology management are becoming more and more interconnected in the contemporary dynamic business climate, which shapes corporate settings within companies. Currently accounting for only 2% of global financial services revenue, the fintech industry is predicted to generate $1.5 trillion in revenue annually by 2030 (Goyal, 2023). The increasing use of financial management tools in smaller businesses is highlighted by this prediction of technology adoption in financial planning. These technical and financial elements work together to drive innovation, effectiveness in operation, and long-term viability. Furthermore, the combined application of financial and technology strategies is especially important for manufacturing European SMEs since these businesses frequently have limited resources and are subject to significant

market pressures. Adoption of technology, such as electronic supply chain tools, automated processes, or Enterprise Resource Planning (ERP) systems, is feasible for companies to manage its operations (Jenkins, 2023). However, this is also in line with organisational objectives as financial planning is done properly and also involves risks. Thus, SME adoption of innovative technologies is delayed by inadequate financial foresight, which lowers competitiveness within the contemporary business sector of Europe.

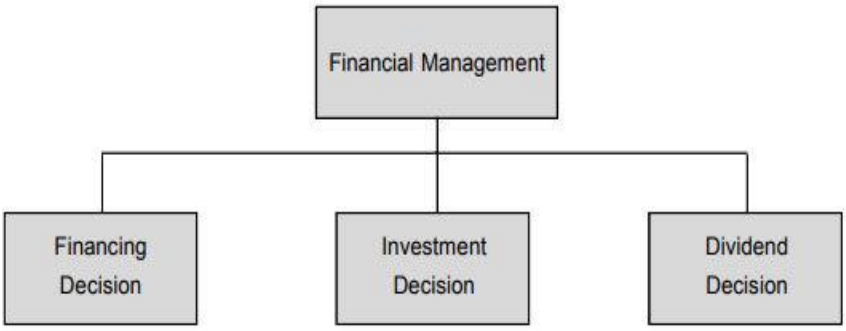


***Figure 2: Aspects of financial management***

(Source: Sharma, 2019)

***Figure 2,*** states that dividend decisions (distribution of profits to shareholders), investment decisions (placement of funds to long-term assets or initiatives), and financing decisions (funding decisions) are important components of financial management (Sharma, 2019). These factors are important because each has a direct impact on the distribution of assets and financial planning required for dynamic European manufacturing SMEs to successfully adopt new technologies. However, digital platforms include challenges such as data privacy issues and cyber threats, yet increase quicker transactions and transparency (Saeed *et al.*, 2023). These potential risks can lead to monetary losses in the event are not well controlled, indicating the necessity of a diverse strategy in contemporary business settings. Therefore, the effects of technology and financial management extend beyond operational enhancement and also influence strategic positioning and sustain commercial efficacy in European manufacturing SMEs.

### *2.3 Role of technological advancement towards improving financial management in businesses*

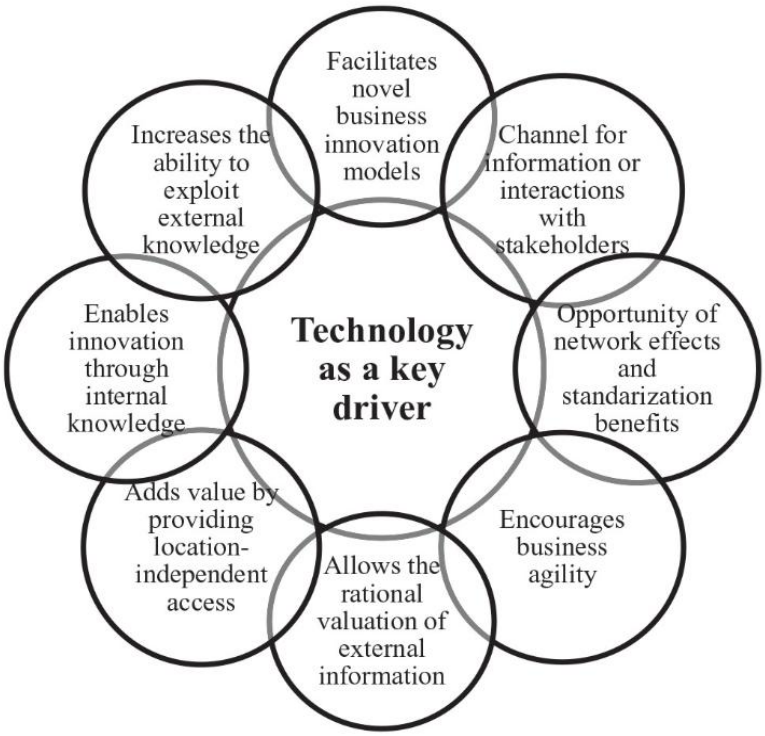


***Figure 3: Advantages of technology for business strategies***

(Source: Kraus *et al.*, 2021)

Technological advancements powered by blockchain, Machine Learning (ML) and IoT lead to enhancement of the strategic value of financial management with efficiency in operations within the contemporary business settings. As Avira *et al.* (2023) states, digital transformation has led to real-time access of financial information with streamlining of operations and compliance with the evolving regulatory standards. This showcases that technical adoption within businesses increases competitive advantage and leads to generation of profitable revenues. For instance, automation through the use of Artificial Intelligence (AI) leads to reduction of human error and allows them to focus on creative decision-making rather than mundane tasks (Lintner, 2023). The automation of routine tasks with technological innovations leads to revolutionising the back-office functions in businesses with reduced operational costs and improved cash flow management. Further, Kraus *et al.* (2021), outlines that technology is a key driver that has led to innovation within businesses while promoting standardisation and effective utilisation of resources for effective interaction with stakeholders ***[Refer to Figure 3]***. Digital technologies seek

to anticipate customer needs and enhance the value of business networks with data-driven decisions. Thus, the integration of technology with financial management in businesses leads to reshaping of the dynamic business environment.

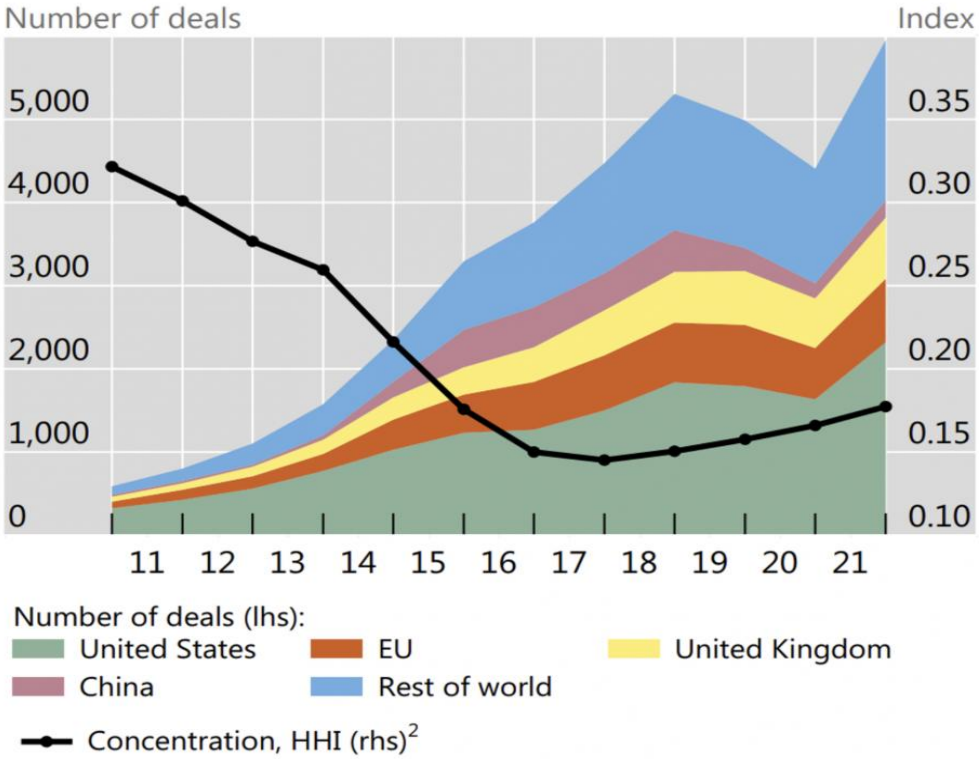


***Figure 4: Growth of Investment in FinTech***

(Source: Vives *et al.*, 2022)

***Figure 4***, showcases that use of digitalisation and new techniques has led to offering of new payments with subsequent growth in FinTech investments across the United States and European Union to overcome market failures (Vives *et al.*, 2022). The technological tools lead to financial risk management and anticipation of market fluctuations with supply chain optimisation within businesses. For example, John Sisk & Son with focus on Information and Communications Technology (ICT) has led to optimisation of the supply chain issues across its operating nations with recording an overall profit of £8.4 million in 2021 up from £2.8 million in the previous year (Gleeson, 2022). The use of data-driven technology within businesses leads to identification of inefficiencies and improving the accuracy in internal financial reporting through cost management and resolving the operational difficulties. Therefore, technological advancement has led to strategic transformation of financial management within businesses through accuracy and better decision-making for survival and growth.

### *2.4 Impact of financial planning and investment decisions within the manufacturing sector*

Financial planning is valuable for investment because it results in a consistent and logical approach to money management and achieving both short- and long-term objectives. The manufacturing industry relies heavily on strategic investment choices and efficient financial planning to encourage innovation and success. These factors impact a company's ability to change with the market, incorporate new technology, and maintain ***long-term viability*** in the context of European manufacturing SMEs. SMEs in the European manufacturing sector, like Sappi Lanaken Mill, show that wise ***investment choices*** like the alternation of Stockstadt and Lanaken sales resulted in cost savings (Business Wire, 2025a). This resonates with viability and operational effectiveness and shows investment in production techniques and energy-efficient equipment, in line with EU green goals. Similarly, a growing tendency in the chemical industry towards sustainability-led planning is reflected in comparable investment trends, with the creation of shareholder value for ***reputational advantages*** and technological upgradation (BASF, 2025). Thus, this implies that the capacity to make well-informed choices about investments and financing has an immediate influence on technological adaptability, operational effectiveness, and competitiveness.

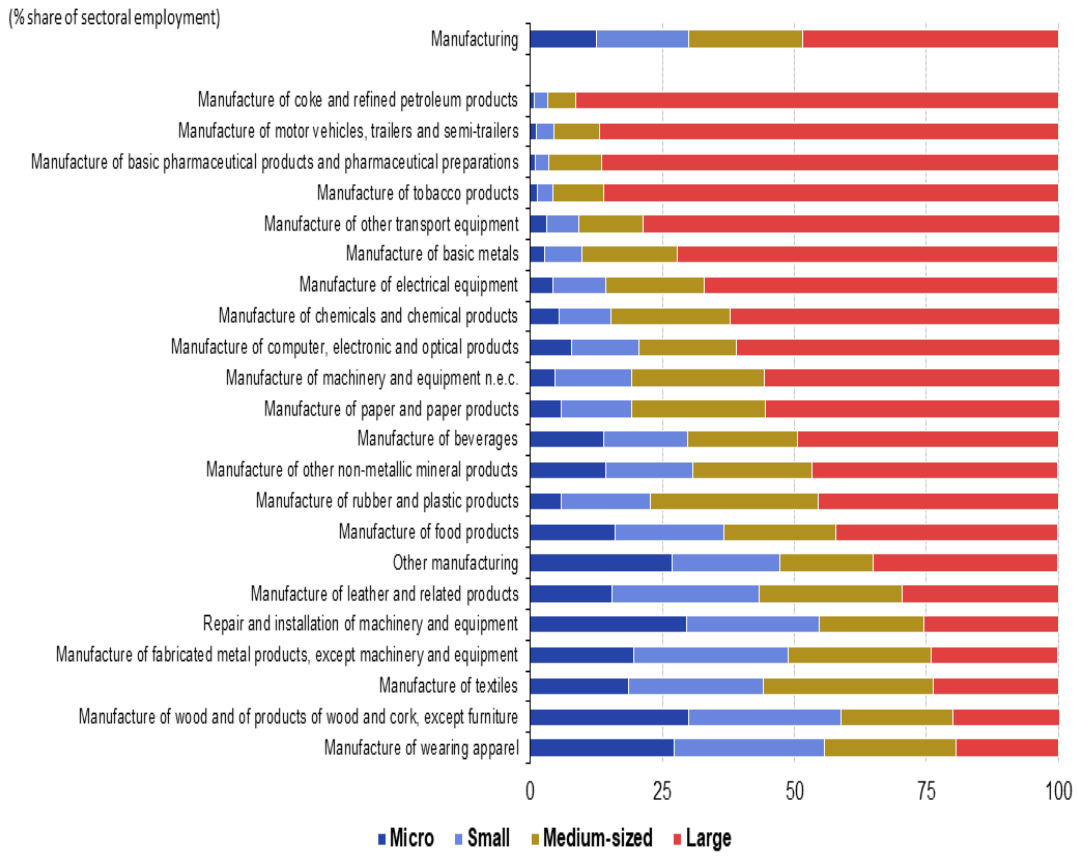


***Figure 5: Manufacturing sectors in Europe***

(Source: EU, 2025)

***Figure 5,*** shows that the EU economy still depends heavily on the manufacturing sector because of its high concentration of SMEs, sophisticated infrastructure, and investment in innovation across micro, small, medium, and big businesses (EU, 2025). This reliance highlights the necessity of focused investment decisions and ***proactive financial planning*** to guarantee profitability, creativity, and growth for companies of all sizes operating in the EU manufacturing sector. Additionally, Severfield Plc increases its efficiency by using capital investment in digital fabrication technologies and structured budgeting to manufacture plate girder carcasses (Severfield Plc, 2025). Such decisions have helped the business to maintain ***cost management*** and on-time project completion by allowing it to withstand supply chain interruptions and changes in the pricing of raw materials. Conversely, Galapagos NV significantly depends on investment choices in the pharmaceutical industry, as in 2024, R&D costs for the development of Filgotinib totalled €8.2 million for discontinued operations (Galapagos NV, 2024). These long-term ***funding commitments*** are essential for expanding into new markets and sustaining innovation pipelines. However, these

examples demonstrate that SMEs are better prepared to handle present and upcoming business issues that combine financial planning with strategic resource allocation. Consequently, sound financial planning and wise investment decision-making are essential for fostering innovation, growth, and adaptation in the European manufacturing sector.

### *2.5 Technical adoption and digital transformation for production, innovation among manufacturing SMEs*

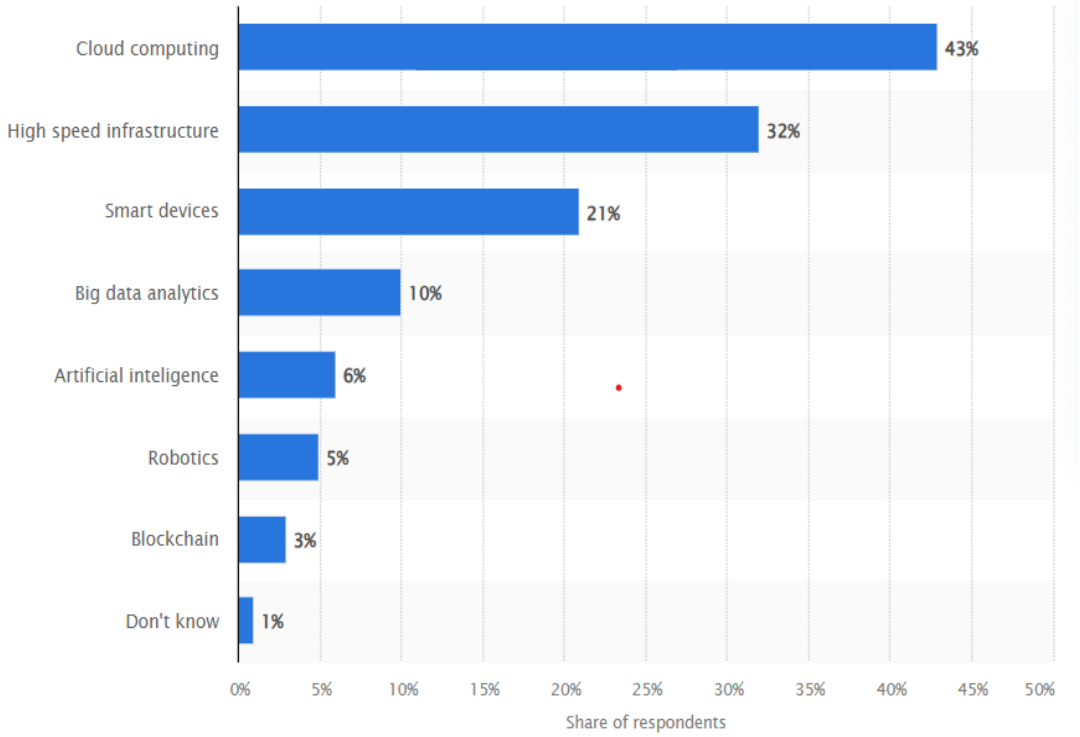


***Figure 6: Digital Technology Adoption by SMEs in Europe***

(Source: Espinosa, 2024)

The adoption of digital technologies within the manufacturing sector has led to operational efficiency, increased competitiveness and improvement of innovation capacity for the SMEs. According to Faruque *et al.* (2024), the adoption of digital transformation has led to heightened productivity, reduced economic disparities for SMEs and reshaping of business models. The technological empowerment is essential for regional economic development and value creation within the manufacturing SMEs. For instance, the EU is expected to invest €180 million on key technologies such as AI, robotics and new materials for a digital and inclusive future with strong representation from SMEs (European Commission, 2021a). The fostering of

innovation within the SMEs by integrating technologies into production leads to building of strong entrepreneurial positions for the European economy and reduction of structural barriers. SMEs in the EU have led to the adoption of cloud computing nearly 43% with only 3% of blockchain technology (Espinosa, 2024) ***[Refer to Figure 6]***. The drivers of digital adoption in SMEs enables a flexible manufacturing system and minimal wastage of resources in meeting customer demands. Thus, digital transformation within manufacturing SMEs leads to enhanced productivity and supply chain coordination for generation of revenue.

As Chen (2021), mentioned, the fourth industrial revolution or Industry 4.0 has led to generation of new business opportunities with successful industrial automation and allowing IoT integration in the smallest devices. The development of architecture has led to development of value networks for the manufacturing SMEs with enhancement of the production systems for supply chain optimisation. For instance, Nordic Pharma with development of Lacrifill Canalicular Gel, a therapy for dry eye, leads to capturing 30% of the European population with delivery of long-lasting effects for patients (Nordic Pharma, 2025). The focus on product and process innovation with digital transformation leads to enhancement of productivity within the manufacturing SMEs and building of strong client-supplier relations. Additionally, the incorporation of digital transformations within business systems leads to the capitalisation of their transformative power with changing of the conventional firm strategy and enabling improved performance (Faiz, Le and Masli, 2024). The increased technological advancement effectively captures the support of top management with improving the competitive edge of SMEs against larger firms. Therefore, digital transformation among the manufacturing SMEs has accelerated innovation and served as an important tool for following long-term strategic goals.

## *2.6 Implications for the Manufacturing Sector in Terms of Finance and Technology management*

Manufacturing industries adopt new technologies and organisational structures to remain competitive, increase operational effectiveness, spur innovation, and adjust to shifting consumer needs. Industry capacities are further enhanced, and creative production procedures are driven by the integration of AI, cloud computing, and the industrial metaverse (EY, 2025). This implies that the profitability and long-term

viability of European manufacturing SMEs now depend on the combination of technology oversight and finance. Moreover, the implications are seen in areas including long-term value generation, legislative alignment, investment success, and productivity in operations. For instance, with the support of parent company Acerinox and a €67 million investment in its alloy divisions, VDM Metals Holdings, the leader in the alloys market in Germany, highlights technological advancements (VDM Metals, 2024). This illustrates that strategic capital expenditures may enhance technological competitiveness at its global manufacturing locations. These funds were allocated to energy-efficient alternatives, automation, and manufacturing growth, which improved market distinctiveness and matched EU carbon-neutral targets. In contrast, as comprehensive investment choices in sophisticated fabrication technologies and automated project oversight by Severfield Plc and Sappi Lanaken Mill have increased production capacity and decreased cost delays. This integration resonates with the insights that the combination of digital technology with methodical financial planning helps SMEs and mid-sized businesses under the InvestEU programme (Finance Europa, 2025). This enables transitions in raising digital capabilities to have long-term implications on financial vision for funding sources.

Investments in manufacturing sectors, fuelled by long-term viability aspects, increase inventiveness and compliance. Furthermore, using digital capabilities with big data analysis to improve process stability, productivity, prices, and safety, as technology advancements such as Smart Factory and Digital Partner Excellence, advanced manufacturing capacity in AMAG Austria (AMAG, 2024). In the highly competitive European metals industry, the combination of technology and finance has bolstered profitable development and enhanced operational efficiency. These effects show that the way that SMEs with limited resources may adopt prudent financial practices to support necessary technological transformation and maintain competitiveness in a crowded market. However, businesses that view technology and finance as interrelated mechanisms are more equipped to take advantage of digital capabilities, promote innovation in their particular industries, and adjust to regulatory challenges (Mou, 2024). Collectively, the flexibility in manufacturing companies and the long-term are improved by combining the tactical aspects of financial strategy, expenditures, and technology oversight. Therefore, in a constantly changing industrial setting, improving the competitive advantage, adaptability, and profitable expansion of European SME

manufacturers requires a successful combination of technological innovation and financial planning.

## *2.7 Key challenges involved in financial management with technological adoption practices*

The technological advancement for transformation of the manufacturing sector with financial tools often leads to challenges such as high maintenance costs, integration with legacy systems and lack of digital financial literacy. The financial technology adoption often leads to ***high implementation and maintenance costs*** with thinner profit margins and higher capital expenditure. According to Thomas and Weiss (2021), the ongoing costs of maintaining and operating the digital technologies often requires specialised experts and continuous updates having a significant impact on the profitability of firms. For instance, the UK and European manufacturers in 2025 are expected to lose more than £80 billion due to downtime and operational resilience in the workforce with technical improvements in the sector (IDS, 2025). The underestimation of production systems with delayed integration places constraints on the working capital and demonstrates financial pressure of digital initiatives within the manufacturing SMEs of Europe. Further, the ***modernisation of legacy systems*** for manufacturing firms with adoption of technologies such as IoT, AI led to outdated infrastructure for new software and security features serving as entry points for cyberattacks (Chindanuru, 2025). The customisation based on industry-specific needs such as inventory costing, regulatory compliance led to temporary disruptions in financial workflows and a risky process for the SMEs. For instance, the implementation of Industry 4.0 and 5.0 within the manufacturing sector leads to complexity in integration of advanced systems with obstacles of transition showcasing inefficient use of resources and energy (Info-Tech, 2024). Thus, the digital transformation within the manufacturing SMEs lead to operational disruption with building on maintenance costs for integration of modern financial technologies.

The infusion of technology into finance often ***requires new skills*** that are significantly lacking in the financial professionals within the contemporary business settings. As Gupta *et al.* (2025) states, the rapid infusion of digital technologies demands knowledge regarding automation platforms and process design leading to complexity in financial management. The technological shift from static to dynamic substantially

leads to a skill gap for finance professionals and a difficulty in the growth of the business environment. For instance, 63% nearly two-thirds of the SMEs in the EU struggle in finding skilled employees with the rapid technological developments deepening brain drain and hindering the growth process (European Union, 2025). The skills gap and limited familiarity with digital tools, data science leads to failure in cash flow forecasting and considerable risk for the manufacturing sector. Therefore, the cost pressures, legacy systems and skill shortage often lead to difficulty in integration of technical adaptation and financial management for the manufacturing SMEs.

## *2.8 Tactics to manage challenges in financial management with technical adoption*

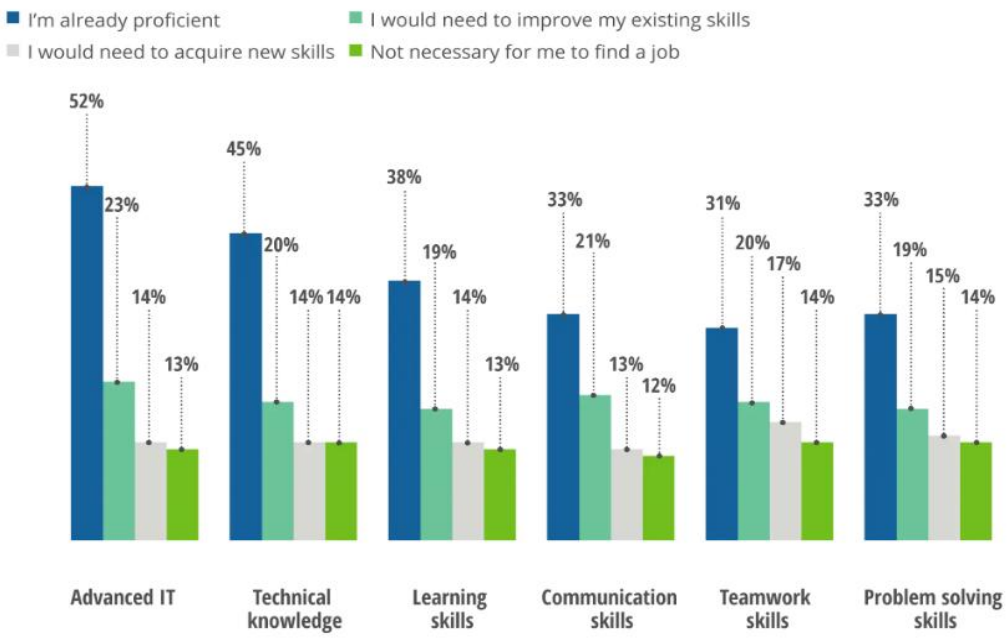


***Figure 7: Upskilling improves technical proficiency for employees***

(Source: Deloitte, 2019)

The rapid digital transformation poses significant challenges that are often mitigated with solutions such as phased implementation, upskilling of the workforce and implementation of cybersecurity measures. According to Habibi and Kermanshachi (2018), ***phased implementation of digital technology*** reduces upfront investments and minimises disruption with improved real-time feedback leading to better allocation of resources. The high implementation costs within the manufacturing SMEs are distributed with the phased rollout of financial technologies with maximisation of operational efficiency. For instance, the phased implementation of Industry 4.0

technologies by European manufacturers has led to reduced costs with competitive advantage accelerating the innovative environment and improving profitability gains (Business Wire, 2025b). Moreover, the bridging of the skills gap through ***investment in upskilling and training*** of finance professionals leverages the full potential of modern systems. The continuous professional development leads to enhancement of digital maturity for manufacturing firms and effective communication driving strategic decision-making among employees (Nwoke, 2024). For instance, the provision of skill-based training to employees led to increased proficiency for 52% in advanced IT with 45% able to implement technical knowledge in the workplace (Deloitte, 2019) ***[Refer to Figure 7]***. The increased employee confidence with continuous professional development leads to financial visualisation and significant improvement within the manufacturing sector. Hence, the focus on minimal disruption and smoother integration into legacy systems with training leads to effective management of challenges faced in technical adoption for the SMEs.

As Chotia *et al.* (2025), mentioned the use of ***cybersecurity tactics within financial systems*** leads to encrypted data transfer and secured cloud storage for manufactures in digital systems. The movement of manual to automated finance operations with legacy systems often benefit with cybersecurity within the manufacturing sector through building of stakeholder trust. For example, the European Cybersecurity Competence Centre (ECCC) adopted the first Cybersecurity Work Programme with €390 million strategic investments supporting SMEs to ensure efficient implementation of projects (European Commission, 2025). The dedicated actions for deploying modern systems and tools with security against cyberattacks leads to rapid decision-making and financial upgradation for the manufacturing SMEs. Therefore, the navigation of complexities in digital transformation leads to realisation of the full benefits in financial management and fulfilment of business objectives.

## *2.9 Theoretical Underpinnings*

### 2.9.1 Technology Acceptance Model (TAM)

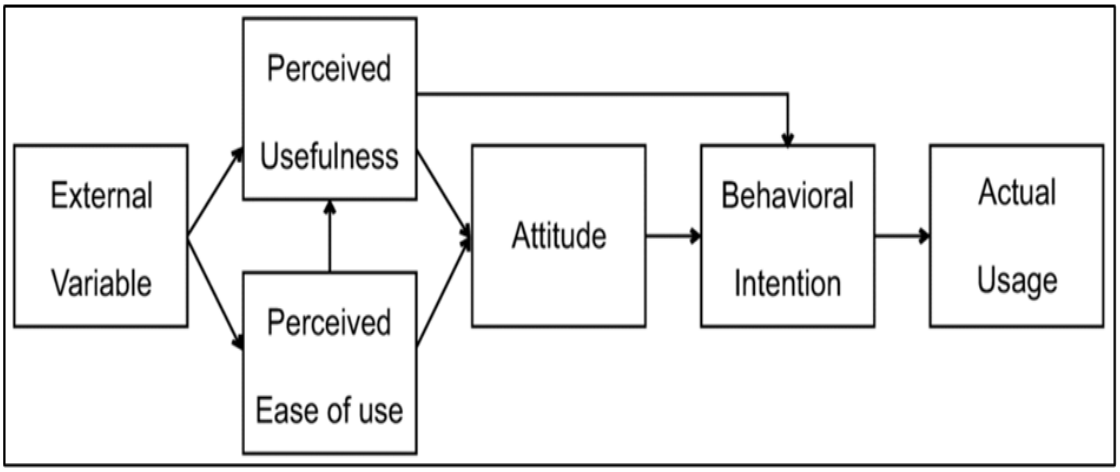


***Figure 8: Aspects of TAM***

(Source: Park and Park, 2020)

TAM posits that the behavioural intention of users, which is based on the assessment of the utility of technology in completing tasks and perceived ease of use, predicts acceptance of the technology (Kripanont, 2006). Perceived Utility (PU) and Perceived Ease of Use (PEOU) are the two main factors that the model uses to assess the rate at which new technology is being used to affect user behaviour, attitude, and use ***[Refer to Figure 8]***. These aspects aid in the explanation of the attitude of the users, and behavioural intentions are impacted by the perception that a specific technology might improve work performance and be simple to comprehend. TAM serves as a vital basis for comprehending the way digital financial technologies are being used by European manufacturing SMEs. Moreover, the idea of perceived usefulness is closely related to the ways decision-makers in SME assess whether digital finance solutions, such as cloud-based accounting, automate reporting, or AI-driven projections, enhance financial planning and efficiency in operation. In contrast, perceived ease of use refers to the accessibility and user-friendly nature of these technologies, and it has a big impact on implementation rates, particularly in businesses with limited resources. The perceived usefulness and Ease of Use are reflected in the actual adoption of technologies such as Smart Factory and Digital Partner Excellence by organisations such as AMAG Austria Metall AG, which are based on strategic worth and practical ease. This implies logical decision-making, however. In practice, adoption also entails industry constraints and resource limitations (Booyse and Scheepers, 2023).

Therefore, by incorporating TAM, it is necessary to look into the connection between financial oversight, utilisation of technology, and behavioural intention. This helps demonstrate the reason there are gaps in the implementation of digital finance throughout manufacturing SMEs in Europe.

### 2.9.2 Dynamic Capabilities Theory (DCT)

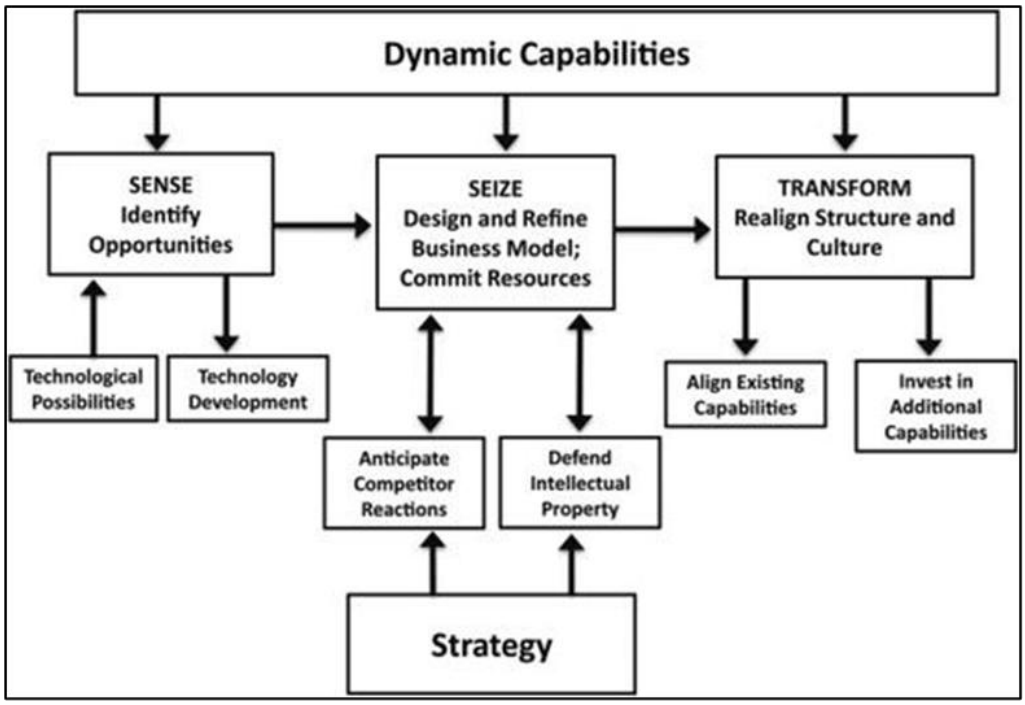


***Figure 9: Segments of DCT***

(Source: Shiferaw and Kero, 2024)

The interconnected competencies identified by the DCT are implementing new strategic assets into organisations, transforming existing resources to meet changing demand, and learning fast to identify possibilities and threats (Teece, Pisano and Shuen, 1997). The DCT theory describes three dimensions that are Sensing (recognising opportunities and risks), Seizing (mobilising resources for gaining value), and Transforming (continual regrowth of competencies) to use organisational and technology resources to change operational structures ***[Refer to Figure 9]***. These elements closely relate to the emphasis on technology and financial management in European manufacturing SMEs. Companies such as VDM Metals, for example, show excellent dynamic skills by investing in automation and equitable financing to improve manufacturing and efficiency in its alloy divisions. This demonstrates the capacity of the company to sense market trends, seize technology advancements, and transform operational frameworks to preserve resilience and adhere to legal requirements.

Furthermore, by reducing risks, building trust, and increasing operational effectiveness for financial planning and technology management, regulatory compliance greatly increases resilience within a company (Udo, 2024). However, European manufacturing SMEs may encounter limitations like inadequate funding or a lack of digital readiness, yet DCT presupposes continuous capability growth. Thus, this clarifies that businesses might seize innovation opportunities, and practical implementation frequently relies on sector-specific difficulties, financial strategy, and resource availability.

## *2.10 Literature Gap*

The evaluation and interpretation of previous studies highlight significant gaps related to the role of SMEs in technical adoption and financial management within the manufacturing sector. According to Chen (2021), digital transformation leads to generation of profitable revenue with real-time access to information and industrial revolution within large companies. The limited focus on SMEs within the manufacturing sector for digitalisation showcases a lack of thorough knowledge in financial planning for structural expansion. Moreover, various studies focused on detailed analysis of the use of AI, ML and IoT by manufacturers with company analysis for supply chain optimisation and operational efficiency (Vives *et al.*, 2022). This focus on subjective inferences with lack of financial quantitative based practices such as ROE, ROCE and cost of capital lead to limited exploration of the benefits of technical financial management. The organisational challenges in technical adoption with lack of in-depth exploration about the manufacturing SMEs in Europe tend to develop future research for navigation of the dynamic business environment. Therefore, the research fills the gap in the existing literature with development of knowledge about the impact of technology financial management in European manufacturing SMEs within the contemporary business settings.

## *2.11 Conceptual Framework*

Dependent Variables:

- ROE
- ROCE
- Cost of Capital

| |
|---|
| Independent Variables<br>• Expenditure on Digital Development<br>• Adoption of Industry 4.0 |
| Control Variables:<br>• Firm Size<br>• R&D Intensity<br>• Debt-to-Equity Ratio |

***Table 2: Dependent and Independent Variables***

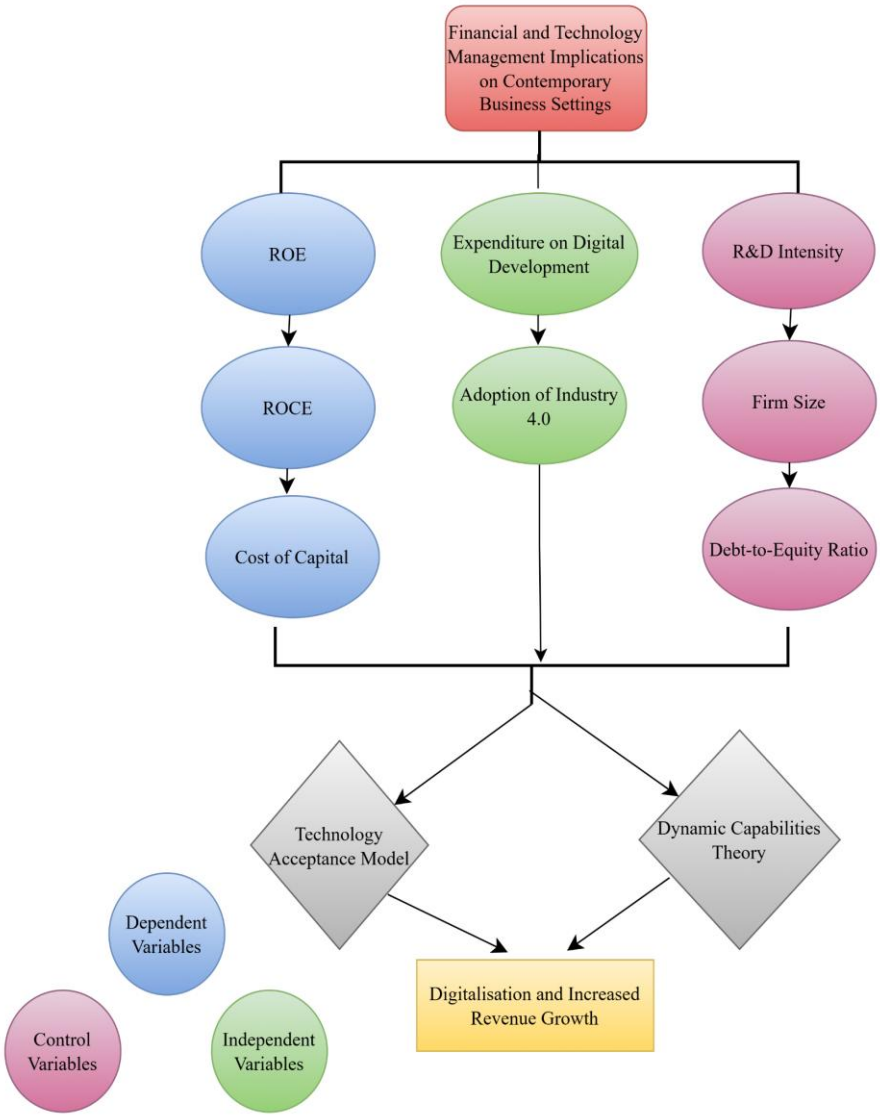


***Figure 10: Conceptual Framework***

The conceptual framework highlights the dependent variables as ROE, ROCE and Cost of Capital with the independent variables being expenditure on digital development and adoption of Industry 4.0 ***[Refer to Figure 10 and Table 2]***. Moreover, the control variables such as firm size, Research & Development (R&D) Intensity and Debt-to-Equity ratio lead to effective financial management with

technical adoption in the European manufacturing SMEs within the contemporary business settings.

## *2.12 Conclusion*

In conclusion, the section highlights that technical financial management leads to operational efficiency and generation of increased revenue for the European manufacturing SMEs. The focus on technologies such as AI, IoT and ML with effective programmes focus on SME improvement and financial integration for modernisation of the systems and leveraging a competitive edge. However, the various challenges such as legacy systems, operational costs and skill gap serve as barriers in successful implementation of technological advancements for financial management. The strategies such as phased rollout, cybersecurity frameworks and skill training lead to increased use of innovation for SMEs and building of stakeholder trust within the manufacturing sector. Additionally, the TAM and DCT theoretical frameworks help to develop the importance of digital transformation in financial planning within European manufacturing SMEs. Therefore, the evaluation of previous literature reflects that technological advancement within the manufacturing sector is dependent on skilled professionals and government support for adequate quantitative financial analysis.

# 3. Research Question(s)

## *3.1 Research Aim and Objectives*

### 3.1.1 Aim

The research aims to explore the influence of technological advancement on the effectiveness of financial management within the contemporary business settings of European manufacturing enterprises.

***Justification:*** The research aims to explore the impact of financial and technological management areas within contemporary business settings. Thus, it is justified due to emphasis on the key variables of the topic context with a focus on European manufacturing firms.

### 3.1.2 Objectives

**Primary Objectives**

To investigate the implications of technology and financial management practices in the modern business setting of manufacturing SME firms in Europe.

**Secondary Objective**

- To analyse the role of financial planning, investment decisions, and access to funding in shaping the growth and resilience of manufacturing SMEs in Europe.
- To assess the impact of technology adoption and digital transformation on productivity, innovation, and market responsiveness among European manufacturing SMEs.

***Justification:*** The developed objectives are beneficial for assessing the role of technological adaptation and product innovation in financial management for European manufacturing SMEs. Thus, with a focus on financial technological management the objectives support the investigation of the identified research problem on the topic context.

## *3.2 Research Questions*

**Primary Question**

How do financial and technology management practices influence the operational efficiency, competitiveness, and long-term sustainability of manufacturing SME firms in Europe?

**Sub Questions**

- What is the exact role of financial management within the modern business settings of the European manufacturing SMEs?
- How does the adoption of new technologies and digital transformation impact the European manufacturing SMEs?

***Justification:*** The research questions are framed with proper relation to the research objectives for assessing the impact of financial technology on operational efficiency long-term sustainability. Hence, the questions are justified due to assistance in evaluating the European manufacturing SMEs in terms of digital transformation and financial management.

# 4. Methodology

## *4.1 Introduction*

The research methodology chapter with adoption of a systematic approach leads to an investigation of financial and technological management within contemporary business settings and interpretation of the information. The methodology helps in appreciation of the development process with pitching light on the research methods and various steps leading to the explanation of the study with gathered information (Swarooprani, 2022). The chapter discusses on a particular pattern of gathering, analysing and interpreting complex data leads to an understanding of the digital transformation within the European manufacturing sector and its impact on financial performance. Thus, the aim of the chapter focuses on highlighting purposive sampling technique with the key instruments used for data collection and drawing of statistical inferences based on the selected SMEs. Moreover, the ethical considerations ensure validity and reliability of the data with maintenance of academic standards within the study. Thus, the research methodology with justification of the choices and alignment with the research questions leads to effective contribution in showcasing the importance of financial and technology management within the SMEs.

## *4.2 Data Collection*

### 4.2.1 Research Sampling

Research sampling leads to the selection of a subset from a large population to study, and draw conclusions that validate the findings of the research. ***Purposive sampling*** has been selected for exploring the financial management practices that are evolving with technological adoption within the European manufacturing sector. As Campbell *et al.* (2020) states, purposive sampling is a way of identifying and selecting cases that use limited resources with fulfilling of specific criteria for effective analysis of the research. In the context of the study, within the manufacturing sector of Europe various industries such as aerospace, automobile, chemical, steel, construction, textile, minerals and pharmaceutical operate. However, the selection of industries such as chemical, pharmaceutical and steel are considered due to increased potential in adoption of new technology and management of cash flows within the sector. For instance, the combination of Industry 4.0 technologies and digitalisation lead to drug

discovery and optimisation processes for productive purposes (Anthwal *et al.*, 2024). The selection of SMEs within the industries leads to development of the role of digital transformation with effective financial management in the contemporary business settings. Hence, the application of purposive sampling leads to involvement of industries that focus on new technological adoption and financial planning within the manufacturing sector of Europe.

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| Availability of Annual reports from 2022-2024 and company website. | No availability of annual reports and company website. |
| Companies operating in Europe, manufacturing sector and SME. | Companies not operating in Europe, manufacturing sector and SME |
| The annual report and websites to be in English Language. | The annual reports and websites are not in English. |
| High potential of technology adoption within the companies. | Limited technological adoption within the companies. |

***Table 3: Inclusion and Exclusion Criteria***

The focus on SMEs within the European Union leads to capturing diverse perspectives and maintaining relevance with the research problem with insights on operational efficiency and strategic decision-making. A total target size of 23-25 SMEs was selected within the manufacturing sector out of which a sample size of 3 SMEs within the chosen industries were considered as case companies. The ***table 3***, highlights the exclusion and inclusion criteria for the selection of SMEs within the European manufacturing sector. For a purposive sampling, the purpose is adhered towards the relevance of creditworthiness of SMEs for technological integration for mapping out financial technology implications in contemporary business settings (SMEs). The chosen SMEs were ***Galapagos NV (Pharmaceuticals), Ems-Chemie (Chemicals) and Severfield Plc (Steel)*** based on the inclusion and exclusion criteria. Thus, the focus on financial and technological management with purposive sampling leads to the gathering of meaningful data within the European manufacturing sector.

### 4.2.2 Research Instruments

Research instruments refer to tools that are used to gather information such as document analysis for reliable and meaningful data for the study. In this research, a ***secondary qualitative data collection method*** was used based on exploring the implications of financial and technology management on contemporary business settings. According to Wickham (2019), the secondary method allows collection of information from a large number of sources with time-effective in offering convincing outcomes. The secondary data collection with use of instruments such as ***annual reports***, ***company websites*** and applications such as ***MS Excel*** lead to understanding of the financial practices, managerial strategies and investment decisions in technological innovations for the SMEs. The annual reports with narrative disclosures regarding the board of directors and company spending on technology with financial statements lead to accuracy in justification of the strategic decision- making process. Moreover, Voinea *et al.* (2024), mentioned that the financial audit report leads to identification of risks and potential errors with suggestions on appropriate funding options that lead to transparency in reporting for companies. The 2 year in-depth evaluation of annual reports helps in building a pattern or trend prevailing within the SMEs with changes in market conditions. Additionally, the use of MS Excel leads to computation of ROE and ROCE for the selected SMEs based on financial information from the annual reports with justification on technological investment and shareholder engagement. Thus, the research instruments through secondary qualitative data leads to overall depth and reliability on the findings of the study with maintenance of financial discipline.

## *4.3 Data Analysis*

Data analysis refers to examining, cleaning or modelling of data to extract meaningful insights and provide an understanding about the research. The case study analysis supported by statistical inferences is chosen for understanding of the business scenario within the European manufacturing sector with focus on technological adoption and financial management. As Priya (2021), outlines, the case study analysis is beneficial in the generation of theoretical propositions and in-depth evaluation of the data collection over a sustained period. The analysis of the annual reports for the past 2 years with focus on keywords such as Research & Development (R&D) and Capital

Expenditure lead to providing a detailed understanding about the financial decisions carried within the selected SMEs and organisational capabilities that influence business outcomes. Moreover, the investment in digital tools and outlining the total debt and equity stated in the consolidated financial statements provides an insight about the capital structure of the SMEs with understanding of the cash flow management within the dynamic environment. As Tan (2024) states, the capital structure reflects the financing and innovation capabilities of an organisation with reduced market risks with efficient resource allocation. The technological spending by SMEs with financial management are effectively outlined with an optimal capital structure leading to the validity of findings. Hence, the case study analysis leads to driving financial and technological management practices that are effective for SMEs within the competitive environment.

The case study analysis along with financial inferences based on numerical data tend to provide a significant relationship between technical adoption and financial performance. The computation of ROE, ROCE and cost of capital on MS Excel with information gathered from annual reports and other websites for the selected SMEs showcase the profitability and investment returns generated by shareholders. ROE is computed by dividing the net income and total shareholder equity and expressed as a percentage to provide insights about the financial management of a company (CFI, 2024). The use of ROE as a financial metrics leads to showcasing of the profitability with fiscal health and degree of competitiveness within the market. The net income from the income statement and total shareholders' equity from the balance sheet is extracted onto the MS Excel and leads to calculation of ROE. Further, the ROCE consists of two components Earnings before Interest and Tax (EBIT) and Capital Employed and leads to comparison of profitability levels across companies (CFI, 2022). The capital employed is computed as total assets fewer current liabilities while ROCE involves the dividing of its two components to generate appropriate results. Lastly, the cost of capital is the minimum rate of return that a business generates before value creation. The calculation of the cost of capital requires the use of Weighted Average Cost of Capital (WACC) with key elements such as equity, debt, cost of debt, cost of equity and effective tax rate (CFI , 2023). The use of the financial metric leads to determination of the optimal capital structure that provides companies with tax shields and leads to preservation of the total value and cash flow. Thus, the financial

computations within MS Excel through focus on data from the annual report of SMEs leads to assessment of the creditworthiness and profitability in adoption of technical management.

Moreover, the financial computations highlight the management of the directors in fund allocation for new innovations and the improved financial impact on the SMEs. The outcomes of the financial computations reflect the internal as well as external capabilities of the SMEs with building of effective relationships with customers and shareholders through building of new technologies for demand fulfilment. Hence, the data analysis strategy with focus on case study and numerical inferences leads to uncovering of the digital transformation and financial management for SMEs within the European manufacturing sector.

### *4.4 Limitations*

The reliance on secondary qualitative data collection lacks critical perspectives that lead to capturing of limited information. As Martins, Cunha and Serra (2018) states, that the use of secondary data often requires justifying the context and reporting on limitations that leads to often gathering of outdated insights for the research. In respect to the study, the conducting of interviews or surveys would lead to capturing of the challenges and difficulties faced with technological adoption and financial management. Further, the secondary collection requires proper data management with secured storage to build on the credibility of research (Pederson *et al.*, 2020). The focus on a limited number of SMEs leads to limited applicability of the conclusions based on findings to a larger population. However, the chosen research methodology offers valuable insights regarding the financial spending of SMEs on innovation with statistical inferences supporting the case study analysis in showcasing the optimal capital structure. Hence, the information related to emerging trends towards financial management in contemporary business might lack insights but outline the impact of technology on financial performance for the SMEs.

### *4.5 Ethical Considerations*

The ethical consideration for secondary research leads to accuracy, credibility and validity of the information that already exists. The study assures that all sources are fully acknowledged to preserve academic integrity and all references have been cited

following the academic guidelines. Moreover, no evidence has been misinterpreted or presented inaccurately to support the conclusions with ethically sound and dependable inferences of the research. The use of the ***Copyrights, Designs and Patents Act 1988*** leads to safeguarding of the original works of authors and designs used in the data collection process (UK Government, 1988). This study also complies with the ethical standards and the guidelines of National College of Ireland (NCI) specifically regarding the use of information and intellectual property rights. The seeking of appropriate feedback from supervisors regarding the study leads to the prevention of plagiarism and avoidance of infringement within the data collection and analysis process. Therefore, by adhering to the ethical norms, the study enhances the validity of the outcomes and leads to a credible contribution to the area of financial research.

## *4.6 Conclusion*

In conclusion, the analysis of technology and financial management within the European manufacturing sector focuses on selection of the secondary qualitative research method. The purposive sampling technique leads to choosing the sample size of SMEs that adhere to technical integration and financial management within the manufacturing sector. The secondary qualitative data collection method focuses on gathering of insights pertaining to the European SMEs with availability of annual reports and websites for trustworthy results. Moreover, the case study analysis with statistical inference leads to precise understanding of capital expenditure and cash flow management within the European economy for the SMEs. The adherence to university guidelines, ethical consideration of the research with copyright claims leads to reduced misconduct and validity of the outcomes. Hence, this chapter leads to meeting of the research questions and showcasing the need for financial and technology management in the European manufacturing sector.

# 5. Findings & Analysis

## *5.1 Introduction*

The findings and analysis section of the research outline the results of the secondary qualitative study exploring the impact of financial and technology management within contemporary business settings. The key variables including ROE, ROCE and WACC are assessed with connection to 3 SMEs in the Europe manufacturing sector along with investments in technological advancements showcasing new innovations in the enterprises. Further, the financial information with focus on case study analysis leads to outlining the managerial as well as financial changes through technology adoption within the SMEs with focus on net sales improvement and higher profits. Hence, the outcomes of the study are analysed with focus on research questions to assess the implication of technology and financial management within contemporary business settings.

## *5.2 Data Analysis*

### 5.2.1 Company A: Financial and Technology Management by Galapagos NV (Pharmaceuticals)

Galapagos NV is a research-driven pharmaceutical SME that focuses on sustained commitment to biopharmaceutical innovation. The Research & Development (R&D) expenses for the company amounted to €335.5 million in 2024 as compared to €241.3 million in 2023 (Galapagos, 2024b) ***[Refer to Table 4]***. The company with adoption of Janus Kinase 1 (JAK1) inhibitor technology led to the development of Filogtinib, a key technological advancement for the SME.

| Particulars | 2024 (€ millions) | 2023 (€ millions) |
|---|---|---|
| R&D expenses | 335.5 | 241.3 |
| Development of Filgotinib | 8.2 | 190.2 |
| R&D incentives income | 27,223 | 32,968 |

***Table 4: R&D Expenses of Galapagos***

(Source: Galapagos, 2024b)

The technology focuses on JAK1 selective inhibitors due to its ability to modulate inflammatory pathways for autoimmune diseases such as Ulcerative Colitis (UC) and Crohn's disease (CD) (Xu et al., 2025). This significant role of the technology in pro-

inflammatory signalling amid growing demand for oral immunomodulators led to benefit for the company with serving the customers and curing of chronic-inflammatory diseases. Moreover, the R&D expenses for the development of Filgotinib amounted to €8.2 million in 2024 as compared to €190 million in 2023 (Galapagos, 2024b). The investment focused on a global Phase 3 to evaluate the safety and efficacy of Filogotinib during treatment of biologic-experienced patients (Galapagos, 2023). This offered financial continuity to the company with strategic reinvestment into other research areas such as oncology, cell therapy with royalty streams and product revenues. Thus, the supported R&D funding despite regulatory challenges led to evolution of the pharmaceutical company with adoption of Filgotinib and the inhibition technology and further new innovations focused on effective financial growth in the long-run.


***Figure 11: Expanded R&D capabilities with Gilead***

(Source: Galapagos, 2024a)

The fast adoption of Filgotinib led to operational efficiency for Galapagos with evolution of the research-intensive SME within the market. The strategic partnership with Gilead led to process efficiency and streamlining of late-stage clinical trials with significant reduction of duplication in internal efforts during the development stage (Galapagos, 2024b) ***[Refer to Figure 11]***. This partnership for the company led to rising royalties on revenue with building of end-to-end value chains within the operational process. Further, the company with focus on European markets led to building of direct links with healthcare professionals and patient advocacy groups for timely delivery of Jyseleca (commercial name of Filgotinib) (Galapagos, 2024b). The focus on fulfilment of customer demands led the SME to understand real-world patterns and gain insights regarding the ongoing popularity of the drug with required future developments. Thus, the technological adoption within the pharmaceutical

company led to increased customer satisfaction with building of new models for enhanced employee efficiency and operational growth of the SME.

Galapagos with the development of Filgotinib led to a transition in operational biopharmaceutical entities with elevated R&D expenses and comparatively lower revenue. The collaboration revenue with Gilead for Filgotinib amounted to €26 million in 2024 compared to €429.4 million in 2023 with net sales of approximately €1.7 million in 2024 while €18 million in 2023 (Galapagos, 2024b). This reflected the substantial long-run capital investment required for generation of full economic return within the pharmaceutical company.

| Particulars | 2024 (€ thousands) | 2023 (€ thousands) |
|---|---|---|
| Net Income | 74,082 | 2,11,697 |
| Total Shareholder Equity | 28,96,939 | 27,95,566 |
| **Return on Equity (ROE)** | **2.56%** | **7.57%** |
| *Formula: (Net Income/Total Shareholder Equity)*100* | | |
| | | |
| Earnings before interest and tax (EBIT) | -1,88,338 | -88,263 |
| Total Assets | 41,35,719 | 43,57,396 |
| Current Liabilities | 3,35,081 | 4,28,223 |
| Capital Employed | 38,00,638 | 39,29,173 |
| *Formula: Total Assets - Current Liabilities* | | |
| **Return on Capital Employed (ROCE)** | **-0.05** | **-0.02** |
| *Formula: EBIT/Capital Employed* | | |

***Table 5: ROE and ROCE for Galapagos***

(Source: Galapagos, 2024b)

Further, the ROE decreased from 7.57% in 2023 to 2.56% in 2024 for Galapagos showcasing a strong capital base for the SME with focus on heavy investments to commercialise Filgotinib and expand R&D capabilities ***[Refer to Table 5]***. The falling net income from €211.7 million to €74.1 million with higher operational costs and lowered shareholder investment highlighted a fall in profit position for the company (Galapagos, 2024b). The deterioration in ROCE from -0.02 in 2023 to -0.05 in 2024 indicated inefficiencies and a need for restructuring of the working capital for the pharmaceutical company ***[Refer to Table 5]***. The non-revenue generating clinical programs and infrastructure with technological development focused on long-term strategic investments demonstrated a challenging year for the SME (Galapagos, 2024b). The biotech SME undergoing transformation with future therapeutic innovations led to underperformance in the efficiency of Galapagos.

| Particulars | Value |
|---|---|
| Risk-Free Rate | 1.92% |
| Beta | -0.01 |
| Equity Risk Premium | 2.50% |
| **Cost of Equity (Re)** | **1.90%** |
| *Formula: Risk-Free Rate + (Beta*Equity Risk Premium)* | |
| Total Equity (E) (€ thousands) | 28,96,939 |
| Total Debt (D) (€ thousands) | 9,03,699 |
| Tax Rate (t) | 25% |
| Total Interest Expense (€ thousands) | 689 |
| **Cost of Debt (Rd)** | **0.06%** |
| *Formula: (Total Interest Expense/Total Debt)*(1-Tax Rate)* | |
| **Weighted Average Cost of Capital (WACC)** | **1.45%** |
| *Formula: ((E/(E+D))*Re)+(((D/(E+D))*Rd)*(1-t)))* | |

***Table 6: WACC for Galapagos***

(Source: Galapagos, 2024b)

The conservative financial structure of Galapagos is highlighted with a negative beta of -0.01 and cost of equity being marginally below the risk-free rate for the biopharma company ***[Refer to Table 6]***. Moreover, the low cost of debt with low interest obligations showcases a focus on non-interest bearing debts for the company with lower WACC of 1.45% having a strong efficiency and low financing costs. The continuous improvement in Filgotinib with technological adoption enables clinical programs with a moderate cost burden and focus on capital-intensive investments (Galapagos, 2024b). The technological implication within the SME led to higher equity generation and building of a revenue platform for long-term scalability into future markets. The lower marginal cost leads the company towards launching of additional drugs and expansion into future assets such as cell therapy with positive profits and retention of earnings helping financial dilution without risks of external borrowing. Therefore, the technological adoption within the manufacturing sector for the SME led to development of strategic foresight and balancing of innovation risk with commercial viability for over the long-run shareholder value creation.

### 5.2.2 Company B: Financial and Technology Management by Ems-Chemie (Chemicals)

Ems-Chemie is an SME operating in the high-performance polymers and speciality chemicals sector with adoption of technology to remain highly competitive within the specialised markets. The investments amounted to CHF 49 million in 2023 reduced

from CHF 94 million in 2022 with primary focus on capacity expansion and minimal on technical improvement (Ems-Chemie, 2024) ***[Refer to Figure 12]***. This significant investment with focus on automated polymer compounding systems led to building of high-temperature resistant speciality polymer platforms.

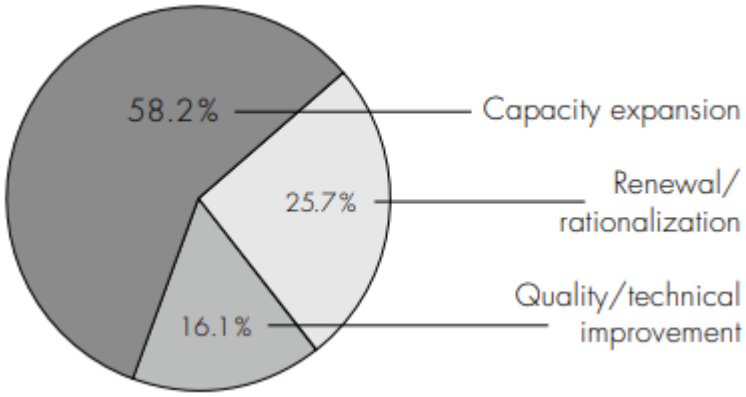


***Figure 12: Investment by Purpose for Ems-Chemie***

(Ems-Chemie, 2024)

The focus on the technology with the business unit of EMS-GRIVORY led to light-weight design solutions and a shift towards electrification and mobility trends (Ems-Chemie, 2024). This innovation strategy of the chemical SME with enhanced process precision and reduced cost led to significant growth in sales within the competitive environment. The use of polymerisation plants for amorphous particularly aromatic polyamides in Domat/Ems (CH) led to reduced energy consumption and larger production volume of the material (EMS-GRIVORY, 2021). This investment in process automation and digitalised compounding within the manufacturing sites led to increased scalability and emphasis on minimal disruption within internal operations. The R&D investment consistently exceeding 6-7% of the annual net sales for each business unit with reinvestment of operating cash flows led to sustained innovation without external funding (Ems-Chemie, 2024). The technology upgrades within the chemical SME with modernised infrastructure led to boosting of financial stability and maintaining a strong cash position within the production process. Thus, the resource-efficient approach with technological advancement led to leveraging of internal R&D within Ems-Chemie and boosting financial performance in the global chemical market.

The advanced polymer processing technologies at Ems-Chemie led to enhanced process efficiency with data-driven compounding and real-time quality control

systems. The modernised technology led to reduced material waste, faster productivity and a consistent increase in quality contributing to operational excellence (Ems-Chemie, 2024). These improvements reduce compromising on quality for products with growth in specifications based on customer needs across facilities and rise in revenue for the SME. Moreover, the delivery of customer specific polymers with technological upgradation and feedback allowed improvements in the manufacturing process and reduced energy consumption in the competitive market (EMS-GRIVORY, 2021). The building of strong customer relations with consistent quality even during volatile supply chain periods led to building of a strong reputation for the company. Hence, the cost control along with quality assurance with advanced polymer technologies led EMS-Chemie to respond flexibly to fluctuating global demand and build on the competitive strengths within the chemical market.

The investment in advanced polymer technologies by Ems-Chemie led to the reflection of strong financial metrics and generation of profits. The high performance polymers generated net sales amount of CHF 1,995 million in 2023 in comparison to CHF 2,188 million in 2022 along with fall in net operating income from CHF 548 million in 2022 to CHF 466 million in 2023 (Ems-Chemie, 2024). This maintaining of quality with long-term technological advancements led to continued delivery of earnings for future investments in additional capacity.

| Particulars | 2024 (CHF thousands) | 2023 (CHF thousands) |
|---|---|---|
| Net Income | 657067 | 498878 |
| Total Shareholder Equity | 1131683 | 942397 |
| **Return on Equity (ROE)** | **58.06%** | **52.94%** |
| *Formula: (Net Income/Total Shareholder Equity)*100* | | |
| | | |
| Earnings before interest and tax (EBIT) | 674299 | 510123 |
| Total Assets | 1235520 | 1026393 |
| Current Liabilities | 100763 | 80923 |
| Capital Employed | 1134757 | 945470 |
| *Formula: Total Assets - Current Liabilities* | | |
| **Return on Capital Employed (ROCE)** | **0.59** | **0.54** |
| *Formula: EBIT/Capital Employed* | | |

***Table 7: ROE and ROCE for Ems-Chemie***

(Source: Ems-Chemie, 2024)

Further, the rising ROE from 52.94% in 2023 to 58.06% in 2024 indicated an efficient generation of profits with employing adequate capital ***[Refer to Table 7]***. The increased net income from CHF 498.9 million in 2023 to CHF 657.1 million in 2024 showcased efficiency in operations and a focus on profit retention for new investment

in the long-run (Ems-Chemie, 2024). This high ROE for the company showcased efficient utilisation of capital with strategic deployment of retained earnings without over-reliance on external financing. The ROCE for the company also showed continuous improvement from 0.54 to 0.59 in 2024 with a proportionate rise in capital employed ***[Refer to Table 7]***. The increase in total assets from CHF 102.6 million in 2023 to CHF 123.6 million in 2024 led to the successful employing of scalable automated technology with enhanced marginal growth (Ems-Chemie, 2024). The increase in both profitability ratios for the chemical SME showcased a focus on reinvestment of extra earnings into energy-efficient technologies with building of advanced polymers for long-term shareholder value creation. The process innovation driven by a high-revenue generation with sustainable and light-weight products led to increased operation efficiency for Ems-Chemie.

| Particulars | Value |
|---|---|
| Risk-Free Rate | 1.92% |
| Beta | 0.71 |
| Equity Risk Premium | 2.50% |
| **Cost of Equity (Re)** | **3.70%** |
| *Formula: Risk-Free Rate + (Beta*Equity Risk Premium)* | |
| Total Equity (E) (CHF thousands) | 1131683 |
| Total Debt (D) (CHF thousands) | 103837 |
| Tax Rate (t) | 6.20% |
| Total Interest Expense (CHF thousands) | 2463 |
| **Cost of Debt (Rd)** | **2.22%** |
| *Formula: (Total Interest Expense/Total Debt)*(1-Tax Rate)* | |
| **Weighted Average Cost of Capital (WACC)** | **3.56%** |
| *Formula: ((E/(E+D))*Re)+(((D/(E+D))*Rd)*(1-t)))* | |

***Table 8: WACC for Ems-Chemie***

(Source: Ems-Chemie, 2024)

Ems-Chemie outlined a financially stable capital structure with WACC of 3.56% and a moderate beta of 0.71 within the chemicals market ***[Refer to Table 8]***. This characteristic showcased a less volatile stock with maintenance of long-term client contracts and a focus on technological expansion of its products to meet customer needs (Ems-Chemie, 2024). The low cost of debt after adjustment from taxes reflected low borrowing costs for Ems-Chemie with a pre-dominant focus on equity financing. The higher return metrics combined with capital costs highlight that technological adoption for Ems-Chemie led to strong-value creation for the shareholders and providing a substantial cushion for carrying on R&D-intensive initiatives. Therefore,

technological management within the SME with focus on advanced polymers led to strategic investment in innovations and growth in the production of sustainable products in the long-run.

**5.2.3 Company C: Financial and Technology Management by Severfield Plc (Steel)**

Severfield Plc, a leading structural steel specialist in the market has embraced technological adoption with focus on automation, Building Information Modelling (BIM) and digital workflow platforms. The capital expenditure of £11.3 million in 2024 and £6.3 million in 2023 exhibit the continued capital investment programme of the company (Severfield Plc, 2024). This led to the expansion of BIM capability for Severfield Plc with enhanced design accuracy and supply chain integration for customisation in large-scale industrial projects.


***Figure 13: Strategy of Severfield Plc***

(Source: Severfield Plc, 2024)

The focus on the selected technology leads to a shift towards digitised construction with faster delivery of customer demands in project execution through value engineering of design and building information (Severfield Plc, 2023). Further, the steel SME focused on an incremental implementation strategy with investment in existing platforms and integration of new tools across its operations in Europe. The expansion of automated fabrication equipment with rolling out digital quality assurance systems leads to the achievement of operational excellence with consistent reduction in rework and meeting demanding client schedules (Severfield Plc, 2024)

***[Refer to Figure 13]***. The technological adoption for Severfield Plc leads to providing a competitive edge to the SME with increased production of revenue and optimising steel usage within the European market. Thus, the scalable digital infrastructure with continuous investment in expansion of existing technology leads to diversification of its customer base and significantly generate higher revenue in the long-run.

The technological advancement focused on BIM by Severfield Plc leads to delivering operational implications with enhanced project efficiency across the project lifecycle. BIM integration into the design process by the SME enabled real-time coordination between engineering, fabrication and site teams with cutting down of lead times reducing rework within large-scale steel infrastructure projects (Severfield Plc, 2024). This streamlining of operations within the company with lowered defect rates led to maintenance of quality standards for the SME and generation of increased profits across the production process. Moreover, the adoption of modern technology with latest state-of-the-art computer software for 2D and 3D BIM analysis improved project transparency for the customers with increased precision engineering in the building process (Severfield Plc, 2023). The technological adoption through digital quality systems led to improved satisfaction and alignment for the clients with visualised outcomes of the infrastructure projects carried by the SME. Hence, the focus on new technology within Severfield led to operational improvements with making it more adaptive and future-ready within the construction market.


***Figure 14: UK and Europe Order Book Value***

(Source: Severfield Plc, 2024)

The integration of digital design technologies with automation systems led to significantly improved financial implications for Severfield. The UK and Europe order book stood at £478 million in 2024 compared to £510 million in 2023 showcasing

good earnings visibility with future revenue meeting the strategic objectives of the SME (Severfield Plc, 2024) ***[Refer to Figure 14]***. The technological improvements such as BIM led to scalability of the company outcomes and increased capital efficiency in the long-term.

| Particulars | 2024 (£ thousands) | 2023 (£ thousands) |
|---|---|---|
| Net Income | 15,901 | 21,566 |
| Total Shareholder Equity | 2,20,751 | 2,17,718 |
| **Return on Equity (ROE)** | **7.20%** | **9.91%** |
| *Formula: (Net Income/Total Shareholder Equity)*100* | | |
| | | |
| Earnings before interest and tax (EBIT) | 26,415 | 30,154 |
| Total Assets | 3,78,410 | 3,64,990 |
| Current Liabilities | 1,03,293 | 1,09,021 |
| Capital Employed | 2,75,117 | 2,55,969 |
| *Formula: Total Assets - Current Liabilities* | | |
| **Return on Capital Employed (ROCE)** | **0.10** | **0.12** |
| *Formula: EBIT/Capital Employed* | | |

***Table 9: ROE and ROCE for Severfield Plc***

(Source: Severfield Plc, 2024)

Further, the ROE for Severfield Plc demonstrated a decline from 9.91% in 2023 to 7.20% in 2024 with reduced net income despite the rising shareholder equity ***[Refer to Table 9]***. The drop in net income from £21.6 million to £15.9 million during 2023-2024 highlighted rising operational costs with technology upgradation and a short-term compression in returns during the period (Severfield Plc, 2024). The ROCE also fell slightly from 12% in 2023 to 10% in 2024 with decrease in both capital employed and EBIT during the technological adoption phase ***[Refer to Table 9]***. This reduced EBIT from £30.2 million in 2023 to £26.4 million in 2024 outlines a focus on technology investment for the company with less profit earnings from primary business activities (Severfield Plc, 2024). The focus on technology investment by the SME led to lowered profits and a fall in the ratios with increased upfront costs and capital expenditure. The revenue initially falling tends to significantly increase with the implementation and integration of the new technology within the business.

| Particulars | Value |
|---|---|
| Risk-Free Rate | 1.92% |
| Beta | 0.84 |
| Equity Risk Premium | 2.50% |
| **Cost of Equity (Re)** | **4.02%** |
| *Formula: Risk-Free Rate + (Beta*Equity Risk Premium)* | |
| Total Equity (E) (£ thousands) | 2,20,751 |
| Total Debt (D) (£ thousands) | 54,366 |
| Tax Rate (t) | 26.20% |
| Total Interest Expense (£ thousands) | 3,220 |
| **Cost of Debt (Rd)** | **4.37%** |
| *Formula: (Total Interest Expense/Total Debt)*(1-Tax Rate)* | |
| **Weighted Average Cost of Capital (WACC)** | **3.86%** |
| *Formula: ((E/(E+D))*Re)+(((D/(E+D))*Rd)*(1-t)))* | |

***Table 10: WACC for Severfield Plc***

(Source: Severfield Plc, 2024)

The WACC of Severfield Plc is 3.86% with a moderate cost of equity at 1.92% indicating risk-adjusted returns for the investors with a stable operating profile ***[Refer to Table 10]***. The low beta for the SME showcases consistency in earnings with technological advancement leading to diversification in infrastructural and industrial projects through long-term contracts and repeat business. Additionally, the cost of debt with consideration of tax rate in the challenging macroenvironment reflected a strong credit-standing and relatively disciplined financial management for the SME. This leads to conservative capital structure with limited financial risk through the adoption of BIM in automation fabrication technology and digitally control systems. Therefore, the technological adoption within Severfield led to reinforcement of a strong financial performance with long-term sustainable growth in the construction market.

## *5.3 Findings*

The technological adoption within the manufacturing sector of Europe with focus on the 3 SMEs emerged as a strategic enabler of operational improvement and long-term growth within the market. The integration of BIM and automated fabrication platforms led to accuracy and execution speed with significant improvement in project coordination for Severfield. Similarly, the adoption of advanced polymer processing technologies by Ems-Chemie led to efficiency in automation systems with improved supply chain reliability and enhanced productivity across the mid-sized corporations. This focus on technological adoption within the SMEs initially led to a reduction in

ROE and ROCE with moderately impacting the operational costs and EBIT. However, restructuring efforts and focusing on faster delivery to the customers enabled lower wastage and a moderately high increased revenue in the long-term. The short-term financial pressure within the SMEs with technological advancement lead to significant improvement in resource utilisation with revealing of a complex cost-benefit environment. Galapagos with the discovery of AI-driven drug platforms and continuous improvement in Filgotinib with phased clinical trials leads to meeting of strategic objectives and providing cure to patients with oral dosages. Thus, the high R&D costs with focus on new technology for the SMEs lead to significant decline in short-term financial performance with the building of a strong competitive edge within the contemporary business setting.

The divergent financial outcomes for the SMEs with rising costs of R&D despite a stable capital base indicated operational benefits of technology adoption and a slow enhancement in profit margins with effective design coordination. Galapagos high investment in drug discovery showcased a conservative capital structure with setbacks related to its Filgotinib assets. The technology advancement strongly influenced by external industry trends with rising client expectations and regulatory compliance requirements serves as a motivation for SMEs. Ems-Chemie with investment in the advanced polymer technology showcased a strong financial performance with rise in EBIT and Net income creating immediate shareholder value and material innovation in successful implementation of operational strategy within the SME. The use of digital technologies though a cost-centre in the initial stage leads to upgradation in the process with strategic repositioning and operational enhancements for the SMEs combined with financial benefit in the long-term. The technological adoption within SMEs in the manufacturing sector leads to digital integration with building a competitive edge in the rising complex environment with long-term growth in finances. Therefore, the short-term pressure on EBIT margins and capital efficiency for the SMEs are overcome with increased digital readiness and the emergence of strong market leaders through growth in financial performance in the long-run within the manufacturing sector of Europe.

### *5.4 Limitations of the Study*

The study provides valuable insights into technological adoption patterns and financial implications with secondary data collection of 3 SMEs across the European manufacturing sector. However, the lack of primary data collection such as interviews with senior executives or technology officers leads to limited focus on employee sentiments and leadership dilemmas faced during the adoption process. According to Mazhar et al. (2021), the primary data collection method leads to gathering of original information with enhanced data quality and relevance for researchers to draw effective conclusions. The current study due to this limitation lacked the assessment of changing organisational dynamics with technology implementation reducing the impact on behavioural factors. Further, the selection of limited case companies for data analysis led to lowered cross comparative analysis for other business settings and a difficulty in understanding of the sectoral diversity caused due to technological adoption on the financial performance of SMEs. The cross-comparative analysis leads to exploring the different characteristics of companies while providing a better understanding across various social categories than single-site studies (Heath, Moran and Dowrick, 2024). The focus on a few case companies in terms of the contemporary business settings of Europe led to reduced focus on operational benefits and a trend in financial performance with the implementation of new technology within the SMEs. Thus, the study, though beneficial in showcasing the benefits of technology adoption on the financial position of SMEs, provided moderate insights due to limited case analysis and methodological constraints within the manufacturing sector of Europe.

### *5.5 Conclusion*

In conclusion, the findings and analysis section of the study showcase the impact of technical adoption for the 3 SMEs in the European manufacturing sector with significant impact on its financial performance. The new technologies with huge investment lead to an initially lowered earnings and higher operational costs for the SMEs. However, the technology leads to reduced error and increased customer satisfaction with digital platforms and automation leading to a rise in revenue and future profit gains in the long-term. The lack of primary data collection and limited case companies limits the evaluation of the study in serving the benefits of technology

on financial performance for the SMEs. Therefore, this chapter leads to analysing that technology is important for SMEs and leads to long-term profits with successful integration and a stable financial position focused on future growth.

# 6. Discussion

## *6.1 Introduction*

The discussion chapter of the research study provides a critical insight about the collected data with linkage to the prior literature and findings for reflection of the research questions. According to Taherdoost (2022), the discussion chapter with focus on comparison with literature review perspectives lead to highlighting the gaps and reflecting the benefits of the findings from the current research. The findings with literature comparison leads to emphasising the importance of technological implementation on financial position of the European manufacturing SMEs and establishing a significant impact of the research. Thus, the comparative analysis leads to an in-depth analysis of the literature with the findings and provides a foundation for future researchers based on the similar context of study.

## *6.2 Discussion*

### 6.2.1 Influence of technological and financial management practices on operational efficiency and long-term sustainability for SMEs in manufacturing sector

The convergence of digital transformation and financial discipline serves as core enablers of sustainable growth for the manufacturing European SMEs. As Kraus *et al.* (2021) mentioned technology within firms leads to innovation and efficient utilisation of resources along with long-term value creation for the shareholders. Contrarily, technology with integrating of current resources and capabilities of an organisation lead to enhanced productivity and achievement of operational efficiency within the competitive environment (Noorani *et al.*, 2025). This benefit of technology adoption is observed by Severfield Plc in the implementation of BIM for improved speed and accuracy of the construction projects. The technology enabled real-time collaboration and served as core drivers of operational efficiency for SMEs with significant maintaining of financial stability. Further, Mou (2024), states that the interrelationship between technology and finance within businesses leads to efficient utilisation of the digital capabilities with promotion of innovation in the complex regulatory environment. The increased financial revenue for Ems-Chemie with focus on advanced polymer processing showcased the significant benefit derived from

technological investment with customer-specific innovation. On the other hand, Budiasih (2024) outlined that digital technology leads to profound impact on the strategic decision-making process for companies by exploring the change in business models associated with the evolving dynamics of technological advancements. This highlights that technology when used to its complete capability leads to the effective management and cost and earnings within SMEs with building of a cost leadership within the manufacturing sector. Thus, the technological and financial management signifies improved delivery time for SMEs with potential for future growth with rise in the profit position within the sector.

The findings also showcase that technological adoption for SMEs is a short-term financial pressure with relatively high operational costs and lowered EBIT. However, the integration of technology within the operations and supply chain of SMEs lead to long-term sustainable growth and a translation into positive financial returns with improved innovation cycles. As Avira *et al.* (2023) states, digital transformation within businesses leads to real-time access of financial information with focus on meeting evolving regulatory guidelines and generation of profitable revenues. On the contrary, financial management practices tend to improve organisational performance in SMEs with focus on budgeting and asset management for adequate cash flow generation (Otoo, 2024). The financial management practices within SMEs lead to balancing of innovation and liquidity with consistency in strategic transformation for long-term sustainable growth. The WACC of Ems-Chemie with limited debt highlights reinvestment capacity of the SME with a strong equity position enabling internal funding of automation initiatives without dependency on volatile credit markets. This significant adoption of financial management practices by SMEs in the European manufacturing sector enabled technological adoption for improved operational structure with reinvestment leading to increased future scalability within the market. Moreover, the focus on technological management leads to transparency for customers with reduced risks of data privacy issues and cyber threats for organisations (Saeed *et al.*, 2023). Galapagos with high-risk innovation and technological investments in the bio-pharma market lead to alignment of the emerging industry trends with maintenance of investor confidence through technology deployment within the SME. Hence, the technological and financial management practices within European manufacturing SMEs lead to long-term sustainable growth

with maintenance of disciplined capital employment and operational efficiency in the competitive markets.

### 6.2.2 Role of financial management in European manufacturing SMEs

Financial management in manufacturing SMEs of Europe serves as a backbone for sustainable growth and innovation within the continuous evolving landscape. According to Abad-Segura *et al.* (2020), financial technology leads to the streamlining of fiscal services and procedures with significantly increased revenue generation. Contrarily, financial management leads to optimisation of capital structure with effective balancing of debt and equity fuelling growth of SMEs (Rocca *et al.*, 2025). This showcases that the significant management of finance within SMEs leads to reduced risks and efficient allocation for reinvestment on technological innovations. Severfield with a balanced capital structure and lowered focus on debt supported the BIM integration into its supply chain with reduced focus on external borrowing. The higher equity funding despite operational expenditure for the SME led to effective capitalisation and monitoring of investment returns with strategic transformations in the long-run. The strong financial security for SMEs enables overcoming short-term uncertainties and maintenance of a stable economic position within the evolving market (Zimon *et al.*, 2022). The findings highlight that companies though facing significantly lower ROE and ROCE were not experiencing losses due to the continuous focus on internal funding of technological advancement and minimal debt risks. For instance, Ems-Chemie with significant earnings from smart manufacturing systems and product innovation led to disciplined reinvestment and long-term stakeholder returns for the SME. The focused investment decisions with financial planning lead to guaranteed long-term profitability and growth for SMEs within the European manufacturing sector. Thus, financial management for SMEs leads to wise investment decisions with focus on new innovations fostering long-term sustainable growth within the sector.

The financial planning in SMEs leads to efficient investment in innovation decisions specifically in capital-intensive industries even during extreme economic volatility. The global financial services accounting for 2% of the total industry predicts the generation of $1.5 trillion in revenue with adoption of modern technology by 2030 (Goyal, 2023). This use of financial management tools by SMEs leads to the driving of innovation and long-term viability within the manufacturing sector of Europe.

Galapagos with focus on an aggressive R&D strategy reflected an innovation model influenced by internal funding and clinical trials for improvement in its new drugs. As Caporale, Donati and Spagnolo (2023) stated, European SMEs with efficient financing leads to improved stability and a cleaner use of the production technologies with promotion of future growth potential. On the other hand, the use of digitalisation and use of modern technologies leads to subsequent growth in financial investments on new technologies with opening of new mediums for revenue generation and reducing subsequent market failures (Vives *et al.*, 2022). The alignment of finance with strategy leads to the allocation of capital resources and maintaining decision-making structures with technology upgradation within the European SMEs. For instance, Severfield Plc highlighted strategic alignment with financial decisions based on the adoption of BIM and further expansion in European markets along with a rising profit in the long-run for the steel SME in the manufacturing sector. The ROE and ROCE for the 3 SMEs showcase that the focus on profitability projects with asset utilisation leads to the recovering of investment yields with increased R&D spending and suggesting a strong fiscal position in the long-term. Hence, the role of financial management is an important strategic driver in improving the European SMEs within the manufacturing sector with sustained future growth.

### 6.2.3 Impact of technological adoption on the European manufacturing SMEs

The technological adoption within SMEs in the manufacturing sector leads to a determinant of competitiveness, productivity and a long-term survival in the evolving environment. According to Lintner (2023), the use of automation through implementation of AI leads to a significant reduction in human error with revolutionising creative decision-making and reduced operational costs within organisations. Contrarily, the manufacturing of SMEs with extensive use of technological advancements leads to increased productivity and reduced malfunctions at affordable prices for superior goods (Sabog, 2024). The use of modern technology leads to faster project delivery and increased consistency in driving operational gains for the European manufacturing SMEs. The automated polymer processing units of Ems-Chemie has led to delivery of highly-customisable materials with precision and opportunities for improved scalability significantly reducing the downtime in production process for the SME. Moreover, the adoption of digital transformation leads to reduced economic disparities with reshaping of business models for SMEs

and empowering of regional economic development in the long-term (Faruque *et al.*, 2024). For instance, Galapagos operating in the pharmaceutical market demonstrated that digital platforms tend to improve drug discovery and accelerate the clinical trials through target identification and streamlining of regulatory compliance. The technological adoption leads to achievement of profits with effective drug development and reduced failure rates of clinical trials for the European manufacturing SME. As Arroyabe *et al.* (2024) states SMEs adoption of the complex nature of technological innovations has led to enhancement of both internal organisational capabilities as well the external environmental factors resulting in improved future earnings. Thus, technological adoption leads to the maintaining of efficient cost structures for the European manufacturing SMEs with delivery of enhanced productivity in the long-run.

The technological adoption though a significant way of stimulating growth leads to the biases with the recognition of future trends within the evolving manufacturing industry. The technological biases embedded within system algorithms and strategic frameworks leads to the adoption and changing of innovative advancements for the organisations (Mariyappan *et al.*, 2024). On the other hand, Gupta *et al.* (2025) highlighted that the rapid infusion of digital technologies leads to complexity in financial management with focus on changing demons of automation platforms and process designs based on customer expectations. The over-reliance on capital-intensive solutions showcases a high-impact on operational improvements with process simplification for the employees. For instance, Severfield Plc with focus on BIM modelling led to financial burden and a lowering of both ROE and ROCE despite the improved technological environment. This demonstrated a bias towards high-tech solutions despite the cost-efficient alternatives of technological innovations for the manufacturing SMEs in Europe. Further, Mallik (2023) states that the evolution of technology within the manufacturing sector leads to automation of the process with a rise in profits as sales improve for the businesses within the economy. The technological changes from static to dynamic leads to a significant skill map for finance professionals and a significant difficulty within the evolving business environment of the European manufacturing sector. For instance, Ems-Chemie with excellent capital efficiency and innovation performance faced restricted access to digitalisation schemes and a technological bias reflecting manufacturing abilities for

the SME. The embracing of digital transformation is often influenced by network biases despite being an enabler of future innovative ecosystems for organisations. Hence, the impact of technological adoption on European manufacturing SMEs leads to operational efficiency with significant improvement in financial health in the long-term.

### *6.3 Summary*

The discussion chapter of the study leads to drawing of effective comparisons between the findings and the existing literature for European SMEs in the manufacturing sector. The financial and technological management leads to long-term value creation for shareholders with focus on innovation and resource productivity. Moreover, a balanced financial structure reflects the long-term benefits of digital transformation for SMEs with profits soaring high. The focus on internal funding for the selected SMEs across the manufacturing sector enables reduced debt risks and reinvestment in technological advancement leading to long-term sustainability. Therefore, technical and financial management within the European manufacturing SMEs leads to ensuring environmental responsibility and managing fiscal discipline in the long-term.

# 7. Conclusion and Recommendation

## *7.1 Summary of the research*

**Primary Question**

The findings of the study demonstrate that the integration of financial and technology management lead to competitiveness and sustainability within the European manufacturing SME. The case study analysis with Ems-Chemie focused on automated polymer processing leads to lower operational costs and making better decision-making within the contemporary business settings. The investments in digital transformation within the manufacturing firms leads to reduction in ROE and ROCE at an initial stage due to higher capital expenditure and longer payback periods. The SMEs, despite the lower return on capital, tend to improve process efficiency and product quality along with future increased revenue within the European sector along with long-term financial sustainability. Moreover, Severfield Plc with implementation of BIM leads to building of interrelationship between technology and finance with efficiency in utilisation of the digital capabilities within the complex regulatory environment. The lowered EBIT and building pf a strong cost leadership leads to efficiency in delivery time with increased profitability position within the European manufacturing sector. For instance, Galapagos NV with high-risk but strategic investments within the medical SME began with lowered returns but positioned the firm for future innovation. This demonstration over the time with technological advancements within the modern contemporary business settings improves process efficiency with strategic reinvestment capabilities in the dynamic European market. The financial management practices with liquidity and consistency in strategic transformation enables improved operational structure and increased transparency for the customers within the SMEs. Thus, the outcomes led to effective evaluation of the role of financial and technology management practices with significant influence on long-term sustainability and operational efficiency within the European manufacturing SMEs.

**Sub Question 1**

The financial management with every technological initiative within the contemporary business settings leads to building of strong investment prioritisation and increased internal funding mechanisms. For instance, Ems-Chemie with reinvestment of profits

without reduced reliance on external financing supports sustained innovation and lower WACC focusing on internal cash flows. The significant management of finance with efficient allocation for reinvestment and technological innovations leads to long-term strategic transformation within the European manufacturing sector. The findings focused on lowered ROE and ROCE with focus on internal funding lead to minimal debt risks for the manufacturing SMEs with strong financial security and maintenance of stable economic position within the dynamic market. Moreover, the use of financial metrics within the analysis leads to balancing of immediate liquidity concerns and long-term strategic investment in improving the supply chain disruptions and increased operational efficiency. The balanced capital structure of Severfield and lowered reliability on debt as a support from BIM integration leads to a significant improvement in financial management practices within the manufacturing SMEs in Europe. This alignment of the financial stability with technology upgradation leads to a rising profit and recovering of strong yields for the SMEs within the contemporary business settings. The pursuing of technology adoption within the manufacturing SMEs with focus on increased pace of clinical trials and modern polymer processing led to pursuing focus on development without comprising solvency position even during periods of initial earning volatility. The operational efficiency with reduced costs and lowered error time led to the opening of a new medium for revenue earnings within the SMEs in the modern business setting. Hence, financial management within SMEs operating in the European manufacturing sector leads to resource optimisation and serves as a lever driving innovation and structural transformation in the long-run.

**Sub Question 2**

The technological adoption within the European manufacturing sector has led to significant enhancement in operational agility, customer responsiveness and increased market adaptability. For instance, Ems-Chemie with the focus on advanced polymer technologies leads to increased production efficiency and client customisation contributing towards the strong market position. This focus on technological development within the SME led to improved productivity and a precision in manufacturing of customised materials with reshaping of business models. Moreover, Severfield Plc with digitisation of its operations and integration through BIM led to improved supply chain coordination with efficiency in real-time decision-making. This combined with the lowered ROE and ROCE led to building of strong cost-

effective alternatives for the steel SME in Europe and building of a skilled financial performance within the evolving business environment. The technological management within the European manufacturing sector leads to excellent capital efficiency and focus on building a strong financial stability with embracing of digital transformation within the SMEs. Moreover, the findings reflect an initial barrier at early stages of digital transformation with high initial costs and a limited skills gap within the SMEs. However, the enhanced innovation cycles and customer satisfaction in the long-run lead to lowering the impact of short-term difficulty and increased future earnings for the SMEs. Therefore, the adoption of new modern technologies within the European manufacturing SMEs leads to digital transformation and a strong competitive edge combined with financial planning in the long-run.

### *7.2 Recommendation for Future Research*

The current study provided critical insights on the influence of financial and technological management in operational efficiency and long-term sustainability within the European manufacturing SMEs. However, the opportunities for future research with focus on subjective and real-time perspectives of the key stakeholders such as financial managers and operational staff within the various SMEs will lead to providing a trail in technological investment patterns. The personal observations lead to disclosure of the obstacles faced with structured financial information in developing a technological background for the SMEs with limited external funding. Moreover, the increased sectoral scope with inclusion of other manufacturing firms such as textile, automotive and electronics leads to a diversified understanding in the nature of technological adoption and focus on business models that lead to financial stability within the European market. The larger sample size of SMEs with diverse geographical locations operating in the European manufacturing sector leads to stronger understanding of the impact of technological innovation with earnings driving the way forward. Thus, the future research with focus on primary interviews and a broader sampling size substantially enriches the understanding of financial and technological management in determining the evolving SME manufacturing landscape within Europe.

## Glossary

1. Technical Management refers to the systematic efforts presented in the deployment of a system or process with balancing of its costs and effectiveness.
2. Financial management tends to the practice of handing the finance of a company in accordance with the compliance regulations.
3. SMEs are companies that maintain revenue, assets or a number of employees below a certain threshold.
4. ROE refers to the measurement of financial performance of an organisation with focus on net income and shareholders' equity.
5. Technological adoption is the process of accepting, integrating and using new innovations within the society.
6. Sustainability is the focus on maintenance of a certain level with the ability of future generations towards economic growth.

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