



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Effects of Automation Processes on Ambidexterity

*A case study of the effects of automation processes on efficiency and innovation
within the IT department of a high-tech multinational enterprise*

Jasmine Rashdy

Graduate School

Master's Degree Project in Knowledge-Based Entrepreneurship

Graduate School, Institute of Innovation and Entrepreneurship
Course; GM1361 V22 Master Degree Project in Knowledge-based Entrepreneurship
Supervisor in GU; Viktor Ström, VT 2022
Supervisor in the Case Company: Martin C.

Abstract

More and more organisations are adopting automation business processes to facilitate work, be more efficient, and let workers do more value-creating and complex tasks. Being able to exploit (efficient) and explore (innovate) simultaneously is defined as ambidexterity and leads to successful organisations. However, the trade-off between exploitation and exploration is challenging to master. It is easy to prioritise and plan for one activity only, which many organisations do. Ambidexterity is not well introduced to organisations yet and is quite an unknown area for many. In addition, research about the effects of automation on ambidexterity is not well presented in the literature or within the case company. It is, therefore, an interesting area of research.

The following research aims to study the effects of automation processes on ambidexterity in the IT department of the case company. But also to investigate how to achieve ambidexterity through the adoption of automation processes. The research considers literature that includes ambidexterity, automation business processes and the effect of automation on efficiency or innovation. Moreover, primary data were collected through 14 interviews made with developers, experts and managers within the IT department of the case company. In addition, a thematic analysis was done where first- and second-order codes were identified, followed by three themes.

Finally, the study findings demonstrate the positive effects of automation on efficiency regarding resource release, savings, and quality enhancement. On the other hand, the organisations' lack of planning makes them less efficient. Further, no positive effects on innovation have been found. The negative impact on innovation consists of a lack of financial resources, resistance and organisational mindset, lack of transformation, and security and rigidity. Ultimately, the effect of automation results in negative effects on ambidexterity due to an imbalance because of a high focus on efficiency and non-prioritised exploration. Released time is being used to exploit and to be more efficient. In conclusion, managerial recommendations and a model have been proposed to make automation efforts result in a better balance of efficiency and innovation, i.e. ambidexterity.

Keywords: *Automation business process, exploitation, exploration, efficiency, innovation, ambidexterity*

Acknowledgements

I would like to express my appreciation to the case company for providing me with such an opportunity to collaborate. Furthermore, I would like to extend my sincere thanks to my supervisor Viktor Ström, for his guidance and continuous help throughout the thesis process. I would also like to thank my supervisor within the case company, Martin C., for his support and positive remarks. I express my sincere gratitude to all candidates who contributed to the interviews with valuable information.

Last but not least, I would like to thank my amazing family and my beloved husband for their unconditional support.

Table of contents

1. Introduction	5
1.1 Background	5
1.2 Problem discussion	6
1.3 Purpose and RQ	7
1.4 Case company description	8
1.5 Delimitations	9
1.7 Disposition	9
2. Literature Review	10
2.1 Ambidexterity - a paradoxical concept?	10
2.2 Automation of business processes	11
2.2.1 Effects of Automation on Efficiency	12
2.2.3 Effects of Automation on Innovation	14
2.4 Conclusion	16
3. Methodology	19
3.1 Research Strategy	19
3.2. Research Design	20
3.3. Research Method	21
3.3.1 Primary Data	21
3.3.1.1 Selection process and sample size	21
3.3.1.2 Interviews	22
3.3.2 Literature review and Secondary Data	24
3.4. Data Analysis	24
3.4.1 Coding process	25
3.5. Research Quality	25
3.5.1 Credibility	26
3.5.3 Conformability	26
3.5.4 Dependability	26
3.5 Ethical considerations	27
4. Empirical Findings	28

4.1 Positive effects of automation on efficiency	28
4.2 Negative effects of automation on efficiency	30
4.3 Negative effects of automation on innovation	30
5. Discussion	34
5.1 Efficiency as a result of automation	34
5.1.2 Effects that hinder efficiency	35
5.1.3 Obstacles to achieving innovation	35
5.2 What are the effects of automation on ambidexterity?	38
5.3 Recommendations to achieve ambidexterity through automation	39
6. Conclusion	43
6.1 Answering the research questions	44
6.2 Limitations and Future Research	45
References	46
Appendix	51
Appendix 1 - Thematic analysis	52
Appendix 2 questionnaire for contributing	54
Appendix 3 questionnaire for affected candidates	55

1. Introduction

The following chapter aims to briefly go through the background of digital transformation and automation concerning efficiency and innovation, followed by the problem formulation. Further, the purpose of the study and the research questions are addressed. Thereon, a brief description of the company is performed, followed by the delimitations of the study. Finally, the chapter ends with a disposition of the whole thesis with a descriptive model.

1.1 Background

“It is not the strongest of the species that survive, nor the most intelligent, but the one that is most responsive to change.” - Charles Darwin

In a world of rapid changes and the emergence of new technologies, organisations need to adapt to changing demands while at the same time exploiting their current activities to succeed (Reeves & Deimler, 2011). Therefore, organisations need to strive to restructure, adopt technologies, transform processes, and innovate to adapt. Such change and restructure is called digital transformation (Lindgren, Toll & Melin, 2021). A considerable part of the digital transformation process consists in adopting automation processes which appear to be a mechanism for development in organisations (O’Reilly & Tushman, 2007; Siderska, 2020).

Consequently, it will allow employees to stop doing repetitive work and instead focus on job activities that require more human cognitive skills where they can explore new opportunities for innovation (Makowski & Kajikawa, 2021). Hence, the organisation can increase efficiency while at the same time exploring new opportunities. Furthermore, both a short (current) - and long-term (future) perspective is required to explore future opportunities and exploit existing assets for quick and profitable outcomes. This approach is called ambidexterity, i.e. the ability to balance exploitation and exploration, which is a fundamental approach in digital transformation (Jöhnk, Ollig, Rövekamp & Oesterle, 2022; March, 1991). In the literature, exploitation has been related to efficiency, while exploration has been related to innovation; hence, often, these concepts are used interchangeably in research (March, 1991; Turner & Maylor, 2012). However, ambidexterity is a concept that many organisations

have not yet learned and digested, especially when it comes to incumbent firms (Gibson & Birkinshaw, 2004; Tushman, 2011).

Digital technologies and automation processes improve efficiency by reducing costs and time (Tabrizi, Girard & Irvin, 2019). There has been a constant dilemma in the literature due to the tradeoff between exploitation and exploration within organisations (March 1991). When organisations go through a transformation, sometimes they get stuck into a frame of enabling efficiency and freeing up resources, whereas the innovation can be forgotten (Magnusson et al., 2020). However, on the other hand, a balance of exploitation and exploration leads organisations to succeed in their business and, as aforementioned, makes them survive and quickly adapt to future changing demands (March 1991; O'Reilly & Tushman, 2007).

1.2 Problem discussion

According to Makowski and Kajikawa (2021), a considerable focus has been placed on automation processes within companies. Automation processes aim to enhance efficiency in terms of cost and time reduction. Further, these reductions can lead to releasing resources where employees have the chance to find new opportunities and create innovation. Thus, organisations need both efficiency and innovation to be successful. In other words, the organisation needs to master both exploitation to be efficient and exploration to find opportunities and innovate to achieve ambidexterity (Gibson & Birkinshaw, 2004). However, it is common that organisations only focus on being efficient and innovation remains forgotten (Magnusson, Koutsikouri, & Päivärinta, 2020).

Furthermore, there has been considerable research on the effects of automation on efficiency (e.g., Jovanović et al., 2018; Thomas, Davenport & David Brain, 2018) and recently on the effects of automation on innovation (e.g., Azani & Khorramshahgol, 1991; Satchell, 2020; Satell, 2017). Nevertheless, there is still a lack of research addressing the concept of automation in relation to ambidexterity according to Figure 1. A search was done on automation and ambidexterity with no results. Therefore, the researcher did a search on broader keywords such as automation and efficiency, automation and innovation, and ambidexterity with a time scope between 1980 and 2022 (see Figure 1). The number of articles on automation and efficiency has increased exponentially since the beginning of the early 20s. On the other hand, research about ambidexterity is relatively low and started late

compared to the other two, even though it is a fundamental approach when it comes to digital transformation. The following research aims to fill the current gap within the literature and clarify the existing dilemma. Thereby, a research on the effects of automation on ambidexterity will be accomplished.

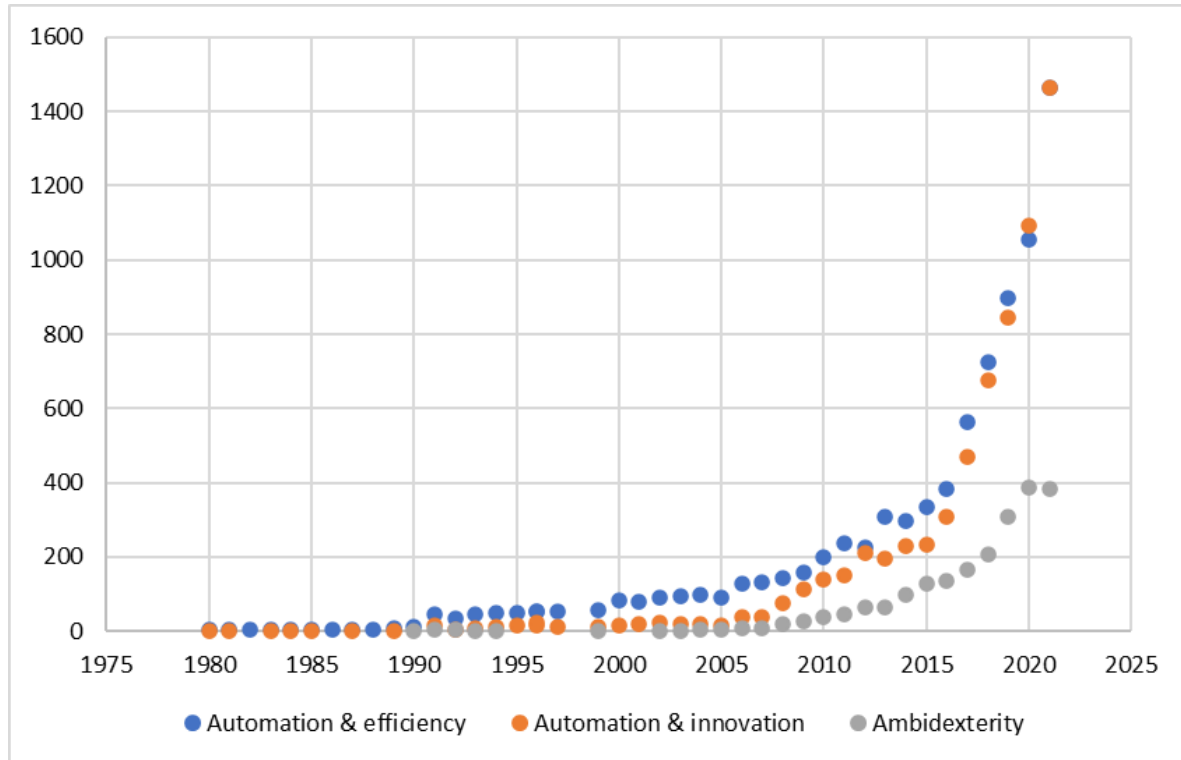


Figure 1: Academic articles and research done each year (1980-2022), search terms: “Automation and efficiency”, “Automation and innovation”, and “Ambidexterity”, performed on the search engine Web of science.

1.3 Purpose and RQ

The following thesis aims to contribute with research regarding what effects automation has on ambidexterity which has been identified according to March (1991) as exploitation (related to efficiency) and exploration (related to innovation). As discussed earlier, there is a lack of research within the area of automation in relation to ambidexterity (Figure 1). In addition, some researchers claim that both efficiency and innovation can be achieved through automation (e.g., Makowski & Kajikawa, 2021), while some researchers argue that a high focus on efficiency might hinder innovation (e.g., Magnusson, 2020). Hence, research on the effects of automation processes within an organisation on ambidexterity will be examined.

Moreover, the following thesis will also provide the case company with recommendations to help them achieve ambidexterity through automation.

Research Questions;

1. *What are the effects of automation on ambidexterity in the IT department of a high-tech multinational enterprise?*

To ease the analysis and interpretations, the main research question has been divided into two sub-research questions, which are the following:

- 1.1 *What are the effects of automation on efficiency?*
- 1.2 *What are the effects of automation on innovation?*
2. *How to achieve ambidexterity through automation processes?*

1.4 Case company description

Initially, for privacy reasons, the company's name will stay anonymous and will be referred to as “the case company” throughout the thesis. The case company is a large high-tech multinational enterprise founded in 1940 in Sweden. Approximately 17 000 employees are working within the organisation in over 30 countries. The company is constantly developing new technologies to meet changing demands because they serve a global market of governments and corporations with products, services and solutions. According to the company, an essential part of its organisational strategy is to build strong collaborations and relationships to create opportunities and fulfil the required needs. Cyber security is also a central part of the company, both in their way of working and the products they develop. The research focuses on the IT department, as it is the main constituent of the organisation that has the role of serving different business areas. Furthermore, the IT department leads multiple initiatives to increase the whole organisation's efficiency by streamlining processes, reducing costs, and communicating digital and automated solutions to the different units of the organisation. Therefore, the IT department has the role of exploiting current knowledge to increase efficiency and, at the same time, explore new technologies and skills to adapt to rapid changes and introduce new solutions.

The organisation is currently working on filling digital gaps by automating manual tasks. This is done by digitalising processes, which can be automated instead of manually executed.

Some of the automation adoption initiatives within the department are a digital signature, virtual agents (chat robots), and digital robots, such as robotic process automation (RPA), that handle password reset and partially financial work concerning invoices etc.

They have limited access to advanced technology such as artificial intelligence. However, the organisation takes slow but steady steps when introducing advanced technology widely to the organisation, and it will increase when the degree of maturity rises. The company wants to digitalise as many processes as possible so that the current automation state can evolve and span new processes that could be automated.

1.5 Delimitations

The research aims to be a single case study focused on the IT department within a high-tech multinational enterprise in Sweden. Since the area of automation is broad, the scope of the research will only discuss and include automation business processes. Further, the company is in its initial phase of digital transformation and automation. Therefore, the organisation's maturity level regarding digitalisation is still relatively low. Additionally, the interviewees have been selected based on their knowledge, expertise or involvement within automation processes and digital transformation.

1.7 Disposition

The following research study will first address a literature review consisting of several subchapters that discuss ambidexterity, automation, the effects of automation on efficiency, and the effects of automation on innovation. Additionally, the research methodology will be presented, followed by data analysis of the interviews, a discussion of quality approaches, and ethical considerations. Lastly, the findings will be presented, followed by a discussion. Finally, the research ends with a conclusion of the research study. See the disposition in Figure 2 below.



Figure 2: Disposition of the research study

2. Literature Review

The following chapter aims to address the literature review. The chapter begins with a description of the concept of ambidexterity and automation processes. Further, research regarding the effects of automation on efficiency and the effects of automation on innovation will be presented. Finally, the chapter ends with a conclusion of the literature review, followed by a table that summarises the literature findings.

2.1 Ambidexterity - a paradoxical concept?

Ambidexterity is the art of balancing exploitation to be efficient and exploration to find new opportunities and learning activities to be innovative (Benner & Tushman, 2003; March, 1991; O'Reilly & Tushman, 2013). Magnusson et al. (2020) claim that successful ambidextrous organisations exploit existing resources and opportunities to achieve efficiency while at the same time exploring new opportunities to achieve innovation. Focusing only on exploitation improves existing activities, whilst organisations need to explore to be innovative (Magnusson et al., 2020; Taródy, 2016).

Mastering exploitation and exploration simultaneously is challenging for many organisations, and getting stuck in the current routines and structures can sometimes be hard to avoid. Dynamic (flexible and adaptive) organisations have a higher probability of achieving ambidexterity (Alos-Simo et al., 2020; Stettner & Lavie, 2014). March (2003) states that organisations that cannot master both elements simultaneously will find it hard to succeed and innovate and will gradually find it challenging to grow if they do not start to have a short-and long-term mindset. Companies need to have the ability to recombine and reconfigure assets and organisational structures to be able to succeed and adapt, which is defined as dynamic capabilities. Teece et al. (1997) argue that the dynamic capabilities approach focuses on the external and internal organisational perspective by adapting to changing external events and reconstructing the layout of resources. Cyfert et al. (2021) discuss a dynamic capabilities model consisting of five primary activities: *exploring opportunities, knowledge management and learning, coordination, configuration and reconfiguration, and organisational adaptation.*

O'Reilly and Tushman. (2007) claim that assumptions have always been that a sacrifice needs to be made where the organisation has to choose between efficiency (exploitation) or innovation (exploration). It can be compared to the analogy of the trade-off between cost or quality. O'Reilly and Tushman. (2007) stress that in order to overcome such challenges, a clear leadership is required. Alghamdi (2018) discusses two styles of leadership, closing and opening leadership. Opening leadership encourages innovation and exploration while closing leadership sets specific goals and guidelines for exploiting activities. An ambidextrous leader has a combination of closing- and opening leadership. In addition, O'Reilly and Tushman (2007) assert that a shared vision needs to be established, followed by goals and strategic management to manage such trade-offs.

Furthermore, the organisational context was presented as a way to achieve organisational ambidexterity, so-called contextual ambidexterity. The approach advocates for letting employees master exploitation and exploration simultaneously (Lô & Fatien Diochon, 2020). The balance of these two activities (exploitation and exploration) arises when an adequate level of performance management (through discipline and stretch) and social context (through trust and support) is achieved. Performance management demonstrates how the organisation encourages the employees to seek more value-creating goals. Whereas social context refers to the employees creating common value-creating goals to support each other within the organisation. Hence, a communicative environment needs to be established for challenges, vision, goals and expectations, followed by a safe environment for risk-taking and flexibility to enable new approaches (Gibson & Birkinshaw, 2004; Marri, Ali & Sin, 2020).

2.2 Automation of business processes

Bataev and Davydov (2020) state that automation of business processes, such as applications within a business process or technical facility, control systems etc., can liberate a worker from direct involvement in a process. Business automation is related to the management and control of productive activities. One of the many outcomes that automation processes provide is increasing business efficiency by using computers and software. Automation also improves quality, labour efficiency and human working conditions. Cummins (2016) discusses several advantages that a business could obtain through business process automation, such as reliability and control. The automation process can define what and how a task can be done

while, on the other hand decreasing risks by better controllability. Further, users and actors can be engaged in exploiting advanced technology by working with automation processes. The optimisation is another benefit of automation processes where repeatable tasks can be measured.

There is also a cutting-edge concept called robotic process automation (RPA) related to automating business processes. RPA is based on software bots or artificial intelligence robots (Siderska, 2020). Eikebrokk and Olsen (2019) define RPA as “*A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management*” (p. 2). RPA focuses on automating rule-based, repetitive human tasks and is relatively new to many organisations (Ivančić, Vugec & Vuksic, 2019).

2.2.1 Effects of Automation on Efficiency

The concept of efficiency has been defined differently in literature and research. For example, Kumar Gupta et al. (2020) identified efficiency as accomplishing work without wasting time and being cost- and time-efficient. It is essential to distinguish between efficiency and effectiveness, where effectiveness encompasses the impact of the outcome or result. On the other hand, efficiency refers to the whole process, including productivity, delivery, quality, responsibility, and increasing capability and skills. Both concepts lead to enhanced organisational performance.

However, Mouzas (2006) states that efficiency is not a measure of success but rather productivity and is often related to cost, time reduction and improving operational edge. Magnusson et al. (2020) identify the concept of efficiency as “*a focus on incremental improvements in existing services and processes, building upon existing technologies*” (p.1).

When the organisational focus relies on efficiency, activities are being exploited. Further, Roger and Martin (2019) assert that organisations and managers are constantly striving to be efficient by eliminating waste of time, cost and resources. Resource release can be achieved by technologies such as adopting automation processes. Thomas et al. (2018) claim that the main reason for adopting automation processes within organisations is to enable efficiency, productivity and achieve savings. Khalid, Hunjra and Sirohey (2012) stress that the impacts

of automation processes also lead to organisational efficiency by decreasing repetitive and redundant work. The authors studied the impact of automation processes on employees' efficiency and found that reduced redundant processes have positively impacted employees and the overall organisation. Khalid et al. (2021) discuss four significant factors that affect the employees' efficiency level, *understanding of the new system*, *response to change*, *adaptation to new technology*, and *conformity to standards*. If the employee accepts the change, the organisation is more likely to achieve efficiency, while resistance might lead to the opposite effect. Azani and Khorramshahgol (1991) assert that resistance comes as a reaction based on fear of change and job loss. Cooperation reduces conflicts due to increased awareness and understanding, leading to short-term efficiency.

Additionally, Kheir (2018) claims that adopting automation in business processes encourages better resource allocation since employees can manage less repetitive tasks and more value-creating activities, which can lead to organisational progress. Automation processes also come with other benefits. Yuvaraja (2018) presents several benefits that software bots or robots offer. One of them is the accuracy of business operations. Robots can handle any repetitive process based on how it is programmed and rule-based at a much higher speed than a human can. Furthermore, robots provide reliability with much more detailed logs, making it easier for employees or users to oversee the systems and processes efficiently and productively (Varghese, 2017; Yuvaraja, 2018). However, since change comes so fast, sometimes it exceeds the human ability to accept such change. Hence, if the organisation is not well prepared and aware of such change, efficiency might decrease or not be fully achieved (Azani & Khorramshahgol, 1991).

Since the growth of automation, a dilemma has arisen about whether robots will take over human labour or contribute to the generation of new jobs. According to Estlund's (2018) study, automation comes as a cheaper alternative, providing work with fewer risks and can therefore become a substitute for human workers. However, automation has already contributed to an increased inequality where robots have replaced workers. The problem is not only the lost jobs caused by automation, as Autor (2015) states, but that adoption of automation may prevent the creation of new jobs, especially for workers that are classified as semi- and unskilled. An example mentioned in the article was the Luddite movement in the early 19th century. Automation of textile production increased but was not appreciated by the textile artisans. Therefore they resisted by destroying some of the machines. A study by Lima

et al. (2021) discussing the impact of automation on employees showed that the higher the employees' education level, the less the automation affected them negatively. Employees with lower-skilled or low education levels had a higher probability of being replaced by automation processes (Jadhav & Gawande, 2020; Lima et al., 2021).

Nunes (2021) claims that automation transforms jobs; approximately 12 million more jobs will be created or transformed through technology by 2025. Thereby, a lack of proper reallocation followed by the correct skill set and capabilities leads to challenging outcomes in coping with changes. Eventually, it will also lead to lost opportunities and inefficiency. Eikebrokk and Olsen (2019) studied the effects of automation processes on workers within the public and private sectors. The result showed that the adoption of automation processes often led to layoffs and a decreased demand for workers and consultants. Moreover, the research also demonstrated that the adoption of automation processes is driven by cost reduction through reduced employment. In other words, automation aims to replace employees by doing their work which is a more efficient and cheaper alternative for the organisations. Finally, Satell (2017) claims that many knowledge workers have lost their jobs due to automation, and more jobs will be eliminated while many future jobs have not been created yet.

2.2.3 Effects of Automation on Innovation

Analogous to the concept of efficiency, literature has also defined innovation in different ways. For example, Taylor (2017) defines innovation as the process of something novel, having new ideas or improving ways of doing things. Magnusson et al. (2020) explain innovation as radical initiatives and processes, including the development of new organisational competencies, skills and knowledge bases. Further, Magnusson et al. (2020) explain that innovation is created through exploration and searching for new opportunities for value creation. On the occasion of rapid business environmental changes, organisations need to continually seek to increase their ability to be adaptable, flexible and efficient. Hence, continuous innovation of technologies, behaviours and processes is required.

Obeidat, Alamayreh and Sweis (2019) reveal that automation has beneficial outcomes, improves internal business processes, develops new ways of working, and enhances performance. Makowski and Kajikawa (2021) indicate that automation processes are essential for innovation creation. Automation processes enable change in business processes

which leads to innovation tools. Through the adoption of automation processes, the organisation, as earlier mentioned, can achieve cost and time reductions, optimise processes and increase productivity. Consequently, it comes with a strategic change and pushes the organisation to restructure. As a result, organisations can find new paths and opportunities for strategic innovation.

Greve, Henrich, Taylor and Alva (2000) argue that automation affects and changes human cognitive ability. Makowski and Kajikawa (2021) discuss the multi-scale impact of automation on two levels. The first level is the cognitive micro-level, which refers to the fact that automation releases resources, leading to reduced time and creating possibilities for new paths to innovate for actors within the organisation. Consequently, it can enhance creative problem-solving, management innovation, and the organisational actors' activities. The second level is the organisational and societal macro-level, which refers to a transition in organisational routines which can be challenging if the organisation is unaware of it. Therefore, organisations must redefine and restructure to create value for strategic innovation by using their macro capabilities and strategic management innovation.

However, as earlier mentioned, semi- and unskilled employees will find it challenging to face changes due to the adoption of automation processes (Autor, 2015). On the other hand, Varghese (2017) stresses that 44, 4% of the software workers are unprepared for the change. Hence, the organisation needs to prepare for a reskilling and relearning process. Richter and Sinha (2020) state that organisations need to encourage the use of current technology and new technology, have a long-term plan, and include reskilling and learning to provide employees with proper support and training.

Tyagarjan (2019) says that to avoid employees becoming robots, managers will need to prepare and be better about “walking the walk” concerning reskilling and redistributing employees and will have to change roles. Managers have to invest in educational and reskill initiatives to make employees explore their skills further. The focus is mainly on having hard-tech skills. However, if a reskilling process or initiative is not considered, automation will harm innovation since employees will be confused and clueless, which will hinder the improvements and innovation efforts.

Thomas. et al. (2018) state that since automation processes only support the so-called "as-is", no improvements can be implemented. Magnusson et al. (2020) argue that inefficient

organisations are the most innovative since innovation is related to high risk, uncertainty, and exploration. Based on that logic, automating with the focus on being efficient leads to a lack of innovation due to the rigidity it creates. Thomas et al. (2018) claim that since many organisations focus on being efficient, they lose opportunities that could have led to improvements in business processes. The challenge for many organisations is not adopting automation processes to reduce cost and time per se but to identify the next big area of value creation. But also to identify how to use technology to restructure and increase workers' skills and competencies to create innovation. A common trap that organisations fall into is focusing only on efficiency. Satell (2017) asserts that focusing on efficiency as cost and time reduction will lead to a loss.

2.4 Conclusion

In summary, ambidexterity is defined as exploiting and exploring simultaneously. Exploiting refers to utilising existing resources to be efficient, and exploring refers to searching for new opportunities for value creation to be innovative (Magnusson, 2021; March, 1991). The trade-off between exploitation and exploration is challenging to master and requires a short- and long term mindset to recognise current activities to exploit and explore new opportunities and possible paths (Alos-Simo et al., 2020; Tarody, 2016). Further, contextual ambidexterity has been discussed, which refers to exploiting and exploring, and the interaction of performance management and social context within the organisation (Lô & Fatien Diochon, 2020). Employees need to know how to switch between the two activities, encourage shared goals, and support each other. The organisation has to act as a facilitator for such an environment (Gibson & Birkinshaw, 2004; Marri et al., 2020).

Further, automation business processes aim to facilitate and reduce repetitive work, thereby enhancing efficiency and increasing quality and accuracy. Studies have shown both negative and positive impacts of automation on efficiency and innovation. Efficiency has been identified in different ways. The core definition is the ability to “exploit existing resources efficiently” within the organisation and eliminate the waste of resources (Kumar Gupata et al., 2020; Magnusson et al., 2020). Efficiency through cost and time reduction seems to be a goal for many organisations when automating processes by releasing resources (Roger & Martin, 2019; Thomas et al., 2018).

Further, the adoption of automation processes also leads to higher accuracy since robots make fewer mistakes than humans (Yuvaraja, 2018). On the other hand, adopting automation processes might positively impact efficiency on an organisational level but lead to unfair conditions on an employee level. Automation leads to job loss, especially for semi-and unskilled employees, since their jobs are automated, leading to more efficiency for organisations (Autor, 2015; Estlund, 2018; Jadhav & Gawande, 2020; Lima et al., 2021). However, lack of understanding, planning and awareness leads to resistance to change and restructuring. Thus, efficiency cannot be fully exploited, which leads to lost opportunities (Azani, 2019; Khalid, 2012).

In addition, organisations also seek opportunities to grow and achieve innovation, be more flexible and adapt to changing demands, which requires exploration for improvements (Obeidat et al., 2019). Innovation is identified as an iterative, ongoing process of exploration for new value creation or improving ways of doing things where the development of new organisational skills and knowledge bases are essential (Magnusson et al., 2020; Taylor, 2017; Tidd & Bessant, 2011). Research has shown that the adoption of automation processes leads to internal business process improvement and develops new ways of working, leading to innovative tools. Automation comes with a strategic change and pushes organisations to restructure and find new paths and opportunities (Makowski, 2021; Obeidat, 2019).

Two impacts of automation have been found: the cognitive micro level, which refers to the released time that makes it possible for workers to innovate and explore opportunities (Makowski, 2021). In addition, it requires planning for reskilling and restructuring employees to improve their cognitive abilities (Autor, 2015). The second impact is organisational macro-level, and it refers to the organisational restructure and transition, which requires awareness and a willingness to change (Makowski & Kajikawa, 2021). However, many organisations focus on efficiency, which leads to rigidity and no innovation since automation only supports the “as is” without further improvements. In addition, efficiency can be seen as the opposite of innovation since it is characterised as risk-averse and short-term focused (Magnusson et al., 2021; Satell, 2017; Thomas et al., 2018). Table 1 below summarises the literature review, the effects of automation on efficiency and innovation that are highlighted in each article, the effect level, and key findings.

Table 1: Summary of the literature review

Topic	Effect	Level of effect	References	Key findings
Resource release, productivity	Efficiency	Employee/ Organisational	(Roger & Martin, 2019; Thomas, 2018)	<i>Positive impact on efficiency</i>
Resistance due to lack of understanding/ awareness, response to change, adoption	Efficiency	Employee/ Organisational	(Azani, 2019; Khalid, 2012)	<i>Negative impact on efficiency:</i> When the following aspects are lacking.
Job loss for semi-unskilled employees	Efficiency	Employee/ Organisational	(Autor, 2015; Etlund; 2018; Jadhav & Gawande, 2020; Lima et al., 2021)	<i>Positive impact on efficiency:</i> On an organisational level, whilst it can have a negative impact on the employee level
Improvement of accuracy	Efficiency	Employee/ Organisational	(Yuvaraja, 2018)	<i>Positive impact on efficiency:</i> No need to correct mistakes
Increased human cognitive ability	Efficiency/ Innovation	Employee	(Greve et al., 2000; Makowski & Kajikawa, 2021)	<i>Positive impact on efficiency and innovation:</i> Humans can focus on more value-creating tasks
Change in business processes and structures	Innovation	Organisational	(Makowski & Kajikawa, 2021; Obeidat, 2019)	<i>Positive impact on innovation:</i> Can lead to innovation tools, new paths and opportunities
Reskilling, relearning and restructure	Innovation	Employee/ Organisational	(Autor, 2015; Tyagarjan, 2019)	<i>Positive impact on innovation;</i> planning, long-term mindset, improvements for employees becomes
Core focus on efficiency, lack of exploration	Innovation	Organisational	(Magnusson et.al, 2020; O'Reilly and Tushman, 2007; Satell (2017; Thomas et al, 2018)	<i>Negative impact on innovation;</i> Efficiency is considered as the opposite of innovation, and robots only support the “as-is”.

3. Methodology

In the following chapter, the research strategy, design and methods will be presented, followed by an illustration of the research design. Further, the data analysis will be addressed, including a thematic analysis and a table presenting a list of the interviewed candidates. Finally, a discussion of research quality and ethics will be conducted.

3.1 Research Strategy

A qualitative approach has been applied due to the purpose of the research. The research questions aim to answer what effects automation has on ambidexterity and how to achieve ambidexterity through automation. Since the qualitative approach aims to answer questions about *why*, *how* and *what*, the following approach is suitable for the study, but also because no numerical data is required. The approach also enables the collection of individuals' interpretations, attitudes, and in-depth insights and encourages discussion, which is needed to answer the research questions. On the other hand, the quantitative approach relies on collecting numerical data in a larger sample through surveys, for example, with mainly close-ended questions and is therefore not suitable for the research. In addition, semi-structured interviews have been conducted in conjunction with follow-up questions if needed to collect primary data. Such an approach also enables the interviewees to answer freely, whereas the interviewer also can ask follow-up questions to get more insights (Bell, Bryman & Harley, 2018).

Further an abductive reasoning has been applied. The abductive reasoning suits the following research due to the nature of the research question, which requires an iterative process. The deductive and inductive approaches are not suitable for the research study because the deductive approach aims to test a theory by developing hypotheses, while inductive reasoning includes observations where the goal is to find patterns to theorise (Bell et al., 2018). Since there is an incomplete set of observations and no existing theory, the deductive and inductive approaches are not suitable for the following study. According to Bell et al. (2018), the abductive approach is an iterative process, as illustrated in Figure 3, that allows the researcher to develop an understanding and the best explanations during the research process. Abductive

reasoning aims to be something between the inductive and deductive approaches to overcome their limits. Figure 3 illustrates the research phases that have been adopted throughout the whole study. Firstly, the area of interest, the problem formulation, and the research questions have been identified in collaboration with the company supervisor and by the consultation of the literature. Furthermore, an iterative approach has been applied to go back and forth between the collected primary data and the literature in order to build a better and more comprehensive analysis. Finally, conclusions that summarise and highlight the fruit of this work have been derived.

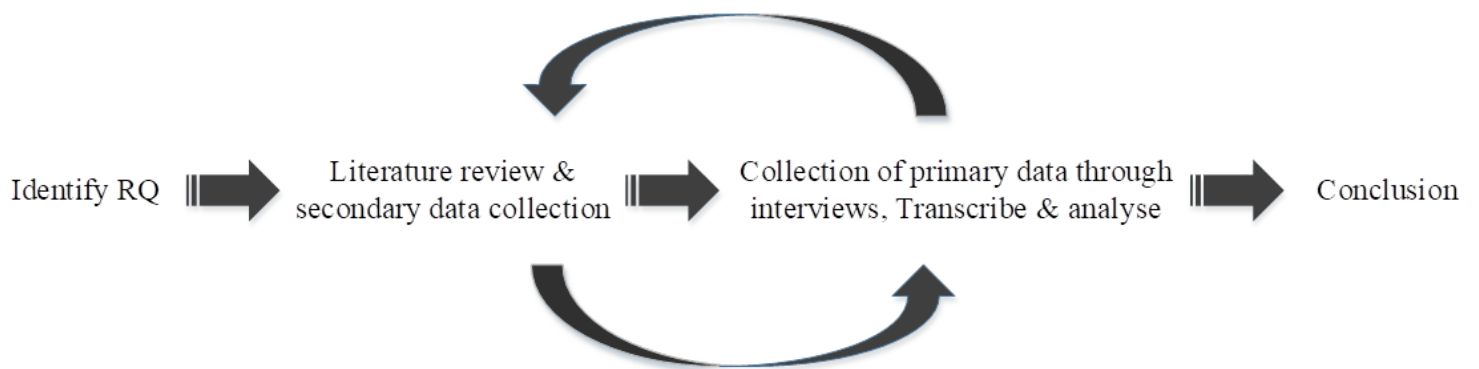


Figure 3: Overview of the iterative research strategy of the study

3.2. Research Design.

A single case study approach was considered to be the most appropriate approach for the following research. A case study aims to be a study on a single organisation with a focus on a group of relevant workers within the organisation (Bell et al., 2018). The research design is identified by Bell et al. (2018) as a framework that should be assessed when collecting and analysing data. Berg (2009) explains that case studies can contribute to a deep understanding of a specific phenomenon, people, behaviours and organisations. Since the research questions are very specific, doing a single case study contributes to a deeper and more specific understanding. Collis and Hussey (2009) claim that such research aims to understand a specific phenomenon within a certain context. The research aims to identify what effects automation has on ambidexterity and how to achieve ambidexterity through automation.

Collis and Hussey (2009) present steps to follow in a case study, starting with selecting a case company. A case company has been selected, and the research area has been identified. As

earlier mentioned, the case company is in their initial phase of digital transformation with a significant focus on automation. Automation has been mentioned in the context of efficiency and innovation in the literature and the case company. Therefore it was interesting to investigate the effects of automation on ambidexterity. Further, the researcher got familiar with the context of the research.

3.3. Research Method

The following section aims to explain the techniques for collecting and analysing the data. Primary data collection has been done through interviews. Literature has been collected through articles and books to get an understanding of what is already known, as Bell et al. (2018) indicate. Since the existing literature is incomplete, there is a gap which the following research study aims to fulfil. Further, secondary data have been collected through articles, statistics and other information sources from the case company as complimentary.

3.3.1 Primary Data

The primary data collection process was made, as earlier mentioned, through semi-structured interviews using an interview guide with follow-up questions when needed. Interviews were conducted with managers, experts and developers, see Table 2. Bell et al. (2018) state that the semi-structured interview approach enables the researcher to focus on the research interest. It also enables the researcher to ask follow-up questions if needed. According to Bell et al. (2018), qualitative interviews focus on the interviewees' attributes, attitudes, perceptions, and behaviours.

3.3.1.1 Selection process and sample size

A purposive sampling was considered when selecting candidates to interview. Bell et al. (2018) claim that in the following approach, the researcher strategically selects the candidates based on what the research asks for and the knowledge needed to answer the research question. As earlier mentioned, the researcher made a field investigation based on individuals provided by the case company supervisor and had a pre-meeting with them to ensure that they had the right attributes and the required knowledge.

All the candidates were working in the IT department of the case company. Two categories were identified; the first category involved people who have contributed or are contributing to automation process adoption. The second category involved candidates who are or have been affected in their daily work by automation processes. In the first category (contributing or having contributed to automation processes) of candidates, a requirement was to interview candidates with expertise within the area and some knowledge about the organisation. Candidates with such profiles can also contribute with historical versus current effects, thoughts, or intentions. Since employees contributing to automation processes might not have an overview of the organisation, the researcher also interviewed managers. Three managers working with automation and digitalisation in one way or another were interviewed. In the second category (affected employees), the candidates had to be affected by automation in their daily work. Some of the candidates were both affected and had contributed to automation processes which gave two points of view.

In total, 14 candidates were interviewed; three managers and the rest were either contributing to automation, affected by automation, or both in their daily work. Further, theoretical saturation was achieved, which means that 14 candidates were enough since no new information was identified. But also due to the fact that enough data were collected to answer the research questions. Interview questions asked to the contributing candidates were designed to answer questions on an organisational level and their intentions (Appendix 2). Questions designed for affected candidates were aimed to answer their perceptions, intentions and current state concerning automation processes (Appendix 3) (Bell et al., 2018; Collis & Hussey, 2009).

3.3.1.2 Interviews

All the interviews took place during the first two weeks of April, and each interview took approximately 30 minutes to one hour to perform. About 1-3 candidates were interviewed every day. The interviews were held through Skype (Table 2) because all candidates were not located in the same geographical place. Bell et al. (2018) stress that Skype interviews are more flexible because they can be rescheduled much easier than a face-to-face interview. The researcher sent out needed information to all the candidates regarding the interviews, including background on the research, suggested time and date, and privacy considerations such as anonymity and video recordings. Further, the interview questions were not sent out in

advance; instead, the researcher asked the candidates to reply to the meeting invitation for the interview if they wanted the questions in advance. Approximately three candidates wanted to see the questions in advance to be prepared. In general, all interviews contained follow up questions based on the candidate's answers.

As earlier mentioned, the contributing candidates were system developers and RPA developers working with automation and digitalisation and were aware of confidential-related information. Some candidates had distinguishable positions in the IT department and wanted to remain anonymous. Hence, the researcher referred to the candidates by letters instead of their names. Furthermore, the researcher has instead used general descriptions of the candidate's role or expertise, e.g. manager, expert, and developer, which is presented in Table 2 below.

Table 2: List of interviewed candidates

Quantity	Category	Name	Channel	Length of interview
1	Developer	Candidate A	Skype	50 minutes
2	Developer	Candidate B	Skype	50 minutes
3	Developer	Candidate C	Skype	60 minutes
4	Developer	Candidate D	Skype	60 minutes
5	Developer	Candidate E	Skype	30 minutes
6	Developer	Candidate F	Skype	60 minutes
7	Expert/Manager	Candidate G	Skype	60 minutes
8	Expert/Manager	Candidate H	Skype	60 minutes
9	Expert/Manager	Candidate I	Skype	60 Minutes
10	Expert	Candidate J	Skype	60 minutes
11	ServiceManager	Candidate K	Skype	40 minutes
13	Developer	Candidate L	Skype	40 minutes
14	Developer	Candidate M	Skype	60 minutes

3.3.2 Literature review and Secondary Data

The collection process of scientific articles has been an iterative process where the researcher has collected data through articles and books during the whole research process. Literature was collected through specific databases such as GUPEA, Interscience online, Google Scholar and Web of Science. To find relevant articles, books and other data, the researcher used keywords such as; automation and innovation, automation and efficiency, automation and ambidexterity, and ambidexterity. According to Bell et al. (2018), searching on keywords helps the researcher limit the literature collection process and find relevant literature for the research. The articles and papers had to be peer-reviewed to ensure quality.

Secondary data have been collected through the intranet and other sources of the case company. Such data have been used to describe the company and its activities and gather information about other relevant knowledge and information needed for the research. The researcher carefully selected relevant data from the case company without using sensitive information due to the company's high degree of confidentiality and security. Hence some information such as statistics and in-depth details about the case company has not been presented directly but has been addressed as a citation by an interviewee instead.

3.4. Data Analysis

Bell et al. (2018) assert that recording interviews allow the researcher to go back and listen to the interviews, easier cite exactly what the interviewees have said, and recognise repeated patterns to further code and analyse the data more efficiently. To analyse the collected data through the recordings, the researcher transcribed the data using Office 365. The researcher found it hard to identify all words and sentences in the recordings by only using the transcription service. Therefore, the researcher repeated all transcriptions while listening to all the recordings another time for confirmation. The transcription took place continuously after each interview to see what results the researcher received and whether questions could be added or removed for the next interview. But also to compare answers and identify similarities and differences in an early stage of the interview process.

3.4.1 Coding process

A thematic approach has been applied to analyse collected data through the interviews. Bell et al. (2018) explain the thematic analysis as a process of transcription of interviews followed by coding each transcript and finally identifying concurrent themes. Further, the transcriptions were analysed manually where repetitions, transitions, similarities and differences were considered, as addressed by Bell et al. (2018). The interviews have been coded by identifying relevant citations by the interviewees, similarities, differences, and transitions. The coding process has also been compared to the collected literature to identify similarities and differences in the analysis part. Moreover, not all the answers have been translated into codes due to their irrelevance. The theoretical structure has been applied as first and second-order codes and themes.

The first step was to identify relevant first-order codes by colouring specific sentences or words said by the candidates. Statements were coloured in specific colours based on the content and context of the statement. Then, the first order codes were expanded into second-order codes by combining statements in the same colour in a category. Finally, the codes were divided into three themes, positive effects on efficiency, negative effects on efficiency, and negative effects on innovation. See the thematic framework in the appendix (Appendix 1). Since the collected data is a large amount of data, there is a risk of losing important data. Therefore the researcher took notes during the interviews, which made it easier to recognise patterns later when coding the data. The researcher also asked follow-up questions to collect more detailed information and for clarifications if needed to ensure a correct understanding of the interviewees' intentions (Bell et al., 2018).

3.5. Research Quality

When evaluating the quality of qualitative research, there are essential criteria that need to be addressed. Usually, quality criteria for research are reliability and validity, but researchers have questioned these criteria because they aim to address the quality of quantitative research. Riggs (2015) claims that other similar factors can be used instead; credibility, conformability, and dependability.

3.5.1 Credibility

Credibility refers to the trustworthiness of the research and the confidence of the collected data. The following criteria can be compared to validity, which is used to evaluate quantitative research (Bell et al., 2018). Data triangulation has been used to increase credibility. It refers to using more than one method of data and multiple references to develop an extensive understanding of the objectives or phenomena (Guion et al., 2011). As earlier mentioned, data have been collected through articles, books, internal sources within the company and interviews. Candidates have been identified and categorised at an early stage through pre-interview discussions. Thereby, actual interviews were conducted in-depth to gain insights. The researcher also works within the case company, which makes it easier to find resources and sources through the case company supervisor. Since data were collected from several sources, it increases the study's validity.

3.5.3 Conformability

The following criterion evaluates trustworthiness and refers to the objectivity of the research, not the researcher's perceptions (Bell et al., 2018). The interviews have been transcribed to choose appropriate statements said by the interviewed candidates and compare them to collected literature that has been considered in the study. The researcher also asked "follow-up" questions when answers were unclear or needed more information. Furthermore, the researcher was careful to ask the questions objectively without contributing with own opinions in order to reduce bias as much as possible. The researcher did not have expectations or complete conclusions about the outcomes, which helped further the researcher remain neutral in the whole data collection process.

3.5.4 Dependability

Another criterion is dependability, which corresponds to reliability in quantitative research. Dependability refers to keeping data, problem formulation and records through the research process to ensure trustworthiness (Bell et al., 2018). During the whole research process, recorded interviews have been kept and transcribed in a document. Further, the researcher created another document where additional notes have been kept to go back to during the research process.

3.5 Ethical considerations

Ethical principles are essential when conducting a research to minimise ethical risks and issues. Bell et al. (2018) discuss some ethical principles: harm to participants, lack of informed consent, and invasion of privacy. As earlier mentioned, the interviewees have been anonymised based on participants' requests where no identity, gender or exact role can be identified. Further, the researcher has also maintained the recordings confidentially, and all the interviews have been done on Skype through the appointed work computer. Since the researcher had already talked to some candidates in advance to select suitable candidates for the actual interviews, they had already been given information about the research study. Despite that, the researcher sent an email with information regarding the purpose of the study, stressing that their participation is voluntary and that they can withdraw from participation at any time. Furthermore, the researcher sent a request to get their consent for the recording of the sessions while ensuring their anonymity in the research study. The same set of information was also repeated at the beginning of every interview to ensure that all interviewees understood it correctly. But also if they had any questions to ask before the interviews. At the end of every interview, the researcher asked the interviewees if there was any information they did not want to share in the research thesis to ensure full consent. The company supervisor also read the thesis approximately every month to ensure that no confidential-related data was exposed within the thesis.

Further, the research questions have been designed and asked objectively to avoid subjectivity or introduce eventual bias. Follow-up questions were asked based on what the interviewees stressed without any additional information from the researcher. The researcher works within the company but not within the same area of the thesis research nor with the interviewees.

4. Empirical Findings

In the following chapter, the results will be presented in the same order as the thematic analysis, followed by statements cited by the interviewed candidates. The chapter consists of three subsections presenting the positive effects of automation on efficiency, negative effects of automation on efficiency, and negative effects of automation on innovation

4.1 Positive effects of automation on efficiency

Results have shown a positive effect of automation on efficiency concerning several aspects. All candidates think that implementing automation processes within the organisation positively affects efficiency. Automation makes it possible to get rid of repetitive and administrative tasks. Candidates *J* and *I* stress that the fewer administrative and repetitive tasks done manually, the more efficient the organisation becomes. Automating repetitive and administrative processes leads to a higher degree of efficiency, according to the respondents in the organisation. Hence, less human workforce is included in administrative and repetitive tasks as bots can now handle them. According to candidates *N* and *D*, processes are faster thanks to automation and more efficient than before. There is a will to let employees do something value-creating instead:

"Automation makes it easier for employees' everyday lives because, in large companies like this, people sit and do monotonous, routine-based, recurring and non-value-creating jobs (...) If we can get rid of as much as possible of the administrative job and move to automation, then we will use our staff competencies so incredibly much better; they will also thrive more at work.- Candidate J

Generally, workflows are not being fully automated but parts of them. According to candidates *C* and *L*, parts of their daily work are automated. Hence, employees do not get rid of their jobs immediately. Before the organisation started implementing automation processes, some employees found it hard to complete their work:

This is the first time some administrators have had time to complete their work due to high workloads, thanks to process automation”. - Candidate B

However, that is not always the case, candidate *A* claims that some employees have been replaced by robots and laid off. Hence, to be more efficient, in this case, the organisation has chosen to replace the worker with a robot. In addition, automation has brought more value in terms of time-saving.

“People are being laid off because they have nothing to do anymore. I think we had a guy we could automate the job for and thus did not have to keep later.” - Candidate A

Further, automation processes have also enabled cost and time savings. Candidates *L* and *I* have shown the research statistics that illustrated a cost and time-saving curve due to automation processes, but unfortunately could not be presented in the research due to confidential information. Candidate *C* expresses the difference in the statistics between doing specific tasks manually and automating the tasks:

“When we create a business case, we think about how long things take to do manually, and here we have estimated something that should take 10 minutes to do and also the actual time. Then we can see in the statistics that we go from 10 minutes to 3.5 minutes when it is automated so that the efficiency of doing things is very much higher”. - Candidate C

However, the purpose of automating is not only to be faster but also to increase productivity and reduce mistakes. Automation enhances time-saving and makes space for other tasks to be done. Candidates *N*, *M*, and *K* claim that since many repetitive tasks have been automated, they can catch up with work they usually did not have time for. Candidates *E*, *I*, and *A* say that automation increases quality because of fewer errors since robots work more accurately than humans. They can do the same process over and over again without mistakes. Candidate *C* stresses that it is easier for humans to make mistakes than it is for a robot:

“Many RPA implementations are more accurate than a human is, it is easier for a human to make mistakes than it is for a robot” - Candidate C

4.2 Negative effects of automation on efficiency

Implementing automation processes does not only provide positive effects, but the results have also shown negative effects. Negative effects do not directly come from the automation process per se but the lack of planning when deciding to implement automation processes. According to candidates *H* and *L*, no planning is done in advance, but consequences and actions are being taken on an ongoing basis instead. Even though the intention is to plan in advance, it does not happen in large parts of the IT department:

“We say that we now have an automation first approach, although I do not think it is the case every time. It means that we must know what we want to do before we start doing things. (...) If you automatise a system, you should have a description of the process, who does what, in what system and when. I have probably missed that a bit during large parts of the IT department”. - Candidate E

According to candidate *G*, there is no plan for employees after implementing automation processes. Candidate *J* says that planning for how to redistribute employees should not be the developer's job or people working with automation processes but the manager's responsibility to handle.

4.3 Negative effects of automation on innovation

Several aspects have negatively affected innovation due to automation, whereas a common topic has been financial resources. Candidates *L*, *B*, *F* and *A* have experienced resistance due to financial aspects. If there is no guaranteed outcome of an investment or a project that will hinder efficiency, resistance often occurs. Candidate *H* argues that more money should be spent on exploration. Low spending on exploration also hinders employees from exploring, and if employees want to explore, who is responsible for paying for it?

“In my team, zero time is spent on exploration. I do not know why that is like that. We actually talked about it yesterday; a colleague and I said that we are bad at seeing how we can use new stuff that comes in new releases in the service, for example. It is easy to stick to what you are doing right now and not take on new things. (...) It is the time perspective and

money that hinders it. The question is, who pays for this exploration? Is it a different project or who?" - Candidate B

Furthermore, according to candidate *H*, the needed mindset is not only to solve the problem but to look further ahead. A problem within the organisation is the lack of visionary thinking, where candidate *I* claims that the organisation has a short-term perspective where results have to happen very soon. Candidates *A* and *L* say that the organisation might avoid changes because they do not want to risk anything or it costs too much. Therefore the organisation is not prone to change. Additionally, candidate *J* claims that the problem is not the automation per se, but the people and their mindset, everything that goes beyond the normal is difficult. Hence, resistance occurs, and it is challenging for the organisation to accept changes:

"(...) However, it should be a safe outcome for investing. The organisation is risk-averse, so there may be a certain chance that you skip a change because you do not want to risk anything. It can be that you have tested something once before and it did not work out, so you ignore trying again, and you are just staying there". - Candidate A

Reasons for denial or resistance are several; candidate *F* experiences difficulties in persuading the management about an idea or action due to their mindset or lack of resources. The organisation is risk-averse and sees risks in most things (candidates *A* and *J*). Candidates *I* and *F* claim that the organisation has a low degree of maturity, which is challenging for the people who want to bring changes. Additionally, candidate *J* explains that identifying the people who are willing to push for a change needs to be considered. They have to carefully choose whom to talk to:

"I need to choose whom I will present ideas to; some people are open for change, others are not. We need to identify the people who push for this and want to change". - Candidate J

Focus on efficiency has been the core and, therefore, the most prioritised aspect when automating processes. Candidate *B* argues that innovation can disappear since the organisation wants to be as efficient as possible despite the fact that prioritising innovation and exploration leads to more value in the long term. Often, the organisation works to solve old problems efficiently, which is done by automating without considering the holistic picture

(candidate *E*). There is a thought that the organisation needs to work as they always have been working:

Most of the time, we have had a historical idea of how we set up a specific pattern, so we do as we always have done. - Candidate M

According to candidates *C* and *F*, automation can contribute to innovation by dedicating the released time for exploration and development. However, currently, no time is dedicated to exploration. Instead, released time is being spent on other things rather than investing in new solutions and exploring. The perfectionist mindset drives the organisation, which hinders uncertain iterative processes from happening. Unless they fully control the environment, they do not take risks (candidates *J* and *L*). However, candidate *G* claims that automation can help retain skilled staff to contribute to more creative and complex things. On the other hand, there is no general plan to reskill staff; employees are prioritised based on their competencies compared to the degree of complexity of a specific task (candidates *G* and *N*).

(...) "We have no general idea of how to reskill staff, but it is a good idea. We may have to think about that" (...). - Candidate G

Due to the nature of the organisation of having high-security standards and restrictions, candidates have identified security as an obstacle and can be seen as vulnerable to innovation. Security is a massive part of the organisation's strategy and is hard to ignore or not follow. Hence, it puts limits on the employees in their work when it comes to development. Candidate A claim that security makes it hard to explore:

"Security becomes a vulnerability and can be an obstacle to development and automation. If you fix it so that it is safe, you lose a whole lot of potential goals".- Candidate A.

Candidates *E* and *A* assert that it is hard to agree with the security department sometimes due to their high requirements and low risk-taking, and therefore this creates rigidity. Further, candidates stress that humans are also an issue regarding security. There is a dilemma of having robots or humans working:

“The biggest challenge for security is the human. We do not want a human that can make mistakes compared to a robot. And on the other hand, it is also a security risk not to have a person there”. - Candidate L

5. Discussion

In the following chapter, the empirical findings will be analysed and discussed in relation to the literature and research questions. Further, recommendations will be provided to answer how to achieve ambidexterity through automation, followed by a model.

5.1 Efficiency as a result of automation

As stated by the interviewed candidates, some results have shown a positive impact of automation on efficiency. Many candidates have indicated that adopting automation processes contributes to resource release by automating repetitive and administrative tasks. Candidates have indicated that work has become faster because robots work faster than humans, leading to increased efficiency. Eventually, it has led to less human workforce needed for repetitive administrative tasks, which aligns with the study by Khalid (2021), who stated that automation increases organisational and labour efficiency. Many workers within the organisation can finally catch up with abundant work they could not do before.

Interviewed developers and experts claimed that implemented automation processes within the organisation have not contributed to replacing entire workflows but only some parts. Parts of workflows that have been automated are, for example, automatic approval of certain processes without the intervention of humans, and financial tasks within the economy department. However, despite the partial replacement of robots, candidate *A* claimed that some employees had been laid off. The adoption of automation processes has replaced some employees to increase efficiency. Since automation processes enhance efficiency within the organisation, it benefits the organisation. However, some employees have lost their job even if that was not the initial intention, which has been discussed extensively in the literature (e.g. Autor, 2015; Estlund, 2018). As Autor (2015) and Lima et al. (2021) stated, automation is a less costly alternative. It, therefore, has become a substitute for the human workforce, especially for workers classified as semi- and unskilled due to the nature of their tasks. Eventually, it can increase inequality for the employees where more highly skilled employees will remain, and less skilled employees might lose their jobs.

Candidates stressed that cost and time saving have been a massive driving force in increasing efficiency through automation processes. According to internal statistics of specific manual processes that have been automated, automation has enabled cost and time savings. Roger et al. (2019) and Thomas et al. (2018) stated that the organisation's core goal is to reduce costs and be as efficient as possible with time. In addition, another driving force to automate processes has been increasing productivity and quality. Candidates asserted that automation processes have led to higher accuracy levels and fewer errors than humans. Robots are programmed to work in a specific way with repetitive tasks and can do the same action repeatedly. Hence, it has led to increased efficiency since there is no need for corrections which corresponds to the study by Yuvaraja (2018).

5.1.2 Effects that hinder efficiency

Results have also shown that lack of planning when automating processes has a negative effect on efficiency. Candidates stated that there is no awareness of current and future processes, but consequences are handled afterwards when they occur. Candidates *H*, *L* and *J* claimed that the organisation lacks a comprehensive and holistic overview of planning automation processes and their consequences. Lack of planning has led to less efficiency since unexpected consequences need to be handled afterwards, which causes the process to slow down. On the other hand, lack of planning decreases awareness of the process; where Thomas et al. (2018) stated that if organisations want to be efficient, they have to plan and be aware of the current processes.

Further, candidates also asserted that no plan is addressed for employee redistribution due to automation processes. This result is not consistent with the study made by Kheir (2018), in which the study indicated that by implementing automation processes, correct resource allocation could be performed. The organisation is in their initial phase of automating processes, and they are planning to automate more and more during the upcoming period. As a consequence, resource release, as earlier mentioned, might not result in expected outcomes, and time might be used inefficiently.

5.1.3 Obstacles to achieving innovation

The result did not show any positive effects on innovation since no codes or themes could be recognised through the collected data. However, results have shown negative impacts of

automation processes on innovation. According to most candidates, financial resources have proved to be a huge concern. Candidates *J* and *E* shared their opinions regarding the challenges of persuading the management to get financials for risky activities that might lead to a change. The candidates stressed that there is no dedicated budget for exploration, but the question that candidate *B* asked was, *who should pay for exploration activities?* Since the company is project managed, the project owner pays for the activities done within a project. Hence, it might be hard to convince a project owner to pay for exploration since such activities can be seen as a waste of time without any guaranteed outcome. Many employees would like to have financials to invest in exploration to develop automation processes and explore in general, but find it hard. The organisation chooses to sacrifice exploration, whereas Magnusson et al. (2020) and O'Reilly and Tushman (2007) said that investing only in efficiency-related activities leads to fast and short-term results. Even though resources are being released, that time cannot be used in innovative activities due to a lack of finances.

In addition, candidate *H* stressed that the organisation lacks visionary thinking and has a short-term mindset. Therefore, efficiency is the ultimate goal since it contributes to fast results and resource reductions. On the other hand, many candidates claimed that changes are seen as risky, and therefore the organisation is not prone to change. They see risks in everything; employees find resistance and a challenge to convince the management of an activity that could lead to changes. Developers and managers expressed that the organisational maturity level is very low, and therefore it is hard to accept or plan for activities that can incur risks. Since exploration and innovation are risky activities, they are not prioritised compared to exploiting and being efficient. Azani (2019) and Khalid (2021) discussed resistance in their study concerning lack of understanding, awareness and how prone the person is to change. Since the organisation is not prone to change, it is hard to accept such risks. Furthermore, according to the candidates, the management is not very involved in the activities, but only on a higher level. Therefore, they might not fully understand or be aware of such activities.

Further, the organisation lacks transformation; several interviewed developers indicated that many automated processes are designed based on the original manual processes without further development, leading to lost opportunities that could have been harnessed. Focusing too much on efficiency might hinder innovation since efficiency does not support risk-oriented activities, as Magnusson et al. (2020) stated. Hence, the organisation will lose

opportunities, leading to an imbalance (Satell, 2017), and the organisation will remain more efficient without explorative actions for innovation.

Candidates *B*, *L* and *H* stated that they would want to have more time to explore, but currently, there is no time to spend on exploration. Both developers and managers have ideas and want to do new releases, develop and improve, but cannot. According to Makowski and Kajikawa (2021), automation processes are essential for innovation since they allow for business transformation and restructuring by, e.g. exploring; hence the results show the lack of such transformation. Business processes are becoming more efficient thanks to automation processes. Yet, no new ways of working have been developed. The result does not correspond to the study made by Obeidat et al. (2019) and Makowski et al. (2021), who stated that automation has beneficial outcomes when it comes to development and new ways of working and creating innovation.

In addition, the adoption of automation processes requires a reskilling process, as discussed in the literature (Autor, 2015; Tyagarjan, 2019). Some experts and managers said that there is a will to reskill employees, but there are no initiatives yet, and some have not even thought about it. However, some developers contributing to the adoption of automation processes have the chance to develop due to the nature of their work and their technical high-skill level. This leads to two outcomes; on the one hand, some employees will have the opportunity to develop and reskill, and on the other hand, some employees will not have that chance due to the nature of their projects, i.e. how flexible they are when it comes to time and cost, and what goal they have. However, the middle-and unskilled employees will not be able to re-skill in the same manner since there is no dedicated reskilling process.

Since the organisation is in its initial state of adopting automation processes, no employees need reskilling because the current automation processes are not done on entire workflows. However, in the future, when developers use more advanced technology and develop wider automation processes, entire repetitive and administrative workflows might be replaced. Therefore, as Autor (2015) and Estlund (2018) said, semi-and unskilled employees will find it most challenging because automation processes could prevent the creation of new jobs. This will lead to more improvements, competencies, and developments for humans with already high skills and competence. At the same time, semi-and unskilled employees will not be prioritised in the same manner. Further, this will lead to an imbalance of skill sets and

competencies within the organisation. Tyagarajan (2019) also stresses that automation will harm innovation without reskilling initiatives or programmes provided by the organisation since no one will be able to explore and find new opportunities due to limited competencies that now do not meet the demand. It will also harm efficiency in terms of slowing down the employees workforce. Richter and Sinha (2020) claim that organisations need to have a reskill plan and process to provide employees with the proper support, which will lead to an iterative process of continuous improvements that the case company is currently lacking.

Another adverse effect on innovation is security. Security creates rigidity and is seen as an obstacle to exploration activities and other technical aspects that might involve risks.

Therefore, anything that can involve security risks faces resistance. Humans are seen as a risk and are partly being replaced by robots to reduce mistakes and risks. But on the other hand, robots are also seen as a security risk without a human supervising the work. Therefore, due to the high-security level within the organisation, it is hard to be flexible and take risks, hence exploration is limited.

5.2 What are the effects of automation on ambidexterity?

To clarify the impact of automation on ambidexterity, the result clearly shows an imbalance where a significant focus relies on efficiency. At the same time, innovation is not currently a part of the actions or plans as an effect of automating processes. The results showed that resources release and time-saving are used to catch up with non-innovation-related work instead of exploring and finding opportunities to create value due to a lack of finances and absence of time for exploration. On the other hand, there is no reskill process, leading to lost opportunities and a lack of proper competence development. Thereby, employees will either remain stuck without any improvements or be laid off.

Further, the organisation does not have a plan of current or new automation processes or on how to reallocate the employees. This can create a vicious circle since no planning leads to a lack of awareness and eventually a lack of development, as Thomas. et al. (2018) stated.

Since efficiency is seen as the opposite of innovation, according to Magnusson et al. (2020), the organisation will continue to set short-term goals to be efficient without long-term goals for exploration and innovation. Exploration and taking risks are a concern due to the organisational mindset. Thomas et al. (2018) stated that the main challenge for organisations

is to identify the next big area of value creation and how to redesign and make use of technology. Since the organisation is not prone to change due to a short-term mindset, security restrictions, and a lack of visionary thinking, if the new area of value creation involves risks, it will be avoided, and the organisation will expose resistance. Hence, March (2003) claims that the organisation will gradually find it hard to succeed and innovate.

Consequently, the organisation does not achieve the multi-scale impact of automation, cognitive and organisational level that Makowski and Kajikawa (2021) identified. Makowski and Kajikawa (2021) defined the cognitive level as the ability to find new opportunities and paths because of released resources due to automation, and the organisational level as the transition and restructuring of the organisation. Currently, released time is being used to catch up with an overload of work, and there is no dedicated time or cost for exploring and improving. When it comes to organisational transition, the organisation lacks transformation due to resistance to change, development and lack of reskilling and iterating.

5.3 Recommendations to achieve ambidexterity through automation

The following research has shown that adopting automation processes in the IT department of the case company aims mainly to be as efficient as possible. Hence, the case company might lose opportunities due to a lack of exploration, which can lead to an imbalance between innovation and efficiency. Based on the results, recommendations have been proposed to achieve ambidexterity through automation. A model has also been derived (Figure 4) to illustrate the summary of the following recommendations. The model illustrates a pyramid with different elements to consider to achieve ambidexterity through automation.

Leadership and Mindset

Currently, one of the IT department's main challenges is the leadership and the organisational mindset, which focuses on efficiency rather than innovation. This has been shown through their assigned priorities and how time and finances are being spent. Mastering a balance between exploitation and exploration will not be possible if the organisational mindset is focused on efficiency. As Lo and Fatien Diochon (2020) stated, managers and leaders need to have a mindset and willingness to change and develop workers' skills. As earlier mentioned,

the organisation lacks visionary thinking, which hinders the ability to be flexible and open-minded to new ideas, risks and changes. Thereby, automation processes will continue to be adopted to increase efficiency, and the organisation will continue to lose possible opportunities.

Hence, the first recommendation in the model (Figure 4) is to change the leadership mindset towards a short- and long term mindset. It requires having both a closing- and opening leadership style to master both exploitative and explorative behaviours. The organisation is risk-averse and finds it hard to take risks. Therefore, as Alghamdi (2018) claimed, having a combination of the closing leadership by setting guidelines, monitoring goals, etc., and the opening leadership style of being open to explore and do new things defines an ambidextrous leader. Such a leadership mindset involves establishing a trial and error mindset where experimentation can be part of the organisational culture and its activities. It also includes establishing the idea of ambidexterity as a shared vision across the organisation's exploitative and explorative activities and entities. Consequently, having such a mindset encourages employees to exploit to be efficient and explore to find new opportunities and create innovation.

Planning

Further, another shortcoming in the organisation is planning. Since the organisation is currently working towards short-term goals, planning has not been considered in a broader range. Lack of planning leads to less awareness, flexibility, and ability to connect the dots regarding new possibilities and opportunities (Ritcher & Sinha; Thomas et al., 2018). It also increases the risk level in the operations since consequences might not be considered beforehand, leading to less efficiency due to corrections that might need to be done. Moreover, it can result eventually in less innovation since the redistribution and the reskilling process are not considered, which leads to less value creation when resources are being released.

Consequently, the second recommendation in the model (Figure 4) would be to plan the process of automation, eventual reallocation and needed reskilling. Planning increases awareness and knowledge about the processes' past, current, and future steps. In the following case, the company will not only plan for the adoption of automation processes but for an upcoming transformation process where automation processes are an essential part of

it. Thereby, the organisation needs to identify the objectives, why a certain process needs to be automated, the organisation's needs, goals and priorities, how it will make work more efficient, and what advantages it will provide. It is essential to explore better ways of executing a task or performing a workflow before automating the same process to increase efficiency. When establishing a new process, all the actors who will contribute or be affected must be aware of the upcoming change. Therefore, a restructuring or re-skill plan needs to be considered as well. Such a reskill plan could be through workshops or courses, e.g. on the organisation's internal learning page (Workday Learning).

Transformation

Lastly, the organisation lacks transformation due to a high focus on being efficient and solving old problems by automating processes. A high focus on efficiency has led to a lower prioritisation of innovative activities and focus on exploration. In addition, no general reskill process is provided for workers. Since released resources aim to enable efficiency and increase possibilities to create value and manage complex tasks, reskilling is essential (Greve et al., 2000; Makowski & Kajikawa, 2021).

Adopting automation processes is the central part of a digital transformation that the organisation is currently working towards. A challenge is the lack of flexibility and a reskilling process to ensure proper skill sets for the worker. Lack of iteration in the operations is also a concern within the organisation. Instead, they would continue with an operation once an investment has been made rather than going back and forth.

Accordingly, the third and final recommendation in the model (Figure 4) is to restructure, transform and change. At this point, the organisation needs to be aware that automating only to be efficient is not enough. The organisation needs to be flexible and dynamic to adapt, which requires an iterative and agile way of working through slack and exploration. In the earlier recommendation, planning for reskilling was required. In the following recommendation, implementation of reskilling is essential. It will enhance the workers' skills and cognitive abilities to handle complex tasks. The organisation also needs to develop dynamic capabilities, which are the firm's ability to integrate, sense, restructure and transform. A guideline to use could be the model developed by Cyfert et al. (2021). The two scale-impact of automation could be seen as a goal to achieve for developing and working towards a transformation which involves the cognitive and organisational transition levels. In

addition, organisations need to allow workers to switch between explorative and exploitative activities to create value and achieve transformation and contextual ambidexterity, as Marri et al. (2020) claimed. The organisation also needs to develop an ability for change, flexibility and adaptability.

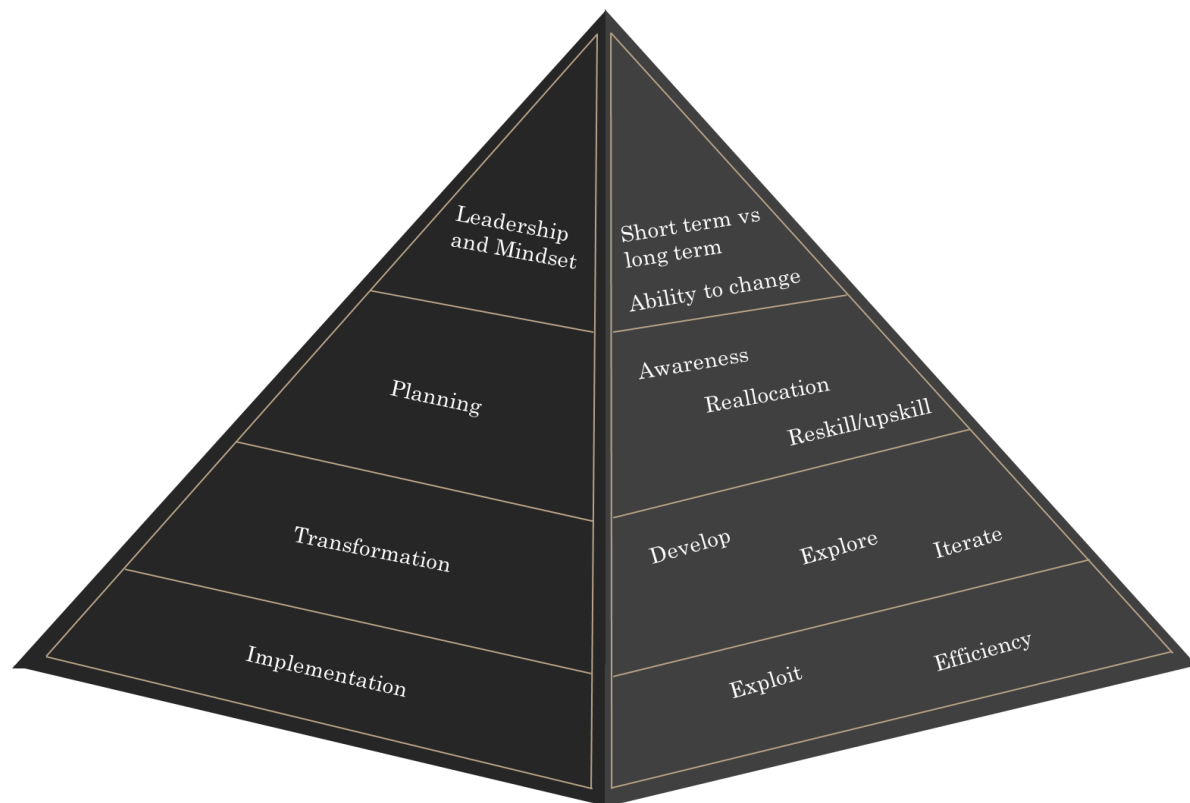


Figure 4: Illustration of recommendations of how to achieve ambidexterity through automation accomplished by the researcher

6. Conclusion

The following chapter aims to conclude the research thesis by answering the research questions and addressing the applied methodology. In addition, limitations and future research will be presented.

Many organisations are going through a digital transformation with a focus on automating processes to be efficient and adaptable in a rapidly changing environment. Commonly, organisations' focus on efficiency and innovation remains forgotten (Magnusson, 2020). Furthermore, research has assessed the effects of automation on efficiency and the effects of automation on innovation separately without considering how automation can affect the balance between efficiency and innovation, known as ambidexterity (see Figure 1). Hence, there is a lack of research on the effects of automation on ambidexterity.

Consequently, this research aimed to investigate the effect of automation on ambidexterity in the IT department of a high-tech multinational enterprise. Furthermore, through the findings, the research addressed how automation can enhance ambidexterity by proposing a series of recommendations.

Research Questions:

- 1. What are the effects of automation on ambidexterity in the IT department of a high-tech multinational enterprise?***

To ease the analysis and interpretations, the main research question has been divided into two sub-research questions, which are the following:

- 1.1 What are the effects of automation on efficiency?***
 - 1.2 What are the effects of automation on innovation?.***
- 2. How to achieve ambidexterity through automation processes?***

A qualitative approach was applied, followed by an abductive reasoning. Interviews have been conducted where managers and employees have contributed with their thoughts regarding the subject. Finally, a thematic approach was applied where the collected data from the interviews were coded, and themes were identified (Appendix 1).

6.1 Answering the research questions

Regarding the first research question, the results have shown that the effects of automation on ambidexterity within the IT department lead to imbalance, with a significant focus on efficiency and exploiting existing activities rather than exploring and innovating. The identified positive effects of automation on efficiency have been resource release, time-saving, and increased quality. Whereas negative effects of automation on efficiency were mainly a lack of planning when implementing automation processes, particularly in relation to the redistribution of affected employees. The negative effects of automation on innovation were a lack of financial resources to be invested in exploration activities or activities that incur risk. Further, results showed an organisational resistance to change with a short-term mindset and a lack of visionary thinking. The organisation lacks transformation where automation has mainly been adopted to solve old problems by automating the identical former manual process. Additionally, there is no general reskill process for employees affected by automation processes in their daily work. Finally, security has shown to be an issue for innovation when it comes to automation due to the restrictions and non-flexibility it implies, thereby creating rigidity. It is hard to balance internal security and opportunities that could be utilised. In conclusion, a higher focus on being efficient by automating processes was considered to reduce time and cost and be more productive, which harms innovation. Released time is mainly used to catch up with an overload of work, not to explore for further developments and enhance cognitive ability to create innovation. There is an imbalance where the focus is on efficiency rather than innovation when automating processes.

To answer the second research question, recommendations have been provided. To suggest how ambidexterity can be achieved through automation (Figure 4) based on the result of the leading research question and the sub-questions. Recommendations have been illustrated in a pyramid model where leadership and mindset are placed at the top of the model. The recommendations start with *Leadership and mindset* maturity, which is essential to balance short-and long-term goals and drive the organisation towards change and transformation. The second recommendation is *planning*, which involves awareness, reallocation and reskilling. Planning, and understanding outcomes, risks and actions lead to a higher awareness of the context. The third recommendation is *transformation*, an ongoing process to create and capture new values by exploring and exploiting. It requires awareness of the context and environment to enhance flexibility and adaptability.

6.2 Limitations and Future Research

The research is a single case study that considers the IT department of a high-tech multinational enterprise in Sweden as the unit of observation. Therefore a suggestion for future research could be to perform a multiple case study to achieve a more comprehensive investigation and thus more robust results. Further, the following research study has focused on automation business processes only. Regarding the time frame, the organisation is not in a mature phase of digital transformation. Hence, a suggestion for future research is to investigate a company that is in a more mature process. Further, it would also be interesting to investigate companies of different sizes and analyse if the results remain valid.

References

- Alghamdi, F. (2018). Ambidextrous leadership, ambidextrous employee, and the interaction between ambidextrous leadership and employee innovative performance. *Journal of Innovation and Entrepreneurship*, 7(1). <https://doi.org/10.1186/s13731-018-0081-8>
- Alos-Simo, L., Verdu-Jover, A. J., & Gomez-Gras, J. M. (2020). The dynamic process of ambidexterity in eco-innovation. *Sustainability*, 12(5), 2023. <https://doi-org.ezproxy.ub.gu.se/10.3390/su12052023>
- Autor, D. H. (2015). Why Are There Still So Many Jobs? The History and Future of Workplace Automation. *Journal of Economic Perspectives*, 29(3), 3–30. <https://doi.org/10.1257/jep.29.3.3>
- Azani, H., & Khorramshahgol, R. (1991). The impact of automation on engineers' creativity and innovation and its implications for reducing resistance to change. *Computers in Industry*, 16(4), 377–383. [https://doi.org/10.1016/0166-3615\(91\)90077-m](https://doi.org/10.1016/0166-3615(91)90077-m)
- Bataev, A. V., & Davydov, I. S. (2020). The role of automation in improving the quality of enterprise business processes. *IOP Conference Series: Materials Science and Engineering*, 986(1), 012015. <https://doi.org/10.1088/1757-899x/986/1/012015>
- Benner, M. J. and Tushman, M. L. (2003), "Exploitation, Exploration, and Process Management: the Productivity Dilemma Revisited", *Academy of Management Review*, vol. 28, no. 2, pp. 238-256.
- Bell, E., Bryman, A. & Harley B., 2018. *Business Research Methods*, 5th Edition, Oxford University Press: Oxford. ISBN: 9780198809876
- Berg, B. (2009). *Qualitative research methods for the social sciences* (7th ed.).
- Collis, J., & Hussey, R. (2009). *Business research : A practical guide for undergraduate & postgraduate students* (3rd ed.).
- Cummins, F. A. (2016). *Building the Agile Enterprise: With Capabilities, Collaborations and Values (The MK/OMG Press)* (2nd ed.). Morgan Kaufmann.
- Cyfert, S., Chwiłkowska-Kubala, A., Szumowski, W., & Miśkiewicz, R. (2021). The process of developing dynamic capabilities: The conceptualization attempt and the results of empirical studies. *PLOS ONE*, 16(4), e0249724. <https://doi.org/10.1371/journal.pone.0249724>

Eikebrokk, T., & Olsen, D. (2019). ROBOTIC PROCESS AUTOMATION FOR KNOWLEDGE WORKERS -WILL IT LEAD TO EMPOWERMENT OR LAY-OFFS? *ResearchGate*.

Estlund, C. L. (2017). What Should We Do After Work? Automation and Employment Law. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3007972>

Gibson, C. B., & Birkinshaw, J. 2004. The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47, 209–226.

Greve, Henrich R., Taylor, Alva, 2000. Innovations as catalysts for organisational change: shifts in organizational cognition and search. *Adm. Sci. Q.* 45 (1), 54–80. <https://doi.org/10.2307/2666979>.

Guion, L. A., Diehl, D. C., & McDonald, D. (2011b). Triangulation: Establishing the Validity of Qualitative Studies. *EDIS*, 2011(8), 3. <https://doi.org/10.32473/edis-fy394-2011>

Ivančić, L., Vugec, D., & Vuksic, V. (2019). Robotic Process Automation: Systematic Literature Review. *Researchgate*. https://doi.org/10.1007/978-3-030-30429-4_19

Jadhav, S., & Gawande, R. (2020). “A Study of Impact of Automation on Industry and Employees. *Alochana Chakra Journal*.

Jovanović, S., Đurić, J., Tatjana, & Šibalija, V. (2018). ROBOTIC PROCESS AUTOMATION: OVERVIEW AND OPPORTUNITIES. *International Journal*.

Jöhnk, J., Ollig, P., Rövekamp, P., & Oesterle, S. (2022). Managing the complexity of digital transformation—How multiple concurrent initiatives foster hybrid ambidexterity. *Electronic Markets*. <https://doi.org/10.1007/s12525-021-00510-2>

Khalid, Hunjra, & Sirohey. (2012). Impact of Business Process Automation on Employees' Efficiency. *Bulletin of Business and Economics*.

Kheir, Omar Ismail. (2018). *THE IMPACT OF WORKFLOW AUTOMATION ON EMPLOYEES EFFICIENCY*. FACULTY OF BUSINESS AND COMMERCIAL SCIENCES

Kumar Gupta, S., Karpa, M., Derhaliuk, M., Tymkova, V., & Kumar, R. (2020). Effectiveness vs Efficiency for Organisational Development: A Stud. *Talent Development & Excellence*, 2478–2486.

Lima, Y., Strauch, J. C. M., Esteves, M. G. P., de Souza, J. M., Chaves, M. B., & Gomes, D. T. (2021). Exploring the future impact of automation in Brazil. *Employee Relations: The International Journal*, 43(5), 1052–1066. <https://doi.org/10.1108/er-08-2020-0364>

Lindgren, I., Toll, D., & Melin, U. (2021). Automation as a Driver of Digital Transformation in Local Government: Exploring Stakeholder Views on an Automation Initiative in a Swedish Municipality. *DG.O'21: DG.O2021: The 22nd Annual International Conference on Digital Government Research*. <https://doi.org/10.1145/3463677.3463685>

Lô, A., & Fatien Diochon, P. (2020). Rethinking contextual ambidexterity through parallel structures. *R&D Management*, 50(4), 522–534. <https://doi.org/10.1111/radm.12402>

Magnusson, J., Koutsikouri, D., & Päivärinta, T. (2020). Efficiency creep and shadow innovation: enacting ambidextrous IT Governance in the public sector. *European Journal of Information Systems*, 29(4), 329–349. <https://doi.org/10.1080/0960085x.2020.1740617>

Makowski, P. T., & Kajikawa, Y. (2021). Automation-driven innovation management? Toward Innovation-Automation-Strategy cycle. *Technological Forecasting and Social Change*, 168, 120723. <https://doi.org/10.1016/j.techfore.2021.120723>

March, J. (1991) 'Exploration and Exploitation() in Organizational Learning, *Organization Science*, 2(1), 71-87.

Marri, Ali & Sin. (2020). Structural and Contextual Ambidexterity: Towards an Integrated Approach. *Organizational Behaviour*.

Mouzas, S. (2006). Efficiency versus effectiveness in business networks. *Journal of Business Research*, 59(10–11), 1124–1132. <https://doi.org/10.1016/j.jbusres.2006.09.018>

Nunes, A. (2021). Automation Doesn't Just Create or Destroy Jobs — It Transforms Them. *Harvard Business Review*.

Obeidat, B. Y., Alamayreh, E. M., & Sweis, R. J. (2019). The relationship among innovation, organisational ambidexterity and organisational performance. *International Journal of Business Innovation and Research*, 19(4), 554. <https://doi.org/10.1504/ijbir.2019.10023208>

O'Reilly & Tushman. (2007). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behaviour*, 28, 185–206. <https://doi.org/10.1016/j.riob.2008.06.002>

O'Reilly, C. A., & Tushman, M. (2013). *Organisational Ambidexterity: Past, Present and Future*. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2285704>

Reeves, M., & Deimler, M. (2011). Adaptability: The New Competitive Advantage. *Harvard Business Review*.

- Richter, F., & Sinha, G. (2020). Why Do Your Employees Resist New Tech? *Harvard Business Review*.
- Riggs, D. (2015). Ensuring Quality in Qualitative Research. *Researchgate*.
https://doi.org/10.1007/978-1-137-29105-9_5
- Roger, L., & Martin. (2019). The High Price of Efficiency. *Harvard Business Review*.
- Satchell, P. (2020). *Innovation and Automation (Routledge Revivals)* (1st ed.). Routledge.
- Satell, G. (2017). How to Win with Automation (Hint: It's Not Chasing Efficiency). *Harvard Business Review*.
- Siderska, J. (2020). Robotic Process Automation — a driver of digital transformation? *Engineering Management in Production and Services*, 12(2), 21–31.
<https://doi.org/10.2478/emj-2020-0009>
- Stettner, U., & Lavie, D. (2014). Ambidexterity under scrutiny: Exploration and exploitation via internal organization, alliances, and acquisitions. *Strategic Management Journal*, 35(13), 1903-1929.
- Tabrizi, B., Girard, K., & Irvin, V. (2019). Digital Transformation Is Not About Technology. *Harvard Business Review*.
- Taródy, D. (2016). Organizational ambidexterity as a new research paradigm in strategic management. *Vezetéstudomány / Budapest Management Review*, 39–52.
<https://doi.org/10.14267/veztud.2016.05.04>
- Taylor, S. P. (2017). What Is Innovation? A Study of the Definitions, Academic Models and Applicability of Innovation to an Example of Social Housing in England. *Open Journal of Social Sciences*, 05(11), 128–146. <https://doi.org/10.4236/jss.2017.511010>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Thomas, H., Davenport, & David Brain. (2018). Before Automating Your Company's Processes, Find Ways to Improve Them. *Harvard Business Review*.
- Tidd, J. and Bessant, J. (2011), *Managing Innovation: Integrating Technological, Market and Organizational Change*, John Wiley & Sons, Hoboken, NJ

Turner, N., Swart, J., & Maylor, H. (2012). Mechanisms for Managing Ambidexterity: A Review and Research Agenda. *International Journal of Management Reviews*, 15(3), 317–332. <https://doi.org/10.1111/j.1468-2370.2012.00343.x>

Tushman, M.L., 2011. Organizational Ambidexterity in Action. *California Management Review*, 53(4).

Tyagarajan, T. (2019). To Prepare for Automation, Stay Curious and Don't Stop Learning. *Harvard Business Review Home*.

Varghese, F. C., & T. A., D. A. K. (2017). The impact of automation in the IT industry: Evidences from India. *IJARCCCE*, 6(3), 292–297. <https://doi.org/10.17148/ijarccce.2017.6366>.

Yuvaraja, D. (2018). A Study of Robotic Process Automation Use Cases Today for Tomorrow's Business. *International Journal of Computer Techniques*, Volume 5(Issue 6).

Appendix

Appendix 1- Thematic analysis

Thematic Analysis				
First-order codes	Second-order codes	Themes		
Automation makes it more efficient in work	Resource release	Positive effects on efficiency		
Automatise repetitive and administrative tasks				
Processes are done faster				
Less human workforce needs to be involved				
Employees can catch up with work				
Some employees have been laid off				
Cost savings	Savings	Positive effects on efficiency		
A lot of time savings are done by integrating robots				
Enhance better data quality	Quality and error		Positive effects on efficiency	
Fewer mistakes are done by robots				
No plan in advance, consequences are being handled afterwards	Lack Of planning			Negative effects on efficiency
We don't know what we want before start automating				
No plan on how to redistribute employees				

Resistance due to cost	Financial Resources	Negative effects on innovation
No dedicated budget for exploration		
Financial aspects hinders exploration		
Who will pay for exploration?		
Lack of visionary thinking	Resistance & Organisational Mindset	
The organisation has a short-term mindset		
People are not prone to change		
The organisation sees risk in most things		
The organisation have a low degree of maturity		
Hard to persuade the management	Lack of transformation	
Organisation wants to be as efficient as possible		
Automated processes are exactly as how the manual processes were.		
Solve old problems in an efficient way		
No dedicated time to spend on exploration		
No general reskill process for affected employees	Security & Rigidity	
Security becomes a vulnerability and obstacle for innovation		
The dilemma of the risk to have a human, and a challenge to have a robot		

Appendix 2 questionnaire for contributing

Personal information

1. What role do you have & for how long have you been working in the company?

Automation

2. Are you influenced by any kind of automation process in your daily work?
3. Why do you think these processes have been automated?
4. How did the process/workflow look like/perceived before the automation?
5. Do you believe that automation was necessary, if yes/no then why?
6. How did you react when they told you that the workflow would be automated?
7. How easy/hard was it to understand how the process works?
8. Do you believe that automation makes it harder to understand the underlying infrastructure or process since it is not visible anymore? Do you understand how this automation works?
9. How was it to adapt to a new way of working, part of your work being automated?
10. Have you been informed of what you can do instead when your prior workflow now is automated?

Efficiency

11. How do you define efficiency?
12. At what rate do you currently consider yourself efficient in your daily work due to automation?

Innovation

13. How do you define innovation?
14. At what rate do you value exploration?
15. In your opinion, do you think that threats and risks are more valued or opportunities?
16. Are your ideas considered by the top management?
17. At what rate have opportunities/ideas been welcomed/avoided?
18. Have you been given the space to learn? add skills and competencies?
19. Do you see yourself growing and developing now when you don't do repetitive workflows in your daily work?
20. How do you organise/balance your work to exploit and explore opportunities?

Appendix 3- questionnaire for affected candidates

Personal Information

1. What role do you have & for how long have you been working in the case company?

Automation

2. How do you define automation, how do you define digitalisation?
3. What automation processes have/are you contributing to?
4. What was the adoption of automation processes' main purpose/intention and why is it important? What was its aim to facilitate?
5. What factors are central when automating processes?
6. What are the automation challenges?
7. How does the automation process affect employees' daily work today?
8. How is a new automated process communicated to the employees and used?
9. Did you receive any resistance from employees?
10. How do you reallocate employees when freeing up resources? What has the plan been?
11. At what rate do you take risks?
12. How do you work with security when it comes to automation?

Efficiency

13. How do you define efficiency?
14. At what rate does the automation process(es) contribute to efficiency?
15. What are the short-long term goals with automation?

Innovation

16. How do you define innovation?
17. At what rate does the automation process(es) increase Innovation?
18. For how long should this automation process be a solution according to you?
19. To what extent are the senior leaders willing to commit resources to long-term projects?
20. In your opinion, do you think that threats and risks are more valued or opportunities?
21. At what rate have opportunities been welcomed/avoided?

22. At what rate do you value exploration?
23. Are there any barriers/hinders to the creation of innovation or innovation process?
24. How much recourse do you spend on innovation?
25. Is there a specific budget aimed at innovation? Who is responsible?
26. To what extent do you believe there is autonomy within the organisation and its employees?
27. Who is responsible for exploring and creating innovation?
28. Are you considering innovation and efficiency as simultaneous goals or separate?