

UNIVERSITY OF GOTHENBURG SCHOOL OF BUSINESS, ECONOMICS AND LAW

Exploring the relationship between absorptive capacity and ambidexterity-Swedish context

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Author's name: Christian Daboura

Supervisor's name: Johan Brink

Graduate school

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Abstract

This study explores the relationship between ambidexterity and absorptive capacity by conducting a quantitative research study on a sample of 31 companies that operate in different industries in Sweden. The data was collected from the companies' annual reports and analyzed by using statistical methods through SPSS software.

The results show a significant positive relationship between ambidexterity and absorptive capacity, demonstrating the essentiality of the absorptive capacity as a factor that helps the organizations to optimize their exploration and exploitation activities and achieve ambidexterity so that they can develop a strong and sustainable competitive advantage in today's dynamic business environment.

The results of this study show moreover that the companies who have high levels of absorptive capacity are better able to achieve ambidexterity and launch new products/services, acquire patents and enhance their current value offerings. This demonstrates the importance of the absorptive capacity to enhance the innovations activities of the organizations.

The study provides valuable practical and theoretical insights to the ongoing debates about ambidexterity and the knowledge management literature, and also to the managers, entrepreneurs and government who are seeking to achieve ambidexterity and increase the organization's competitive advantage.

The limitations of this study include the sample size and the country in which this study is conducted, suggesting a need for future research to address these limitations.

Table of content:

1. Introduction	5
1.1 Background	5
1.2 Problem area	7
1.3 research purpose	9
1.4 Research question	9
2. Methodology	10
2.1 Research strategy	10
2.2 Research design	11
2.3 Data collection	12
2.4 Reliability of the research	13
2.5 Validity of the research	13
2.6 limitations	14
2.7 Ethics	14
3. Theoretical framework	15
3.1 Exploration	15
3.2 Exploitation	16
3.3 Ambidexterity	18
3.3.1 The relationship between ambidexterity and organizational performance	19
3.4 Exploration and exploitation as tensions creating activities	21
3.5 Knowledge management: the role of knowledge management practices in facilitat exploration and exploitation	ing 25
3.6 Absorptive capacity	27
3.6.1 The role of absorptive capacity in facilitating exploration activities	29
3.6.2 The role of absorptive capacity in facilitating exploitation activities	30
3.7 Summary of the theoretical framework	32
4. Empirical study	33
4.1 Introduction	33
4.2 Sample and data collection	34
4.3 The statistical analysis of the data	36
4.4 The results of the analysis	37
4.5 Discussion	41
4.5.1 The results in the light of previous studies	42
4.5.2 Theoretical implications	44
4.5.3 Practical implications	45
4.6 Conclusions	46
5. Limitations and Future research	47
6. References	48
Appendices	52

1. Introduction

The introduction section of this study is divided into four key vital components: The background, the problem area, the research purpose and the research question. The background emphasizes the importance of the ambidexterity for organizations in today's dynamic business environment. It elucidates additionally the essentiality of balancing between exploration and exploitation in order to adapt to the changes in the environment and develop a strong competitive advantage. The background introduces moreover the concept of absorptive capacity as a component to achieve ambidexterity.

The problem area focuses on the challenges faced by the companies in balancing the efficiency and flexibility in order to ensure success and long-term survival. It also highlights the importance of balancing between exploration and exploitation and achieving ambidexterity as a crucial factor to stay competitive in the market. In this section, the absorptive capacity is also mentioned as being an interesting component to be incorporated to help the organizations in balancing exploration and exploitation and achieve ambidexterity. The research purpose clarifies the study's objective, while the research question along with the hypotheses will be presented at last, paving the way to explore further in this study.

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 (O'Reilly & Tushman, 2008)

In today's market, companies must be able to explore and find new opportunities and reconfigure current value offerings continuously in order to adapt to the changes in the market and achieve high levels of competitive advantage. The constantly changing business environment along with the instability of consumer purchasing preferences, put the companies in a situation where they need to simultaneously offer value to the potential customers in emerging markets, and to serve the current customers in the existing market. A considerable discussion has taken place in business management context for a long time, on how organizations can adapt themselves to changes in a volatile market in order to survive and thrive, and the researches have shown that companies who can strike a balance between exploration and exploitation and achieve ambidexterity tend to show a higher possibility of survival than those who chose one of the two streams (e.g., Raisch & Birkinshaw 2008; Jansen et al., 2006).

Companies that conduct the exploration and exploitation activities at the same time have the ability to discover new opportunities and technologies, while improving the current value offering. Whereas companies that tend to choose one stream with the exclusion of the other,

are more likely to witness negative outcomes concerning their ability to adapt to the changes in the market and survive.

In his study, March (1991) states for example that systems who engage in exploration activities with the exclusion of exploitative activities suffer from the cost of experimentation without making any gains, while engaging only in exploitative activities leads to being trapped in the same equilibrium. Levinthal and March, (1993) argue similarly that focusing solely on exploitation leads the company to fall into the risk of becoming obsolete.

The simultaneous conduction of exploration and exploitation gives the firms a capability to achieve what is known as a "virtuous cycle" of innovation, where firms can continuously improve their current products and services at the same time as exploring and discovering new markets and technologies (March, 1991).

Additionally, organizations who conduct the exploration and exploitation activities on a simultaneous rhythm, are better equipped to face the challenges and changes in the market, which gives them the ability to develop a sustainable competitive advantage (Gibson & Birkinshaw, 2004).

The action of balancing exploration and exploitation is referred to as ambidexterity (O'Reilly & Tushman, 2008), and it has been considered essential in order for the organizations to adapt and develop a sustainable competitive advantage.

Ambidexterity is also seen to be rooted in the short term efficiency and the long term capability of innovation of the organizations (O'Reilly & Tushman, 2008; Smith & Tushman 2005).

However, although ambidexterity is a crucial factor for the organizations to adapt to the changes in the environment and survive, it is a very hard action to manage and companies fall, according to a wide range of literature, into a dilemma while trying to manage and balance exploration and exploitation. This is because exploration and exploitation create tensions, as they need different skills, organizational cultures and structures that support them.

Achieving ambidexterity and striking a balance between exploration and exploitation has gained momentum in the past decade, and the efforts to solve the ambidexterity question have increased between the researchers. Many studies have explored multiple approaches in order to get a better understanding of how to achieve ambidexterity.

This discussion highlights that the firm's absorptive capacity plays an important role in the self-renewal process of the firm, in which an increase of the firm's knowledge absorption's level leads to a revitalization and enhancement of the exploitative and the explorational technological capacity of the firm. Ultimately, this can help the firm to achieve ambidexterity (Jansen, Van den Bosch, & Volberda, 2005a, 2005b, 2006).

Additionally, another study by Kang & Snell, (2009) shows that the exploitative activities are based upon the existing knowledge that the firm possesses, while the explorational activities are built upon the new knowledge acquired by the firm. This indicates that the influx of information and new knowledge processed by firms could actually be incorporated with the firm's ability to exploit and explore.

Scholars have tried to explore the relationship between ambidexterity and absorptive capacity, however, without neglecting some key works such as (Jansen, Vanden Bosch, & Volberda, 2005a, 2005b, 2006), there still is an absence in the literature that articulately connects the absorptive capacity of the firm with ambidexterity, constituting a gap that needs to be filled.

The gap may have existed due to the difference in studying the concepts, in which the literature studied the absorptive capacity from Knowledge-based perspective that highlighted the role of knowledge in achieving high organizational performance, while ambidexterity was studied apparently from the strategic perspective that underpinned the role of strategy in allowing the firms to balance between exploration and exploitation.

Another reason for the gap could be that the concepts were basically studied in isolation from each other.

Through sensing this gap, this research is dedicated to explore one of the recent, yet most important areas in the field of business and organizational development, that is the absorptive capacity and its relation to ambidexterity.

1.2 Problem area

In today's dynamic business environment, companies are facing tough situations when it comes to being efficient and generating profit on the one hand, and being effective in the ability of being flexible and responding to the changes in the market on the other hand. Companies should not only focus on exploitation of the current certainties, but they also should aim to explore the future opportunities at the same time as well.

The failure in achieving both activities continuously and simultaneously could have an impact on the own survival of the company and it may lose the long term success. As O'Reilly & Tushman (2008) state, being large and successful one time does not guarantee long term survival.

Moreover, studies showed that only a few companies survived out of 266 during 1984-2004, and the reason for the failure was due to the lack of flexibility in adapting to the changes in the market that led to low performance (Devan, et al., 2005).

Successful firms are those who can align the management of today's business while exploring the future opportunities and adapt to the environmental changes simultaneously (Duncan, 1976; Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008; Raisch, Birkinshaw, Probst & Tushman, 2009; Tushman & O'Reilly, 1996).

Moreover, March (1991) confirms that successful businesses are those who have the ability to balance the exploitation of the current competencies and the exploration of the emerging opportunities. This is because balancing exploration and exploitation helps organizations in avoiding the negative outcomes caused by focusing only on one activity (Jansen et al., 2006)

However, striking a balance between exploration and exploitation is very challenging due to the fact that it requires operating in different mindsets, the right allocation of resources, different infrastructures and unmatched organizational cultures (March, 1991; Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). Moreover, balancing the two activities at the same time forces the companies to confront tensions created by explorational and exploitative

activities, especially when it comes to acquiring knowledge and learning (Ricciardi, Zardini & Rossignoli, 2016), where both existing and new knowledge are seen to be the core structure for increasing the competitive advantage and the performance of the firm (Grant, 1996). In general, the contradictions between exploration and exploitation create tensions, and the skills required to balance these activities are incompatible, thus, achieving ambidexterity can be very hard and costly (March, 1991).

The concern on how organizations can achieve ambidexterity and balance exploration and exploitation has gained momentum during the recent time, and there are many opinions trying to add to the business management context concerning how organizations can achieve ambidexterity. Some scholars argue that achieving ambidexterity is impossible, but others state that it is achievable.

However, through elaborating and building upon what has yet been suggested by the existing literature, this study aims at integrating the absorptive capacity as a key factor in assisting the organizations to achieve ambidexterity.

This aim comes interestingly from the notion that ambidexterity and absorptive capacity are two closely related concepts, in which they both are involved in the organization's ability to adapt and innovate in response to changing environments.

Organizational ambidexterity refers to an organization's ability to simultaneously conduct exploration and exploitation strategies. This conduction involves allocating resources and managing activities in a way that enables the organization to both innovate and optimize its existing operations at the same time.

Absorptive capacity on the other hand, refers to the organizational ability to acquire, assimilate, transform and exploit knowledge gained from the external environment (Zahra & George 2002), which is apparently essential to facilitate the exploration and the exploitative activities.

Earlier studies have shown the important role the absorptive capacity plays in fostering the innovations capabilities of the organization, in which it is considered to be critical in the organization's ability to effectively use the external knowledge in its innovation's processes (Cohen & Levinthal, 1990). In addition, Lane & Lubatkin, (1998) found that the absorptive capacity had a positive influence on the organization's ability to identify opportunities, while Zahra & George, (2002) showed that the absorptive capacity had a positive impact on the organization's innovation's performance.

Studies on the absorptive capacity show that it has a positive impact on the innovation's performance of the organization, and they show moreover that the absorptive capacity is incorporated in the organization's ability to develop a sustainable competitive advantage through acquiring knowledge to foster the innovation's capability. This makes the absorptive capacity a very interesting component to be incorporated into the earlier efforts to solve the ambidexterity question.

1.3 research purpose

The purpose of this research is to explore the relationship between absorptive capacity and ambidexterity in Swedish companies, and to determine whether there is a positive or negative relationship between the two constructs.

Through relying on secondary data sources such as annual reports, this study will analyze a sample consisting of different companies from different industries in Sweden.

By providing empirical evidence of the relationship between ambidexterity and absorptive capacity, this study will contribute to the existing body of knowledge, and the findings are expected to provide an enhanced understanding on the relationship between ambidexterity and absorptive capacity.

The targeted audience of this study are the scholars and the academics in the fields of business and innovation, organizational learnings and strategic management; managers and organizations who seek to enhance their innovation and learning abilities in order to drive the business towards a successful behavior; policymakers and governmental organizations with the aim to increase the economic growth; entrepreneurs and business owners that are interested in getting better understanding on how to increase the competitive advantage of their businesses.

The results of the study are expected to contribute in providing practical recommendations and insights on how organizations can achieve ambidexterity and increase their ability to respond to the changes in the market and establish a sustainable competitive advantage. This study can potentially help the organizations in identifying gaps in their innovation and learning conductions and respond with suitable strategies to address these gaps.

1.4 Research question

Taking into account the background, the problem area and the purpose of the research, the research question can be stated as following:

1. What is the relationship between ambidexterity and absorptive capacity in companies in Sweden?

To answer this question, two hypothesis are stated:

H1: There is a positive relationship between the absorptive capacity and ambidexterity

and

H2: The absorptive capacity helps the companies to enhance their innovation's activities and develop products and services

2. Methodology

The methodology section serves as a roadmap to conduct this study, and it encompasses key components and elements to ensure the validity and reliability of the findings.

This section includes information regarding the research strategy, research design, data collection and sampling methods, the limitations of this study and the ethical considerations.

2.1 Research strategy

This study follows the quantitative approach in order to explore the relationship between ambidexterity and absorptive capacity in companies in Sweden. This exploration is going to be based on the use of quantifiable and measurable data, and on statistical techniques to analyze the collected data.

The data will be collected from a sample of different companies through different industries in Sweden.

In addition, specific proxies are going to be developed when gathering the data and measuring the absorptive capacity and the ambidexterity of the companies.

Earlier studies along with the literature suggest different measurements to rely on when measuring the absorptive capacity of the company, including prior related knowledge of the employees, using the number of alliances and joint ventures and R & D expenditures. However, this study will be relying on R & D expenditures as a primary measure of the companies' absorptive capacity. This is to ensure the maximum level of comprehensiveness and reliability of the findings.

Measuring the absorptive capacity through relying on the prior related knowledge of the employees for instance, could actually set a hinder in front of the aim of this study to explore the relationship between ambidexterity and absorptive capacity. This is due to the limitations in measuring the absorptive capacity objectively (Lane & Lubatkin, 1998).

For example, there may be employees that could not transfer their knowledge through the organization to other employees effectively, and this puts limits in the face of the organization to benefit from their knowledge (Li & Atuahene-Gima, 2001).

Moreover, relying on the number of alliances and joint ventures to measure the absorptive capacity is also limited. Alliances and joint ventures do actually play an important role in transferring the knowledge and resources between the organizations, but they are not considered to be an indication of the knowledge absorption and utilization (Lavie & Rosenkopf, 2006; Li & Atuahene-Gima, 2001).

R & D expenditures on the other hand have been extensively used in the literature in order to measure the absorptive capacity of the firm, since R & D activities enable the firm to acquire new knowledge and skills from the external environment (Cohen & Levinthal 1990). Additionally, companies that invest in R & D have higher ability to acquire, assimilate and apply newly acquired knowledge from external sources, and this is key in absorptive capacity (Zahra & George, 2002).

The company's efforts to invest in R & D are moreover directly associated with the firm's ability to acquire, assimilate and exploit external knowledge (Li & Atuahene-Gima, 2001). Therefore, the focus will be on R & D expenditures as a reliable and accurate measurement when measuring the level of absorptive capacity of the companies.

Similarly, when measuring ambidexterity, The literature and earlier studies suggest different approaches such as innovation's activities, surveys and qualitative analysis methods such as interviews.

This study however, will be relying on the companies' innovation's activities as a reliable measurement to measure the ambidexterity.

On the one hand, surveys could be limited to the respondent's perception of what the firm's activities could be rather than the objective measures of what the actual activities are (Jansen et al, 2006).

On the other hand, relying on qualitative analysis is firstly against the nature and design of this study, since it's a quantitative research study, and secondly may be limited to the quality and availability of the data gathered through qualitative methods (He & Wong, 2004).

Relying on the innovations activities of the firm has been seen as a viable and reliable measurement for the ambidexterity, since innovation activities such as patent application, new product/services launched and incremental developments and enhancements of the products and services are widely considered to be strong indicators for the company's ability to exploit and explore (Gibson & Birkinshaw, 2004)

Additionally, this approach allows the study to follow its strategy and design in order to provide an adequate answer to the research question.

Therefore, the focus will be on the innovation's activities as a reliable and accurate measurement when measuring the ambidexterity of the companies.

After the data collection process is finished, the gathered data will be analyzed using statistical techniques. Specifically, the ANOVA analysis and the correlation analysis will be applied in order to examine the relationship between the constructs.

The ANOVA analysis will compare the means between the different groups, enabling a comprehensive understanding of whether the absorptive capacity affects the innovation's performance of the companies.

The correlation analysis on the other hand will provide insights into the nature, strength and direction of the relationship between the ambidexterity and absorptive capacity. This allows one to get a deep understanding of the interdependency of the absorptive capacity and ambidexterity.

2.2 Research design

The chosen research design to examine the relationship between ambidexterity and absorptive capacity through conducting quantitative study, is cross-sectional design.

This research design allows the researcher to better investigate the two variables and see if there is a relationship between them in the examined sample.

This research will select and gather data from a representative sample consisting of different companies at different sizes, that operate in different industries in Sweden.

In addition, a purposive sampling approach will be followed when gathering the data, and this approach is chosen due to multiple advantages.

Firstly, the efficiency that this approach provides when using the resources, specifically time resources. Though focusing on collecting the data from the most relevant companies, the time is used in an efficient way, instead of spending time on scanning annual reports for companies that could potentially be less informative.

Secondly, by including companies such as Elekta AB, Getinge AB, Essity AB, Raysearch Laboratories AB, Camurus AB, Immunovia AB, Diamyd AB, Mentice Group AB, Ericsson AB, Tobii AB, Atlas Copco AB, SKF, Autoliv Inc AB, Astrazeneca AB, Volvo Group AB, Sandvik AB, Scania AB, Alfa Laval AB, Telia AB, Enea AB, Axis Communication AB, Fingerprint Card AB, Precise Biometrics AB, Acconeer AB, Sectra AB, Saltx Technology Holding AB, Nilar AB, Cellavision AB, Arjo AB, and Xintela AB, the study will be focusing on an accurate and condensed exploration of the relationship between absorptive capacity and ambidexterity.

Thirdly, through purposive sampling, this study can harness advantages due to the deliberate selection of companies that are recognized to be leaders in their relevant fields and they are known for their presence in the market, innovation's capabilities, and success in various industries in Sweden.

The included companies are also known for having strong absorptive capacity and ambidexterity, and through focusing on such organizations, the study can gain valuable information from companies that have already shown strong absorptive capacity and ambidexterity.

Lastly, By excluding other companies, the study can maintain focus and avoid dilution of findings that may potentially come from including companies with different characteristics.

2.3 Data collection

The data is going to be gathered from the available annual reports and documents of the selected companies of the year 2021, and the measurement of the companies' absorptive capacity is going to be based on the R & D expenditures of the selected companies. Measuring the ambidexterity of the companies is going to be based on the companies innovation activities that are announced in the annual reports, such as new product development, patent and technology developments.

After gathering the data, it will be analyzed through statistical methods in order to explore the relationship between the variables, and the results of the significance will be reported.

The annual reports are going to be collected from the companies websites, and also from the following websites:

Bolagsverket Nasdaq Stockholm Annualreports.com Company reports Annual reports service SEC Filings Bloomberg Reuters

The collected data is considered to be secondary data as it already existed in the public domain, and the information gathered will specifically include the companies' innovation activities along with the companies' R & D expenditures.

Additionally, searching words such as R & D expenditures, research and development, Innovation, innovation's activities, patent, new product/service launched, enhanced services/products and investments will be used when reading and scanning the annual reports.

2.4 Reliability of the research

Bell. Bryman & Harley, (2019) state that reliability is essential in quantitative research, and they highlight the importance of being concerned with the stability of the findings, and that the results of the research will be the same if the research is about to be conducted by another researcher under the same conditions. The authors emphasize moreover multiple measures to increase the reliability of the research such as ensuring consistency when collecting data and using standardized measures.

Taking this into account, the reliability of this research will be ensured through:

Firstly, developing a well articulated and comprehensive protocol to make sure that all steps of the research process are followed consistently.

Secondly, pilot study will be conducted to ensure the feasibility of the research before conducting the whole study.

Thirdly, sample size will be taken into account when collecting the data, to confirm that the sample is large enough and to provide the required statistical power.

In addition, the data will be gathered from multiple sources consisting of annual reports and financial statements of the companies of interest. The data will also be checked more than once to ensure accuracy.

Through using these measures, the results of this research will be reliable and allow the researcher to draw valid conclusions concerning the relationship between the two variables.

2.5 Validity of the research

According to Bell. Bryman & Harley, (2019), the validity of the research is reached when the study measures what it claims it measures.

To ensure the validity of this research when measuring the absorptive capacity and ambidexterity, the research has relied on earlier and established measurements used in earlier studies, such as R & D expenditures to measure the absorptive capacity, and innovative activities to measure the ambidexterity.

Moreover, through following an articulate and well designed approach, the information from the annual reports is read more than once and in a careful manner to ensure relativism of the collected data.

2.6 limitations

There are some limitations concerning the results of this study.

Firstly, the results of the study may be limited to be generalized and applied to other countries.

Secondly, as this study is dedicated to explore the relationship between ambidexterity and absorptive capacity, specific statistical methods are going to be applied. However those methods are not applied to explore the causation in the relationship, and this could be a limitation.

Thirdly, since this study was constrained by a specific amount of time and resources, the breadth and depth of the analysis may be impacted.

2.7 Ethics

Through taking into consideration the ethical principles, this study is designed to ensure that the research process adheres to the standards of using the secondary data and to the GDPR (General data protection regulation).

Since the data is collected from publicly available annual reports, the ethical consideration will focus on the appropriate use of these data.

Firstly, the collected data will be used only for the purpose of the research and to answer the research question.

Secondly, privacy and confidentiality are also taken into consideration. Although the data and information are collected from publicly available annual reports, sensitive company information will be handled with respect and care. Moreover, the findings of this study will be reported transparently without any form of biased behavior, and the research will be conducted in integrity.

Thirdly, the study will also take into consideration the storage limitations of the data, in which the data will be stored as long as it is necessary for the intended purpose. After that, the data will be deleted

By adhering to the data protection regulations, this study demonstrates its commitment to the ethical research practices.

3. Theoretical framework

This section will provide a comprehensive understanding of different constructs and concepts that are related to the ambidexterity and absorptive capacity.

The theoretical framework will start by providing in-depth information about the concepts of exploration and exploitation, and why they are considered to be essential activities for the organization.

The framework will then explore the concept of ambidexterity and why it's important for the organizations to strike a balance between exploration and exploitation and achieve harmonious combination of these activities.

The relationship between ambidexterity and organizational performance is also presented, and a comprehensive understanding about why the ambidextrous organizations outperform their peers is extensively discussed.

Moreover, the theoretical framework will provide an explanation on why exploration and exploitation create tensions, and why it's considered to be hard for the organizations to manage these tensions and balance between those activities.

The role of knowledge management practices is also highlighted in this theoretical framework, since the knowledge management practices are considered to be essentially important for the organizations in order to utilize the new acquired knowledge. Additionally in this context, the role that the absorptive capacity plays to leverage the utilization of knowledge is extensively discussed as being a facilitator and a leveraging factor of the knowledge management practices in the organizations.

Furthermore, this theoretical framework explores the concept of absorptive capacity and the role it plays in facilitating the process of acquiring, assimilating and applying the external knowledge to foster the production of products and services.

Lastly, this theoretical framework explores the relationship between the absorptive capacity and how it is related to exploration and exploitation activities. It provides a clear understanding on how the absorptive capacity leverages the exploration and exploitation activities and fosters the innovation's capabilities of the organization.

3.1 Exploration

Exploration is seen to be crucial for the organizational learning and innovation's capabilities, and it has gained significant attention from scholars, policy makers and practitioners in the business world (Lichtenthaler & Lichtenthaler, 2009).

According to March, (1991), exploration refers to the process of searching for new ideas and knowledge and the experimentation in a novel way to solve problems, and it involves activities such as experiment, risk taking and research and developments. Moreover, the author states that exploration is a crucial aspect for the organizational learnings and adaptation's capabilities, since it is incorporated in the process of acquiring new knowledge and developing new capabilities, which both are seen to be essential for the organizations in order to adapt and respond to the changes in the environment.

Due to the ambiguity and uncertainty in the dynamic business environments where these organizations operate, explorational activities are seen to be essentially important to the organization, (Cyert & March, 1963).

Through exploration, organizations can explore and discover new capabilities, knowledge and ideas that will ultimately lead to the enhancements of these organizations' competitive advantage (Levinthal & March, 1993).

Scholars have noted that the explorational activities of the organizations can actually be categorized into three categories. Firstly, the exploration of the existing knowledge, secondly the exploration of new knowledge and lastly, the exploration of new markets (Jansen et al., 2006).

Exploration of the existing knowledge that the organization possesses includes the search for new applications and combinations of knowledge within the organization. This form of exploration is often associated with incremental improvements on the existing products, services or processes (March, 1991).

The exploration of new knowledge is a process that includes the search for new ideas, concepts and technologies that can be used and applied to the existing products and services. This type of exploration is often associated with the development and innovations of new products or services (Jansen et al., 2006). For example, the exploration of new knowledge includes processes such as research and developments, new products or services initiatives and acquiring new technologies (Fey & Denison, 2003).

The last category of the explorational activities includes the search for new markets and customers that are associated with new business opportunities. According to Jansen et al., (2006), this type of exploration is normally associated with innovation's capabilities, where new ways of creating value are developed. The exploration of new markets and customers includes, according to Fey & Denison, (2003), activities such as market research, market expansions and the development of disruption channels.

Exploration activities are important to the organization and they are also positively related to the organizational performance (Jansen et al., 2006). However the researches have shown that the extent to which organizations conduct explorational activities, has a direct impact on the performance and the own survival of the organization (March, 1991). This is due to the importance of the exploitation activities that need to be conducted simultaneously with the exploration activities.

3.2 Exploitation

Like exploration, exploitation has also gained significant attention from scholars and researchers as being an important aspect in the field of management.

Essentially, exploitation refers to the organizational ability to use the existing resources, knowledge and capabilities in order to enhance the current value offering and maintain a competitive advantage in the market (March, 1991). In addition, it refers to the refinement, extensions and application of the existing capabilities of the organization (Levinthal & March, 1993). This means in essence that the exploitation is based upon the optimization and

enhancements of the existing resources and knowledge in order to achieve efficiency and productivity.

The literature categorizes different dimensions of exploitation, including the operational efficiency, process improvement and incremental innovation.

The operational efficiency refers to the activities that involve the optimization of the production processes to enhance the quality and increase the outputs. According to Osterwalder et al., (2014), operational efficiency is crucial for the organizations to remain competitive in the marketplace, and it can be achieved through the involvement of continuous improvement programs.

The second type of exploitation is the process improvements, and it includes activities such as the identifications and eliminations of inefficiencies in the existing processes of the organizations.

The process improvements aim to streamline the processes and increase the efficiency through adopting activities such as improving the communication between the department in the organization and eliminating redundant objectives. According to Schaltegger et al., (2016), process improvement is a key factor in developing and enhancing the efficiency of the organization, and it leads to an increased level of productivity in the organization. Lastly, the third type of exploitation is the incremental innovation and enhancement of the existing products and services that the organization has. This includes the incremental enhancement and optimization on the performance and quality of the existing products and services in order to increase the customer satisfaction and loyalty.

Tidd, Bessant & Pavitt (2005) show through their work that the incremental innovation is a critical and crucial factor that engages in the organizational goals towards achieving success in the market, and the incremental innovation can be achieved through the continuous conduction of the incremental optimizations and improvements.

The exploitation activities of the organization can also involve leveraging the existing capabilities in order to expand to new markets and business areas.

The process of leveraging the existing capabilities is a type of exploitation activity that involves the usage of the existing knowledge and expertise possessed by the organization to develop new products, services or markets. Tecce, (2016) argues in his research that capability leveraging is essentially important in order for the organizations in their strategic renewal, and it is also considered to be a crucial factor that helps the organizations to stay competitive in the rapidly changing business environment.

While both exploration and exploitation are considered to be essential for organizational success, being reliable on only one activity can lead to negative outcomes concerning the long-term performance of the organization.

As it has been stated earlier, focusing solely on exploration may lead to investing heavily in uncertainty that may ultimately lead to low short-term performance.

On the other hand, relying too much on exploitation may lead to stagnation and limit the organizational ability to innovate and stay competitive in the market.

Therefore, it's important for the organization to strike a balance between the two activities in order for the organizations to achieve high levels of innovation's capabilities and stay

competitive in the market (Raisch & Birkinshaw, 2008), and also to stay adaptable and respond to the changes in the market (O'Reilly & Tushman, 2013).

Balancing between exploration and exploitation is referred to as ambidexterity, and it is defined as the ability to be efficient in the exploitation of the existing capabilities, at the same time as exploring new opportunities (Raisch & Birkinshaw, 2008), and it's considered to be essential for the adaptation and survival of the organizations in today's dynamic business environment.

The next section provides an adequate understanding of the concept of ambidexterity and its relation to exploration and exploitation activities.

3.3 Ambidexterity

In today's dynamic business environment, it is essential for the organizations to balance between exploration and exploitation in order to adapt to the changes in the market and to achieve long term success. The literature suggests that neglecting one of the two streams of exploration and exploitation in favor of the other leads to negative outcomes concerning the performance of the organization. Consequently, it is crucial that the organizations develop ambidextrous capabilities that allow them to balance exploration and exploitation. The concept of ambidexterity can be tracked way back to Duncan (1976), as the author was the first one who introduced it to the management literature where he argued that organizations should balance between exploration and exploitation to achieve long term success.

However, it was March (1991) and O'Reilly & Tushman (1996) who further developed the concept, and proposed the "organizational ambidexterity". Since then, the concept of ambidexterity has been developed and used by many scholars, and has also been applied in a broad range of organizational structures and industries as being the solution to manage the tensions created by the exploration and exploitation activities and achieve sustainable success. For example, ambidexterity has reached to small and medium sized enterprises (Junni et al., 2013), family owned business (Chirico & Salvato, 2018), and non-profit organizations (Peng, 2019).

Additionally, researchers have also examined how ambidexterity can be achieved in industries such as financial services (Blome & Schoenherr, 2011), high technological industries (Benner & Tushman, 2013), and most recently healthcare industries (Damanpour & Aravind, 2012).

Ambidexterity has been seen as an approach for the organizations to be able to compete and survive in the fast changing markets. For example, Tushman & O'Reilly (1996) argue that ambidexterity is crucial for the organizations in order to adapt to market changes and achieve long term success. They state that ambidextrous organizations are equipped with the ability to leverage their current capabilities while exploring new opportunities at the same time. Similarly, Lavie et al. (2010) argues that through balancing exploration and exploitation, ambidextrous organizations can actually adapt to the changes in the market while leveraging their existing capabilities.

The literature clearly articulates the ability of the ambidextrous organizations to show high levels of success leading them to outperform the non-ambidextrous in the relevant industry and market.

Pursuing ambidexterity opens the door in front of ambidextrous organizations to witness successful performance in many different areas in comparison to the organizations that don't have the ability to balance between exploration and exploitation activities.

The outperformance of the ambidextrous organizations comes according to the literature from succeeding in essential areas such as finance in which ambidextrous organizations show better financial performance, innovativeness in which ambidexterity allows the organizations to develop better innovations, organizational structure and most importantly in organizational learning.

Having established an understanding of the concept of ambidexterity, it is of high importance to explore the practical implications of ambidexterity in the marketplace.

The next section is therefore dedicated to provide an adequate understanding that is based on empirical earlier studies, and researches, on how and why the ambidextrous organizations outperform their peers in the relevant industry.

3.3.1 The relationship between ambidexterity and organizational performance

According to Jansen et al. (2006), ambidextrous organizations are more capable of achieving superior organizational performance compared to non-ambidextrous organizations. This is because being able to balance the exploration and exploitation allows the organization to leverage the existing resources at the same time as exploring new possibilities and opportunities for growth.

Achieving a superior organizational performance in innovation is facilitated and supported by multiple factors that are possessed by ambidextrous organizations. As Jansen et al. (2006) and Tushman & O'Reilly (2007) suggest, by having the ability to explore new technology while exploiting existing capability, ambidextrous organizations can generate new ideas that would ultimately lead to innovation.

Moreover, the high level of flexibility and adaptability that the ambidextrous organizations have, allow them to adapt themselves to the changing in the market and respond to the changing customer demand. This leads to a greater and better identification of the emerging trends and innovation opportunities (Tushman & O'Reilly, 2013).

Balancing between exploration and exploitation requires, as we stated earlier, the right allocation of resources, and ambidextrous organizations allocate effectively the needed resources to these activities in a dynamic way. By doing so, they have the ability to make a shift in the resource allocation process based on noticed changes in the environment and market they are operating in. This action leads to a better management of the long and short-term objectives and goals (Birkinshaw & Gibson, 2004).

Additionally, the organizational structure of the ambidextrous organizations varies from that in the non-ambidextrous organizations, in which ambidextrous organizations have separate units or teams that are dedicated to exploration and exploitation activities.

Building this unique organizational structure and assigning each unit or team to specifically conduct exploration and exploitation activities at the same time, eliminate the confusion and the miscommunication in the organization, and allow the organization to pursue both activities without conflicts (Raisch & Birkinshaw, 2004).

Another important factor that facilitates the ambidextrous organization's ability to be better in innovations, is the integration of knowledge they are capable of. According to Liu & White (2014), ambidextrous organizations are capable of effectively integrating new acquired knowledge to the existing capabilities that they possess. This efficient knowledge integration allows the ambidextrous organizations to develop better and superior products that are aligned to and based on the customers' needs.

Even when it comes to financial performance, O'Reilly & Tushman, (2013) argue that ambidextrous organizations are more likely able to achieve greater financial performance than the non-ambidextrous ones.

The financial performance of the ambidextrous organizations is facilitated by many factors that constitute a superiority that does not exist in non-ambidextrous organizations.

Firstly, the ability of the ambidextrous organizations to adapt that we mentioned earlier, does also have a positive impact on the financial performance of the organizations.

O'Reilly & Tushman (2013) state for example that by acquiring the ability to adapt to the changes in the environment, ambidextrous organizations are more resilient to downturns and disruptions that might emerge in the economy. This contributes positively to the financial performance of the organization.

Secondly, He & Wong (2004) show through their study that the ambidextrous organizations are led by leaders with a vision and ability to balance the need for efficiency and innovation, which leads to a perfect creation of a culture of experimentation and innovation in the organization. This unique organizational culture supports the employees and encourages them to take risks, come up with new ideas and innovate, at the same time as focusing on efficiency and productivity, which ultimately leads to a better financial performance (Raisch & Birkinshaw, 2008).

Thirdly, ambidextrous organizations leverage the usage of technology and analysis of data to identify and support the exploration and exploitation. This action leads to a better financial performance (He & Wong, 2004)

Additionally, the ambidextrous organization's ability to learn does also play a major role in enhancing the overall performance of these organizations in the market. In their study, Gibson & Birkinshaw, (2004) show that ambidextrous organizations tend to be better in learning from the mistakes and experiences, because balancing between exploration and exploitation can develop dynamic capability for innovation.

Similarly, He & Wong (2004) conducted a study of 92 manufacturing firms in China, and found that ambidextrous firms showed a greater performance in the market compared to non-ambidextrous. The authors suggested that the ambidextrous organization's ability to learn from mistakes and experiences, allowed them to be efficient in responding to the changes in the market, which allowed them to develop more innovative products and services, and thus, show a better performance.

Another study conducted by Raisch & Birkinshaw, (2008) suggests also the superiority of the ability to learn from mistakes and experiences in making the ambidextrous organizations capable of having a better performance in the market. The authors state that the ability to learn and adapt, is a success factor in the ambidextrous organizations to have a high level of performance in the market.

The literature clearly suggests that by having the ability to balance exploration and exploitation activities, ambidextrous organizations are able to outperform their peers in the market, indicating that there is positive relationship between ambidexterity and organizational performance, since achieving ambidexterity gives the organizations the ability to achieve a better organizational performance in the market.

However, the literature suggests as well that achieving ambidexterity is a very hard action to manage, due to the tensions that are created by exploration and exploitative activities (March, 1991).

Nevertheless, there still is an ambiguity and unclarity concerning why and how these tensions are created, and this non-clarification returns most arguably to the fact that different researchers relied on their own theoretical and empirical assessments and perspectives in deriving their explanations. For example, March, (1991) argues that the emergence of the tensions returns to the differences in the search processes used in exploration and exploitation. Exploration requires searching for new knowledge and ideas, which in turn, requires divergent thinking and experimentation, while exploitation involves searching for existing solutions and efficiency, and this requires convergent thinking and improvements. The difference in these search processes requires different skills and mindsets that might be difficult to assemble in one organization.

Levinthal & March, (1993) on the other hand, focus on the role of environmental and organizational factors in creating the tensions, in which they argue that the limited resources forces the organizations to face a trade-off between exploration and exploitation.

This lack of clarification in why there are tensions created by exploration and exploitation activities, sets a hinder in front of the aim of this research to explore the relationship between ambidextrous and absorptive capacity, constituting a need to dig deeply into earlier studies in order to get better understanding that will help in answering the question this research is dedicated for.

Therefore, the next section aims to provide a comprehensive clarification of why there are tensions created by exploration and exploitation activities.

3.4 Exploration and exploitation as tensions creating activities

Exploration and exploitation are two fundamentally structured strategies that the firms pursue in order to achieve growth and innovation. While exploration refers to the search for new knowledge and opportunities, exploitation refers to the enhancement and optimization of the existing knowledge and the current value offering.

March (1991) was the one who developed the concepts in the literature, as being two conflicting organizational learning strategies. The author argues that organizations need to balance between these two activities in order to achieve long term competitive advantage that leads to long term success. He states moreover that the organizations who only focus on exploration may not be able to exploit current opportunities, while organizations that only focus on exploitation may be hindered from exploring new markets and new opportunities, which negatively impacts their growth performance.

Studies on the topic clearly articulate that specializing only in exploration leads to an inflexibility in exploiting current discoveries and opportunities due to several reasons: Firstly, resource allocation. According to March (1991), organizations who only focus on exploration tend to allocate most of the resources to researching and developmental activities, creating a shortage in allocating the necessary resources to exploitation activities such as marketing and production. This has a negative impact on the survival of the organization. Moreover, Banner & Tushman (2004) confirmed what was stated by (March, 1991) arguing that the resource allocation's processes between exploration and exploitation create tensions, because the resources allocated for one activity could be unavailable to the other. Secondly, risk taking.

Exploration is fundamentally a risky activity that is woven with uncertainty, meaning that not all new discoveries and innovations can show a level of profitability. Organizations that only focus on exploration tend to take too much risk investing resources in uncertainty, leading to poor exploitation outcomes (Levinthal & March, 1993).

Thirdly, focusing only on exploration leads to complacency. Those organizations who only focus on exploration show a higher risk of becoming complacent due to the fact that they may rely on their earlier success, neglecting the changing environment and consumer needs, and may be missing effective exploitation of current opportunities (Levitt & March, 1998). Further, according to Cohen & Levinthal (1998) the efficient exploitation of the current new discoveries requires a different set of capabilities than what the exploitation requires, such as marketing and production capabilities. These capabilities may not be acquired and developed in the organizations that are exploration oriented.

On the other hand, focusing only on exploitation will most likely have a negative impact on the long-term success of the organization, because it leads to a lack of innovation. Jansen et al. (2006) argues for example that the organizations who solely focus on exploitation may miss opportunities of growth and sustaining the competitive advantage.

The studies show that by focusing only on exploitation, organizations tend to fall into the "exploitation trap", where they become more focused on enhancing and improving their current value offerings, and neglect the necessity of exploring new opportunities and innovating (Levinthal & March, 1993). This could lead to a low performance over time. In addition, the fast changing business environment in today's world, along with the constantly evolving and changing customer's needs and preferences, put the organizations in front of a situation where they need to be constantly innovative in order to compete. By focusing only on exploitation, organizations may lack the ability to be flexible and respond to the changes in the market and the changes of the customer demands (Danneels, 2002).

Exploration and exploitation are moreover built upon different performance measures. While explorational activities are assessed based on the potentiality of the future revenue, exploitation activities are evaluated based on the immediate returns they have on the revenue (Levinthal & March, 1993). This difference in assessing and measuring the outcomes of the two activities creates tensions in the organization, because they need to balance the short and long-term goals.

Exploration and exploitation also create tensions in the structures and cultures these activities require. Both activities require different and unmatched organizational cultures and structures that support them.

In their recent study, O'Reilly & Tushman (2008) confirm that exploration activities need a culture that is supportive for activities such as experimentation, risk taking and innovation, while exploitation activities require an organizational culture that values efficiency and stability.

Additionally, exploration and exploitation require centralized and decentralized organizational structures. The exploration activities need decentralized organizational structures that reinforce and encourage innovation and experimentation, whereas exploitation activities need centralized organizational structures that empower coordination and efficiency (Tushman & O'Reilly, 1996).

As stated earlier, the exploration activities are characterized by levels of uncertainties, experimentation and innovation. These characterizations need a decentralized organizational structure to support them (Tushman & O'Reilly, 1996).

The decentralized structure facilitates the exploration activities through multiple levels. Firstly, through flexibility and autonomy in which the decentralized structure supplies the employees with the required flexibility and autonomy that support experimental ideas and innovate. In general, the decentralized structures consist of an environment in which employees can make decisions and innovate without the need of reporting every step to a higher position. This is critical to the exploration activities because it allows the employees to take risks or make mistakes, eliminating the fear of retribution (March, 1991).

Secondly, through a faster decision making process. Decentralized structures empower a fast decision making process because the decisions can be made in lower levels of the organizations. In exploration discourse, the decision making process needs to be on a faster rhythm, since new ideas need to be assessed and tested rapidly in order to determine their value (Henderson & Clark, 1990).

Thirdly, through giving the employees empowerment based on providing them accountability and greater responsibility for their work. This fosters, according to (Amabile, 1988), the sense of ownership in exploration activities that leads to a better innovation's possibility. In addition, the decentralized structure reinforces the creativity and diversity by encouraging the participation of a wider range of employees in exploration activities. In decentralized structures, employees from different departments of the organization can participate and supply with their unique perspectives and ideas, leading to more creative solutions (Ancona & Caldwell, 1992).

In general, exploration activities require decentralized structures that facilitate flexibility and autonomy, faster decision making process, fostering employee empowerment and reinforcing

creativity. What is provided by the decentralized structures is crucial for the exploration activities and pushing the limits of what could be possible.

On the other hand, the characterizations of the exploitation activities, such as efficiency, incremental improvements and optimization of the current value offerings, require a centralized structure that facilitates standardizations, clarity, censorship and economies of scale.

Leana & Barry (2000) show through their study that the centralized structures are critical for the exploitation activities, since they allow standardization across the organization.

Standardization is crucial in order to control that the procedures and processes are enhanced for efficiency.

Centralized structures provide the clarity of roles and responsibilities for the different departments that are responsible for different aspects of the business. By clarifying the roles and responsibilities assigned, the duplication of efforts and the confusion of who is responsible for what is eliminated (Mintzberg, 1979).

In addition, centralized structures allow two more important factors that are essential for the exploitative activities, namely control and economies of scale.

Through operating with centralized structures, more control over the operations in the organization is provided. Exploitation activities require a greater level of control in order to ensure that the established procedures are followed and in order to maintain high quality standards (Chandler, 1962).

Centralized structures allow moreover the economies to be on scale by consolidating the required resources. Putting the economies of scale leads to cost reduction and savings and increases the efficiency, which is critical in exploitation activities (Grant, 1996).

Overall, the exploitation activities need centralized structures in order to be conducted. Standardization, clarity of roles and responsibility, economies of scale and control are essential characteristics for the optimizations and enhancements of the current value offering of the organization in order to achieve a high level of efficiency in the market.

All these contradictory requirements to conduct exploration and exploitation activities effectively and efficiently create in fact the dilemma that the organizations need to overcome. Its of importance to mention that the critical approach to overcome this dilemma was earlier to specialize in one of the two streams, but as the later studies clarify, specializing was not the best approach to adapt to face the dilemma, rather the best approach could be through perceiving the two streams as complementary (He & Wong 2004).

Performing ambidextrously, gives the organizations the capability to overcome this dilemma through helping in maintaining the current organizational competitive advantage at the same time as developing new capabilities and opportunities. However, at the same time, pursuing two different and contradictory strategies simultaneously is what makes ambidexterity hard to achieve.

The challenges created from the resource constraints, developing centralized and decentralized organizational structures in the organization at the same time and establishing different cultures and atmospheres that support exploration and exploitation, makes it hard for the organizations to achieve ambidexterity (O'Reilly & Tushman, 2008). Therefore, while

ambidexterity can help in balancing the tensions created between exploration and exploitation, achieving it is complex and challenging (Raisch & Birkinshaw, 2008).

Interestingly enough, earlier research highlighted the role of knowledge in solving the tensions created by exploration and exploitation and achieving ambidexterity, since knowledge can help the organizations to identify new inputs and opportunities that would be beneficial to conduct exploration and exploitation (Banner & Tushman, 2003). For example, Levinthal & March (1993) argue in their study that knowledge is essential in order for the organizations to achieve ambidexterity. The authors suggest that the need to establish and develop learning capabilities is of high importance in order to acquire the needed knowledge and information to exploit and explore. Similarly, Janse, Bosch & Volberda, (2005) clarify the significant role of knowledge in solving the tensions to balance exploration and exploitation.

Relationally, the framework by which organizations create, acquire, share and integrate knowledge to facilitate innovations and develop a competitive advantage, is provided by the knowledge management processes within the organization.

Many studies have contributed to this field and showed that knowledge management is positively associated with the organization's ability to balance between exploration and exploitation in order to achieve ambidexterity.

Consequently, associated with the aim to answer our research question, it is of the highest importance to explore the relevant earlier studies on knowledge management and how specifically knowledge management processes are critical in order to achieve ambidexterity. The next section therefore is focused on exploring how the knowledge management practices in the organization help in solving the tensions created by exploration and exploitation.

3.5 Knowledge management: the role of knowledge management practices in facilitating exploration and exploitation

As we stated earlier, organizations face challenges when trying to achieve ambidexterity due to the inherent tensions associated with exploration and exploitation activities.

The unmatched and different organizational cultures, structures and resources required to support the exploration and exploitation activities, make achieving ambidexterity very challenging.

However, the literature suggests that knowledge management within the organization can help in facilitating the action of achieving ambidexterity. This is due to the conduction of certain processes that reveal a better usage of the knowledge and information acquired by the firm (Jansen et al., 2005).

Knowledge management is a framework that has been extensively used through the literature to explore the relationship between the absorptive capacity and the organizational performance. Through highlighting and examining the role of knowledge sharing, creation

and application within the organization, knowledge helps in facilitating the innovation performance of the organization.

Earlier studies have connected knowledge management to absorptive capacity, and to ambidexterity, and the findings suggest that there is a positive relationship between the three variables.

For instance, Zahra & George, (2002) have found that knowledge management processes such as knowledge acquisition and application are positively linked to the absorptive capacity.

On the other hand, He & Wong, (2004) found that knowledge management is positively related to ambidexterity, in which the knowledge management practices can help in balancing exploration and exploitation. Specifically, knowledge management practices can help the organizations in facilitating the process of establishing the different organizational structures and cultures that are required to support exploration and exploitation activities, in which it allows the organizations to manage the flow of knowledge.

This management of knowledge reveals to the organizations the ability to break down silos and promote the collaboration and knowledge sharing between different departments and parts of the organization, which consequently leads to a greater exchange of ideas and information, which in turn is critical for exploration and exploitation activities.

According to Andreeva & Kianto, (2012), knowledge management practices such as knowledge sharing, creation, and application can actually help the organizations in overcoming various challenges, including those who are associated with the simultaneous establishment of the centralized and decentralized structures that support exploration and exploitation activities.

Similarly, Lichtenthaler, (2009) shows that the same knowledge management practices help organizations in achieving ambidexterity by the creation of a unique culture that supports innovation and continuous learning, which in turn, is essential for exploration and exploitation activities.

Additionally, Bock & Kim (2002) show through their study that knowledge sharing is a key factor in enhancing the innovation performance of the organization.

Knowledge and information are considered to be crucial for the continuous improvements and enhancements of the products and services, and this is essential for exploitation activities. According to Lee & Choi, (2012), knowledge sharing along with organization's ability to learn are positively related to the organizational ability to conduct continuous improvements. Similar to this, Van der panne, Van Beers & Kleinknecht, (2003) found that knowledge acquisition has a positive relation to the continuous improvements of the firm's existing products and services.

Additionally, the role of knowledge management in the literature is of high importance when it comes to enhancing the organizational learning and facilitating exploration and exploitation, since it helps in supporting cross-functional learning and promotes shared understanding of different types of knowledge (Hansen & Haas, 2001).

Interestingly enough, the influx of information and knowledge acquired by the firm is controlled by the firm's absorptive capacity (Zahra & George, 2002), in which firms with the

high level of absorptive capacity are more able to identify and acquire new knowledge that is normally associated with new opportunities (Lane & Lubatkin, 1998).

The absorptive capacity has been seen in addition as a key factor, guiding the processes of the knowledge acquisition and utilization of the organization, and helping to control the management of knowledge in the organization.

For example, companies with high levels of absorptive capacity are better able to acquire external knowledge (Cohen & Levinthal, 1990). This acquired knowledge can be then merged with the organization's existing knowledge base through the effective knowledge management practices (Nonaka & Takeuchi, 1995).

As a result, the absorptive capacity plays the role of a facilitator for the knowledge management practices, which in turn, helps to address the tensions created by exploration and exploitation. In essence, the absorptive capacity helps the companies to enhance the innovation's activities by effectively managing internal and external knowledge sources.

This highlights the important role of the absorptive capacity of the organizations working as a receptor and facilitator to acquire and assimilate the external knowledge that the organization needs in order to manage it through the knowledge management practices and then apply it to balance between exploration and exploitation.

Having established a comprehensive understanding about the role of knowledge in balancing the exploration and exploitation activities and the role of absorptive capacity in facilitating the knowledge management practices, the upcoming section is dedicated to explore the absorptive capacity and the mechanism by which it functions.

3.6 Absorptive capacity

By definition, the absorptive capacity is the firm's ability to acquire, assimilate and apply the external knowledge to enhance and develop the existing products and services or to develop new ones. Cohen & Levinthal (1990) were the first who introduced the concept to the literature, as they argued that by being dependent on external sources of knowledge, firms can improve their innovation's capabilities.

Since then, the concept of absorptive capacity has been intensively studied and several models have emerged to explore and know how firms can facilitate their absorptive capacity. One of these models has left an un-neglectable impact on the literature, and it is the model developed by Zahra & George, (2002). The authors suggest that absorptive capacity is a four stages model: acquisition, assimilation, transformation and exploitation.

The first stage is where a firm looks for and identifies knowledge from external resources. This includes processes such as scanning, searching and interpreting the value of what could possibly contribute to the innovation's capability of the firm. This stage is essential according to Zahra & George, due to the fact that it constitutes the foundation for the later stages. The second stage is the assimilation of the acquired knowledge, in which firms engage in the process of comprehending and understanding the newly possessed knowledge in order to integrate it with the already existing knowledge in the firm.

The third stage is where the firm converse the knowledge and incorporate it in the firm in order to elevate the level of competitiveness, through generating new ideas and solutions that drive the growth.

Lastly, the fourth stage where firms exploit the new knowledge in order to enhance the existing products and services that the firm offers. This stage, according to Zahra & George, is crucial, because it allows the firm to touch and capture the value from the new knowledge. Moreover, without the exploitation of the newly acquired knowledge, firms may miss the potential benefits derived from the absorptive capacity, such as enhancing the growth and the competitiveness of the firm.

Lane & Lubatkin, (1998) on the other hand, developed another model for absorptive capacity that was derived from the organizational learning's perspective. They argue that the absorptive capacity is a dynamic process of continuous recognition, assimilation and application of the external knowledge to enhance the performance of the organization. Both models show the absorptive capacity as being a process of knowledge acquisition, assimilation, transformation and exploitation. Additionally, both models discuss and highlight that the importance of the absorptive capacity lies in the process of enabling the organizations to acquire new knowledge from external resources and apply it to enhance the existing value offering, or to develop new one.

Consequently, the improved value offering helps the company to create greater competitive advantage, get better financial performance and be resilient and adapt to the changes in the market.

Lane et al. (2006) shows for instance that the absorptive capacity has a positive impact on the firm's financial performance. By being able to enhance the innovativeness of the firm, the absorptive capacity leads the firm consequently to enhance its financial performance. Another aspect that has been found to be positively impacted by the absorptive capacity, is the firm's ability to respond to the changes in the market. This includes for example changes in the customers preferences, market changes, market conditions or technological advancements.

Several studies such as Todorova & Durisin, (2007) have shown that the absorptive capacity of the organization is directly related to the organization's ability to adapt and respond to the changes in the environment.

Firms with a high level of absorptive capacity are more able to innovate and develop products and services aligning with the changing demand in the market. By having a high level of absorptive capacity, firms are more able to be innovative and develop superior products and services that go along with the changing demand in the market (Helfat & Raubitschek, 2018). Moreover, according to Cohen & Levinthal, (1990), the absorptive capacity allows organizations to acquire, assimilate and apply new knowledge to their existing knowledge base, which leads to a creation of new innovations. This creation of new innovations is supported by the capabilities that the high level of absorptive capacity gives to the firms in order to leverage the analysis of the newly acquired knowledge.

The research has also supported the notion that by acquiring a high level of absorptive capacity, firms are more likely to engage in strategic alliances and partnerships, which are considered to be an open source for external and new knowledge acquisition (Chesbrough,

2003). This helps those firms consequently to respond quickly to the changes in the environment and to develop a better competitive advantage.

The absorptive capacity of the firm is considered to be a crucial factor in the firm's ability to adapt and respond to the changes in the environment, which interestingly is the aim of ambidexterity as well. This statement clarifies the importance of knowledge absorption and management in solving the tensions created by exploration and exploitation and achieving ambidexterity, establishing a solid ground for stating the first hypothesis that is:

H1: There is a positive relationship between ambidexterity and absorptive capacity

Interestingly, in the preceding sections of this literature review, a well established understanding of key concepts and areas that are related to the research question has been established. The concept of ambidexterity along with the role it plays in facilitating and enhancing the performance of the organization in the marketplace has been discussed. The exploration and exploitation activities along with the tensions that these activities create has also been adequately explored and discussed based on earlier studies. Moreover, this review has also established a comprehensive understanding of the concept of knowledge management and the concept of absorptive capacity and the role they play in enhancing the organizational performance.

This foundation provides a solid ground to delve into the upcoming sections that will shed light and focus on the role of absorptive capacity in enhancing the exploration and exploitation activities.

By getting a better understanding on how absorptive capacity can help in facilitating the exploration and exploitation activities, a primary insight can be derived concerning the relationship between ambidexterity and absorptive capacity. Additionally, the better understanding will also set up the foundation to state the second hypothesis of this study. Therefore, the next sections will be focusing on how the firm's absorptive capacity can leverage and facilitate exploration and exploitation activities.

3.6.1 The role of absorptive capacity in facilitating exploration activities

There is a growing body of literature that highlights the role that the absorptive capacity plays in facilitating the exploration activities in the organizations. Generally, as we stated before, exploration activities involve processes such as the development of new products, services and technologies through actions such as experimenting, risk taking and learning. The literature suggests that the absorptive capacity plays a major role in facilitating the explorational activities in the organization, and this is due to the process of acquiring, assimilating, transforming and applying/integrating the gained external knowledge with the already existing knowledge base in the organization in order to create new knowledge that is normally associated with new products. This is seen as a key factor in facilitating the exploration activities in the organization. For example, a study by Zahra & George, (2002) shows that there is a well established positive relationship between absorptive capacity and explorational innovations in the organization. The study shows that this positive impact

comes from the process of acquiring the external knowledge from various sources such as universities, customers and suppliers, and then assimilating and transforming this knowledge in order to integrate it later with the organization's internal knowledge, which opens the door for the creation of newly and more valuable knowledge.

Similarly, in their study Camison & Fores ,(2010) show that there is a positive relationship between the absorptive capacity and the exploratory activities in the organizations, in which the knowledge acquisition and assimilation foster explorational activities in the organizations. Furthermore, studies have shown that the absorptive capacity optimizes the exploration activities by enhancing the acquisition, assimilation, transformation and exploitation of knowledge, and this leads to the overall enhancement of the exploration activities. For instance, Lane & Lubatkin, (1998) show that by allowing the organizations to effectively access the external knowledge, absorptive capacity helps the organizations in identifying new opportunities and developing new technologies. Similarly, a study by Zahra & George, (2002) states that having the capacity to recognize and incorporate external knowledge allows the organizations to better evaluate the identified opportunities, which in turn leads to an optimized and better exploratory behavior.

Cohen & Levinthal, (1998) show in addition that the absorptive capacity helps the organizations in overcoming the cognitive barriers inhibiting the exploratory efforts, in which it enables the organizations to overcome the tendency to be reliant on existing routines. The literature also shows a positive relationship between the absorptive capacity and the organizational ability to explore new markets, technologies, products/services. For example, Lane, Koka & Pathak, (2006) show that by having a high level of absorptive capacity, organizations can facilitate the process of exploring new markets. Moreover, Jansen, Van Den Bosch, & Volberda, (2005) discovered that the absorptive capacity enables the firms to explore new technologies that can be used to enhance the performance of the firm.

In addition, Lichtenthaler, (2009) found that the absorptive capacity is essentially important in exploring new technologies, in which companies with high levels of absorptive capacity are better able to recognize and assimilate technological knowledge.

The literature clearly suggests that the absorptive capacity helps in facilitating and enhancing the exploratory activities of the organizations. The absorptive capacity helps the organizations to better acquire, assimilate, transform, integrate and apply the new knowledge gained from different external sources, in order to develop new products, services and technologies. Additionally, by the knowledge integration processes, the absorptive capacity helps the organizations in overcoming the barriers such as the resistance to change.

3.6.2 The role of absorptive capacity in facilitating exploitation activities

As stated earlier, the exploitation activities involve actions such as refinement, incremental improvements, efficiency and enhancement of the existing products, services, knowledge and technologies that the organization possesses. The absorptive capacity has been found to be essentially important in facilitating these activities by enabling the organizations to identify, acquire the newly possessed knowledge and integrate it with the internal knowledge.

The absorptive capacity gives the organizations the capability to acquire external knowledge that is related to and relevant to the existing products or services, which leads to an increased efficiency of these products and services. This is achieved by establishing a process of scanning and searching in the external environment of the organization for relevant knowledge that can be then assimilated and transformed to determine how this knowledge can be used to enhance the products and services.

Zahra & George, (2002) show for instance through their study that the absorptive capacity allow the organizations to assimilate and transforme the acquired knowledge by interpreting it with the light of the internal knowledge of the organization, and then determine how it can be applied to enhance and increase the efficiency of the existing products and services. In addition to this, Cohen & Levinthal, (1990) highlight the importance of the absorptive capacity on the exploitation activities by demonstrating how the process of the knowledge-use is applied. According to the authors, after acquiring the knowledge, it goes into a process of testing and evaluating in which the absorptive capacity allow the organizations to test, evaluate and apply the newly acquired knowledge in the existing products and services, and then measure the outcomes in order to effectively and accurately determine the impact that this new knowledge has on the performance of the products and services.

Absorptive capacity is considered to play a critical and crucial role in facilitating the exploitative activities of the organization. By allowing the organizations to acquire, assimilate, transform, and apply the newly acquired knowledge and integrate it with the internal knowledge, organizations can enhance and incrementally improve the performance of their products and services. This leads to an increased performance of the innovation of the exploitation activities in the organizations. For instance, Zahra & George, (2013) found that the absorptive capacity positively impacts the innovation performance of the firms, and Saunila & Ukko, (2014) have demonstrated in their study that the absorptive capacity has a positive effect on the exploitative activities in SMEs.

In addition, Flatten et, al. (2011) argue that the absorptive capacity is essentially important for the development of the products and services.

The existing body of literature provides clear evidence of the role that the absorptive capacity plays in facilitating the explorative and explorational activities of the organization. Through allowing the organization to acquire, assimilate, transform, apply and integrate new knowledge from the external and internal sources, organizations can incrementally improve the exciting products or services and create new ones, and also, organizations can explore new markets and technologies.

This, set up the foundation to state the second hypothesis that will help in answering the research question:

H2: The absorptive capacity helps the companies to enhance their innovation's activities and develop products and services

By examining H1 and H2, an adequate answer should be given to the research question: what is the relationship between absorptive capacity and ambidexterity in companies in Sweden?.

Moreover, these hypotheses, along with the research question will guide the quantitative study and contribute to reaching the answer.

3.7 Summary of the theoretical framework

The ambidexterity and absorptive capacity are two structures with fundamental importance in the organizational behavior and management literature. Ambidexterity refers to the organization's ability to simultaneously engage in explorative and explorational activities that are crucial for long-term growth and short-term effective performance. On the other hand, the absorptive capacity is the organization's ability to acquire, assimilate, transform and apply external knowledge and relevant information that come from different sources.

The literature review conducted in this study, provides clear understanding and demonstrates the cruciality of ambidexterity and absorptive capacity as two fundamentally important factors engaging in facilitating the growth and the performance of the organizations.

Ambidextrous organizations are more likely to show successful behavior in the market due to their ability to balance the exploration and exploitation activities. Exploration refers to the organization's ability to explore, risk take, and define new opportunities. Exploitation refers to the organization's ability to incrementally improve and optimize the current value offerings and also to fully exploit the existing resources and capabilities.

This literature review has also articulately demonstrated the way by which exploration and exploitation create tensions, in which it provided a solid understanding based on earlier studies that the different organizational cultures, structures and ways to support exploration and exploitation activities, are what creates the tensions and contribute to the difficulty of achieving ambidexterity.

Moreover, the role of knowledge management in facilitating the exploration and exploitation activities has been focused on, and earlier studies have shown that the effective usage of the knowledge management practices leads to a better facilitation of the exploration and exploitation activities.

In this discourse, the role of absorptive capacity in facilitating the knowledge management practices has been highlighted as being essential, allowing the organizations to manage the knowledge more efficiently.

The absorptive capacity enables the organization to acquire, assimilate and apply external knowledge to enhance the organization's current value offerings and the overall innovation's activities. It acts as a receptor for knowledge, optimizing the process of acquiring new knowledge and integrating it with the existing knowledge to create new knowledge that is associated with new products and services.

At last, the theoretical framework of this study has helped in illuminating and provided valuable insights into the concepts of ambidexterity and absorptive capacity within the organizational and management context. It has extensively deepened the understanding of

these complex concepts and their significance in driving the organization towards success and developing a strong competitive advantage to be able to adapt to the changes in the environment.

By exploring the literature and the existing theories, this theoretical framework has identified the mechanisms by which ambidexterity and absorptive capacity functions. It has additionally discussed the importance of balancing the exploration and exploitation in order for the organizations to adapt to the changes in the environment and survive. Moreover, this theoretical framework has underscored the role of absorptive capacity in enhancing the innovation's activities.

Furthermore, the theoretical framework has laid the foundation to develop the hypothesis this study is aiming to test. It has helped in getting a better understanding of the variables, their relationship, and the expected outcomes, enabling a focused exploration of the relationship between the absorptive capacity and ambidexterity in the context of Swedish companies. By testing the hypothesis, this study is aiming to provide a clear answer to the research question, contributing to the existing body of knowledge and offering practical implications for the organizations who aim to develop a stronger competitive advantage and to be able to respond to the changes in the market.

4. Empirical study

4.1 Introduction

This chapter aims to answer the research question and explore the relationship between ambidexterity and absorptive capacity between companies that operate in different sectors in Sweden.

The theoretical framework developed in the previous chapter laid the foundations to formulate and test the hypothesis in this study.

To achieve the objective of this study, the data has been collected from the annual reports of 31 companies operating in different sectors such as healthcare, manufacturing, technological and service in Sweden.

The selection method of the companies was dependent on the availability and the quality of the information that is provided in the annual reports, and this concerns annual reports that were published in the year 2021.

In addition, when collecting the data, proxies that were based on the literature were used, in which R&D expenditures used as proxy for measuring the absorptive capacity of the company and new products/services launched, patents, and enhancements of the products/services were used as proxy for measuring the ambidexterity of the companies. When scanning and analyzing the annual report, the content analysis method was seen to be the most valuable to extract the needed data from the reports.

Content analysis is a method that involves systematic examination and interpretation of the textual and visual data in order to identify meanings and patterns.

According to Krippendorf, (2018), content analysis is a very powerful and valuable tool that the researcher can acquire in order to understand and interpret the information that companies disclose in the annual reports. The author states moreover that the content analysis method can help the researcher to identify and understand the information provided in the company's annual report, since the annual reports are considered to be the primary source of the company's information and they contain valuable information concerning the company's financial, non -financial and strategic performance.

Thus, through following the content analysis method when collecting the data, the margin of errors coming from possible misinterpretation of the information was narrowed down, due to insights that the content analysis method reveals into the company's communication strategy and how it communicates and portrays itself to the stakeholders.

The collected data was then analyzed through SPSS software, using statistical analysis such as ANOVA analysis combined with correlational analysis to explore the relationship between the two variables.

Taking this into consideration, the following sections of the empirical chapter of this study are designed as the following:

In section 4.2 of this chapter, the sample and the data collection process is provided in descriptive and accurate manners, providing details about the companies, the selection method of the sample, the data collection method and the variables used in the analysis. Section 4.3 provides detailed description about the statistics used in analyzing the data, and this includes a brief overview of the ANOVA test and the correlation analysis.

The section 4.4 provides the results of the analysis including the test of the hypothesis developed in the theoretical framework.

Section 4.5 discusses the results of this study in the light of the research question and in what has been yet suggested and presented by the literature, and also, identifies the implications of those who are seeking to enhance the ambidextrous behavior of the organizations.

Finally, the 4.6 summarizes the findings of this study, highlights the limitations and sets up the foundations for future research questions.

4.2 Sample and data collection

As mentioned earlier, the sample consists of 31 companies operating in different sectors in Sweden, and these companies are representative of their relevant industries. The selection process of the sample is based upon a purposive sampling method involving the selection of specific participants who are seen to be most useful to answer the research question (Bryman, 2016).

The purposive sampling was considered to be the most appropriate in this study, since it allowed the selection process to be directed towards companies that were seen to be valuable in providing the data to explore the relationship between absorptive capacity and ambidexterity.

Moreover, the purposive selection method allowed the selection process to be condensed to different and, at the same time, specific targeted industries (Healthcare, technology, service, and manufacturing) where there is a high level of competitiveness and companies need to

possess the attributes of ambidexterity and absorptive capacity in order to compete, respond to the changes in the environment and survive.

By selecting companies that were most likely to possess the characteristics that are important for the research question, the generalizability, validity and reliability of the research findings increase (Patton, 2015).

In addition, the sample size is appropriate for conducting a quantitative study and ensures a reasonable level of statistical power. According to Cohen, (1998), a sample size of 30 or more is generally considered to be sufficient to provide an acceptable level of statistical power in studies that are based on quantitative approach.

The data collection process however, started with developing proxies for the absorptive capacity and ambidexterity. Relying on earlier studies and the literature, the R & D expenditures were used by many earlier studies and researchers as a measurement for the level of absorptive capacity in the company, since investing in R & D allows the company to acquire knowledge from the external environment (Lane & Lubatkin, 1998), and allows the company to acquire, assimilate, and apply new knowledge, which is considered to be key in absorptive capacity (Zahra & George, 2002).

Additionally, when measuring the ambidexterity of the companies, the reliance was on the company's innovation's activities such as new product/service launched, patents, incremental improvements and developments of the products and services. These measurements provide accurate indication of the company's ability to possess ambidextrous behavior (Gibson & Birkinshaw, 2004).

The second step of the data collection process starts by identifying the industries where the competition and the concurrence is at high levels, and this is built upon the notion that when the competition is high in the market, companies need to be flexible and adaptable.

Being flexible and adaptable indicates that the companies need to explore and exploit at the same time in order to survive and thrive, (March, 1991). The healthcare sector, along with the manufacturing, service and technology sectors are seen to be highly competitive sectors in Sweden.

After identifying the industries to select the companies of interest, an accurate searching and scanning method was followed. The method included the search for the companies that operate in these industries in Sweden through using Google.com, Allabolag.se, Sverigesindustri.se, affarsvarlden.se, and Dl.se.

The results of the search came with 50 companies, which required a filtration to ensure the accurate selection of the companies that were seen to be most valuable to answer the research question.

The filtration process started with an initial scanning of the companies either by visiting the companies website, or by reading annual reports. After the filtration process, the 31 companies included in the study were selected.

The third step additionally, started with downloading all the annual reports of the companies and reading to get a better understanding and also identifying patterns to ease the process of data collection.

The patterns identified were for example that many companies include the new product/services launched in the first pages of the annual reports, or in the CEO's word, or in a specific section with the title "Important events of the year".

In addition, the R & D expenditures could be announced under the "Research and development" section in the annual report instead of being announced in the income statement.

The fourth step started with the first-time scanning of the reports. Google document was created to code and move the extracted data from the annual reports to the google document. When looking for the measurements of the absorptive capacity and ambidexterity, a well established organizing technique was developed.

The technique was as follows: when a company announces in its annual report a new product launch, then this product launch takes the number 1, referring to the amount of new products/services launched. If the company launched two products, then the number is 2, referring to the amount of the launched products/services. The same technique applies for the patents and the incremental improvements and enhancements of the existing products. This means that a representative number is given to the amount of the new products/services, patents, and incremental improvements.

In addition, when the R & D expenditures are announced as a percentage in the annual report instead of the income statement, the following mathematical equation (R & D in % * net sales) was applied to calculate the exact amount spent on R & D.

The extracted data is then exported to the organized google document.

The fifth step started by scanning and reading the annual reports of the companies once again to ensure that the extracted data was accurate, and also to narrow down the margin of errors coming from potential misinterpretation of the information announced on the annual reports. The gathered data was then exported to an Excel sheet to be cleaned and prepared to be exported as inputs to the SPSS in order to run the statistical analysis and explore the relationship between the variables.

The next section provides detailed script of the statistical analysis

4.3 The statistical analysis of the data

The collected data was imported from a pre-organized excel sheet to the SPSS software, where three variable categories were created.

The first category represented the companies names, and the second category labeled as R & D expenditures, while the third category represented the summed amount of the new products/services/patents/incremental improvements on the services/products that each company has.

Since the selection of the statistical methods should be proportional to the nature of the collected data, the type of the data, the size of the sample, the nature of the research question and the hypothesis, the selection of the statistical methods to conduct this study was based on accurate understanding and reasonable manners in order to obtain meaningful and understandable results.

The statistical methods applied included ANOVA analysis and Correlation analysis.

The ANOVA analysis was chosen due to the statistical power that this analysis provides in comparing the means between and within the variables.

In this study, there were two variables in the data and the ANOVA test helped in projecting the difference in the statistical significance of the means between these variables in order to understand the nature of the relationship between them.

By using ANOVA analysis, meaningful and precise estimations were obtained, and the results helped in deriving the conclusions of this study.

Moreover, the correlation analysis was also of high interest since it allowed the examination of the strength and direction of the relationship between the two variables.

The correlation analysis measures the nature of the relationship between the variables, and also measures the extent to which these variables are connected and related.

By conducting correlation analysis, a better and precise understanding was provided in order to understand the nature and the direction of the relationship between the two variables. Furthermore, Kendall's tau-b analysis was also of importance to explore the correlation between the R & D expenditures and the number of new products/services, patents and incremental developments.

This analysis provided accurate and precise outcomes that contributed in getting a comprehensive understanding of the direction and the strength of the relationship between the two variables.

The statistical methods that were used in this study were selected specifically with the aim to address the specific research question along with the hypothesis in order to provide accurate, comprehensive and meaningful results. ANOVA helped in getting a better understanding about the differences of the means between the variables, the correlational analysis helped in understanding the strength and direction of the relationship. Together, these methods provided the needed statistical power to derive meaningful and reliable conclusions.

4.4 The results of the analysis

In order to answer the research question (**What is the relationship between ambidexterity and absorptive capacity in companies in Sweden?**), two hypotheses were stated. *H1: There is a positive relationship between ambidexterity and absorptive capacity*

And

H2: The absorptive capacity helps the companies to enhance their innovation's activities and develop products and services

To test the hypothesis, correlation analysis was first applied to understand the strength and nature of the relationship between absorptive capacity and ambidexterity.

			The new products. services, patents and innovations	The amount spent on R&D in SEK
Kendall's tau_b	The new products.services, patents and innovations launched	Correlation Coefficient	1,000	,557**
		Sig. (2-tailed)		<,001
		N	31	31
	The amount spent on R&D in SEK	Correlation Coefficient	,557**	1,000
		Sig. (2-tailed)	<,001	
		N	31	31
Spearman's rho	The new products.services, patents and innovations launched	Correlation Coefficient	1,000	,718**
		Sig. (2-tailed)		<,001
		N	31	31
	The amount spent on R&D in SEK	Correlation Coefficient	,718**	1,000
		Sig. (2-tailed)	<,001	
		N	31	31

^{**.} Correlation is significant at the 0.01 level (2-tailed).

The results of the correlation analysis show a positive and significant relationship between the two variables being examined.

The relationship was observed and confirmed using both Kendall's tau-b and spearman's rho which are both analytical methods used to examine the correlation and the relationship between variables.

Both Spearman's rho and Kendall's tau-b show a strong and positive correlation between the absorptive capacity represented by the R & D expenditures and ambidexterity represented by the number of new products/services launched, patents and incremental improvements.

Kendall's tau-b strikes a correlation coefficient of .577**, while Spearman's rho 0.718**, and both show a p-value of less than 0.001 confirming a high degree of statistical significance. The P-value confirms moreover that the correlation between the two variables is strong and statistically significant, eliminating the possibility that the relationship between the two variables is due to chance.

Further, with the aim to determine whether the absorptive capacity would impact the company's innovations' activities, The ANOVA analysis was then applied. In the analysis, the 31 companies are divided into groups based on the amount spent on R & D (High R&D expenditures, Medium R&D expenditures and Low R&D expenditures). The specific metrics and criteria by which these companies are divided into the groups, are determined by the ANOVA analysis automatically.

After this, the ANOVA analysis states the null hypothesis automatically, which suggests that there is no significant relationship between the R & D expenditures (absorptive capacity) and The number of products/ services launched, patents and incremental improvements (Ambidexterity).

After, the ANOVA analysis provides the results in two tables.

ANOVA					
The amount spent on R&D in SEK					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,695×10^21	8	2,118×10^20	1540,978	<,001
Within Groups	3,024×10^18	22	1,375×10^17		
Total	1,698×10^21	30			

As the first table shows, the results of the ANOVA analysis show a significant F-value of 1540,978 and a P-value of less than 0,001, indicating that there is clear and strong evidence to reject the null hypothesis and accept the alternative hypothesis.

The alternative hypothesis suggests that there is a significant relationship between the variables.

In addition, as the table shows, there is a difference between the sum of squares between the groups and the sum of squares within the groups. This indicates and strengthens the argument that the difference in the number of products/services launched, patent acquired and incremental improvements of the products and services (ambidexterity) is related to the R&D expenditures (absorptive capacity).

ANOVA Effect Sizesa

			95% Confide	nce Interval
		Point Estimate	Lower	Upper
The amount spent on R&D in SEK	Eta-squared	,998	,995	,998
	Epsilon-squared	,998	,993	,998
	Omega-squared Fixed- effect	,997	,993	,998
	Omega-squared Random- effect	,980	,946	,983

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

Associated with the first table, the second table of the ANOVA analysis shows the effect sizes in the context of the ANOVA analysis.

The effect size quantifies the level of strength between the variables.

The Eta-squared indicates the proportion of variance in the dependent variable (Ambidexterity represented by the number of products/services launched, patent and enhancements of the products and services) explained by the independent variable (Absorptive capacity represented by R & D expenditures).

The Eta-square is ,998, indicating that 98% of the variance of (Ambidexterity represented by the number of products/services launched, patent and enhancements of the products and services) can be accounted for by (Absorptive capacity represented by R & D expenditures). The 95% confidence interval shows that the true value of the Eta-squared falls between 95% and 98%.

The Epsilon-squared represents the proportion of variance explained by the independent variables (Absorptive capacity represented by R & D expenditures). It shows that 98% of variance in (Ambidexterity represented by the number of products/services launched, patent and enhancements of the products and services) can be explained by (Absorptive capacity represented by R & D expenditures). The confidence interval is also reported.

The Omega-squared fixed is also reported and it shows that 97% of the variance in (Ambidexterity represented by the number of products/services launched, patent and enhancements of the products and services) can be explained by (Absorptive capacity represented by R & D expenditures). The confidence interval is also reported.

The Omega-squared random measures the effect size but it takes into consideration the random-effect model. It shows that around 98% of the variance in (Ambidexterity represented by the number of products/services launched, patent and enhancements of the products and services) can be explained by (Absorptive capacity represented by R & D expenditures). The confidence interval is also reported.

Taking this into consideration, these measurements indicate a strong relationship between the variables, and suggest that the independent variable explains a significant amount of variation in the dependent variable. In other words, the results of the ANOVA test shows that the absorptive capacity does actually help the companies to enhance their innovation's activities and develop products and services.

The findings of the statistical analysis are consistent with, and support both hypotheses. The correlation analysis confirms that there is a positive significant relationship between absorptive capacity measured by R & D expenditures of the companies, and ambidexterity measured by the innovation's activities.

The positive correlation indicates that the companies with high levels of absorptive capacity are better able to possess and inhibit the ambidextrous behavior.

Moreover, the results of the analysis suggest as well that the companies who possess a higher ability to acquire, assimilate, and apply external knowledge, are more likely to balance exploration and exploitation activities and achieve ambidexterity.

The positive statistical significance confirms additionally that there is a strong level of association between ambidexterity and absorptive capacity, indicating that by focusing on developing the absorptive capacity to acquire, assimilate, apply and utilize knowledge, companies can achieve ambidexterity.

Further, the results of the ANOVA analysis support the second hypothesis stated in this study, in which it revealed that there was a significant difference between them.

This confirms that the companies who have high levels of absorptive capacity, also have high levels of innovation's activities in comparison with the companies who have lower levels of absorptive capacity.

This finding supports the notion that the companies who have higher levels of absorptive capacity are better equipped to identify, acquire, assimilate and apply external knowledge, which leads to better innovation performance.

4.5 Discussion

In today's business environment, the ability to balance exploration and exploitation activities of the organization is essential for the long term success. The balance between the two activities can be achieved through ambidexterity, which is defined as the organization's ability to explore new opportunities and exploit the existing resources simultaneously. Additionally, the organization's ability to acquire, assimilate, and apply external knowledge is also seen to be crucial to enhance the organization's innovations capabilities and develop new products and services.

The primary objective of this study was to explore the relationship between ambidexterity and absorptive capacity in companies in Sweden, aiming to provide insights into the organization's ability to balance between exploration and exploitation in order to achieve ambidexterity and foster innovation

.

As we have seen earlier in this study, earlier researches have suggested that ambidexterity can help the organizations to balance between exploration and exploitation activities, leading to better innovation's performance (Raisch & Birkinshaw, 2008).

Similarly, the literature suggests as well that the absorptive capacity is linked and connected to the organization's ability to develop products and services, which ultimately will lead to better performance (Cohen & Levinthal, 1990).

However, with respect to some key works such as (Jansen, Vanden Bosch, & Volberda, 2005a, 2005b, 2006), there was a lack of consensus on the relationship between ambidexterity and absorptive capacity. Therefore, this study had an aim to contribute to the existing body of knowledge by exploring the relationship between ambidexterity and absorptive capacity.

In this study, it was hypothesized that it would be a positive relationship between ambidexterity and absorptive capacity. Additionally, it was also hypothesized that the absorptive capacity would help the companies to innovate more and develop products and services.

To test these hypotheses, correlation analysis and ANOVA analysis were applied on a sample of 31 companies that operated in different industries in Sweden.

The results of the analysis support the first hypothesis, confirming a significant positive correlation between absorptive capacity and ambidexterity. This result goes along with earlier research suggesting that the companies with high levels of absorptive capacity are more likely to possess the ambidextrous behavior (Jansen et al., 2006).

In addition, the results also support the notion that the absorptive capacity and ambidexterity are complementary constructs that are incorporated in the organization's ability to enhance its innovation and develop products and services.

The results highlight moreover the interplay between the two constructs, indicating that the high levels of absorptive capacity allow the companies to be able to balance between exploration and exploitation activities.

In line with the second hypothesis, the results of the ANOVA support the notion that the absorptive capacity helps the companies to innovate more and develop new products and services. This suggests that the companies with higher levels of absorptive capacity are better able and equipped to acquire, assimilate and apply external knowledge, leading to better innovation and development of products and services.

The results of this study have very important theoretical and practical implications that are going to be discussed in detail in the next section.

Theoretically, the findings of this study contribute to the existing body of knowledge by confirming that there is a positive relationship between ambidexterity and absorptive capacity. Moreover, the findings do additionally suggest that by acquiring high levels of absorptive capacity, companies can most likely exhibit ambidexterity, that in turn, enhance their ability to develop products and services and innovate to adapt to the changes in the market and survive.

Practically, the findings can help inform the ones who want to enhance the innovation's capability of the organization. The findings of this study suggest that the companies who invest in building their absorptive capacity are better able to acquire, assimilate and apply the new knowledge. This leads to a better innovation's performance and allows the company to be better able to develop new products and services.

4.5.1 The results in the light of previous studies

The findings of this study have significant implications for understanding the relationship between ambidexterity and absorptive capacity.

Earlier studies have suggested that the companies who have high levels of absorptive capacity are more capable to explore new markets, technologies and customers' needs, while also are better able to leverage their existing knowledge to develop products and services. Through confirming that there is a significant positive correlation between the absorptive capacity and ambidexterity, this study provides further evidence of the positive association between the two constructs.

The results of this study show that the companies who have high levels of absorptive capacity are better able to balance between exploration and exploitation and achieve ambidexterity. This finding goes along with what was suggested by (Jansen et al., 2005a, 2005b, 2006). Moreover, the results suggest that by acquiring a high level of absorptive capacity, companies

tend to launch more products and services in comparison to those who don't. This finding is once more considered to be consistent with the same work by (Jansen et al., 2005a, 2005b). For example, Jansen et al., (2005a) found in his study that the absorptive capacity was positively related to the exploration dimension of ambidexterity, suggesting that the companies who have high levels of absorptive capacity are more capable to explore technologies and markets.

Additionally, another study by Jansen et al., (2005b) focused on the exploitation dimension, and found that there was a positive relationship between the absorptive capacity and the firm's ability to exploit the existing knowledge of the organization. This suggests that the absorptive capacity helps the companies to leverage their existing knowledge to develop products and services.

Further, we have seen in the previous sections of this study that exploration and exploitation are contradictory activities by nature, and they create tensions that hinder the organizations to balance between these activities and achieve ambidexterity.

While earlier studies have identified mechanisms that enable the firm to develop ambidextrous capabilities such as organizational structures, cross-sectional teams and organizational cultures, this study has highlighted the role of the absorptive capacity in solving the tensions between exploration and exploitation and help the organizations to achieve ambidexterity. Specifically, this study showed that by acquiring high levels of absorptive capacity, companies tend to be more innovative and launch more products and services. This indicates that the absorptive capacity has allowed the companies to be better able to manage the tensions between exploration and exploitation and strike a balance between these activities in order to achieve ambidexterity.

However, it's essentially important to mention that the absorptive capacity is not the only factor that contributes to the organizations' capability to solve the tensions between the two contradictory activities.

The literature suggests that there are other factors such as the strategic discussion making, organizational structures and cultures that support both exploration and exploitation (Gibson & Birkinshaw, 2004; Jansen et al., 2006), play a critical role in helping the organization to manage the tensions and achieve ambidexterity.

Although these factors contribute in solving the tensions created by exploration and exploitation, they would not be completed without the essential contribution that the absorptive capacity provides, in which it builds up the foundation for the organizations to successfully and effectively manage the tensions between exploration and exploitation. Specifically, the absorptive capacity allows the organizations to continuously learn, integrate and utilize new knowledge to innovate and develop new products and services so that they can be competitive in the market (Cohen & Levinthal, 1990).

Furthermore, through providing evidence that the companies with high levels of absorptive capacity tend to launch more products/services, acquire patents or enhance their existing products/services, the findings of this study provide evidence that there is a link between the absorptive capacity and the continuous innovation. This finding is aligned with what has been suggested by Zahra & George (2002), in which the authors suggest that the absorptive

capacity is critical in allowing the organization to engage in continuous innovation and achieve ambidexterity.

In summary, through exploring the relationship between ambidexterity and absorptive capacity, this study provides further evidence and results that align with earlier studies and research about the topic.

The significant positive correlation between the ambidexterity and the absorptive capacity indicates that the companies with strong absorptive capacity are better able to balance between the exploration and exploitation, develop products and services and innovate. Moreover, by showing that the companies with high levels of absorptive capacity tend to launch more products and services, the results provide evidence that developing a strong absorptive capacity is key in order for the organizations to achieve ambidexterity.

4.5.2 Theoretical implications

This study provides significant theoretical implications as it strengthens the understanding of the relationship between ambidexterity and absorptive capacity.

By providing empirical evidence of a positive correlation between the two constructs, this study does for sure contribute to the literature and the ongoing debate about how organizations can achieve ambidexterity, with a specific focus on the role played by the absorptive capacity.

Firstly, this study reaffirms the essentiality of the absorptive capacity as a factor that enables the organizations to enhance their innovations' capabilities, develop products and services and optimize their competitive advantage. This finding goes along with earlier studies that highlighted the importance of absorptive capacity in enhancing the organization's innovativeness and achieving ambidexterity.

However, it's important to mention that this study took a step further through providing concrete empirical evidence of a positive relationship between ambidexterity and absorptive capacity. By stepping beyond the theoretical discussions and building a statistically supported connection, this study strengthens the understanding of how these two concepts interrelate. In addition, the finding demonstrates that the companies with higher levels of absorptive capacity tend to launch more products and services, acquire patents, and conduct incremental improvements on the existing products and services, does in fact have implications for theories on the innovation and its relation to the competitive advantage. Namely, this study demonstrates that the continuous learning, knowledge acquisition, integration and utilization through absorptive capacity are important for developing a strong competitive advantage in the markets where companies are required to adapt to the changes in the environment to survive.

Furthermore, this study has indirect theoretical implications that warrant consideration. By identifying the role that the absorptive capacity plays in achieving ambidexterity and balancing between exploration and exploitation, this study has contributions to the literature on ambidexterity.

Specifically, this study contributes to the ongoing debate about the relationship between exploration and exploitation and the innovation performance of the organization.

There are some studies arguing that exploration is the most important for the long-term achievements and innovation's performance of the organizations, and there are other studies who suggest that a balanced approach that includes exploration and exploitation is the most effective. This study supports the latter argument through providing empirical evidence showing that organizations who have strong absorptive capacity can enhance the balance of exploration and exploitation activities and achieve continuous innovation.

Finally, this study also has implications to the knowledge management literature. Through showing that the absorptive capacity is positively related to the enhanced innovation's performance of the organizations, it contributes to the debate on how the organizations can enhance and optimize their innovation's performance to stay competitive in the marketplace.

The theoretical implications of this study are significant and broad. By providing empirical evidence to support the importance of absorptive capacity in helping the organizations to balance between exploration and exploitation, and through demonstrating that the absorptive capacity is positively related to ambidexterity, this study provides a considerable amount of implications to different areas of theoretical inquiry. This includes organizational ambidexterity, innovation, competitive advantage, and lastly knowledge management.

4.5.3 Practical implications

This study does provide practical implications to the managers who are seeking to enhance the organization's innovation's performance and achieve ambidexterity.

The findings of this study suggest that the absorptive capacity plays an essentially important role in enhancing the innovation's capabilities of the organization, achieve ambidexterity and thus, develop a strong competitive advantage.

Managers can in fact focus on leveraging the absorptive capacity of the organization in order to set up the foundations and build the capabilities required to achieve ambidexterity. Additionally, by enhancing the organization's ability to acquire, assimilate and apply the external knowledge, gaps can be identified in the acquired knowledge that is utilized and shared in the organization.

Since the results of this study demonstrate that the companies with high levels of absorptive capacity are better able to achieve ambidexterity and launch new products/services, acquire patents and enhance their current value offerings, managers can focus on enhancing and building a strong absorptive capacity to optimize the organization's innovation's performance.

Further, the government and policy makers are also included in the audience that the results of this study target. By promoting programs encouraging the development of strong absorptive capacity in the organizations, organizations can foster their innovation's activities and produce more products and services, which consequently leads to increased competitiveness in the market, which in turn, leads to better economic growth in the long run.

Moreover, the findings of this study provide valuable insight to the entrepreneurs who want to enhance the competitive advantage of their business. Through focusing on building a strong ability to acquire, assimilate and apply external knowledge, they can optimize their innovation's activities and achieve ambidexterity that will allow them to better respond to the changes in the market.

In summary, this study provides practical and valuable implications to the managers, government and policy makers and entrepreneurs. Through understanding the importance of absorptive capacity in achieving ambidexterity, the organizations can be positioned in a way that will allow them to be successful and adapt to the changes in today's dynamic business environment.

4.6 Conclusions

The research question "What is the relationship between ambidexterity and absorptive capacity in the companies in Sweden?", has been explored in this study, and the findings shed light on the intriguing relationship between ambidexterity and absorptive capacity. The exploration conducted on a sample of 31 companies operating in different industries in Sweden, revealed an intricate connection between the two constructs. The analysis employed statistical methods in order to unravel the intricacies of the relationship, contributing in compelling insights.

The findings of this study confirmed a positive relationship between the absorptive capacity and ambidexterity.

Companies with high levels of absorptive capacity showcased better ability to balance between exploration and exploitation, resulting in the achievement of ambidexterity. In other words, this study suggests that the companies who have better ability to acquire, assimilate and apply external knowledge are in fact better equipped to balance the exploration of the future opportunities and the exploitation of the current resources.

Moreover, this study highlighted the significant role of the absorptive capacity in facilitating the processes of knowledge acquisition and utilization. This, in turn, reinforced the organizations to balance and harmonize diverse knowledge domains in order to develop new products and services. In other words, the positive relationship between ambidexterity and absorptive capacity indicates that the companies who continuously acquire and assimilate new knowledge are better able to innovate and develop products and services. Since the absorptive capacity serves as a facilitator for knowledge management practices, it allows the organizations to integrate the new knowledge with the existing knowledge. This enhances the innovation's activities and helps in addressing the tensions created by exploration and exploitation.

In conclusion, this study affirms a significant positive relationship between the absorptive capacity and ambidexterity in companies in Sweden. The nature of these constructs unlocks the potential for the organizations to innovate more and develop a strong competitive advantage in order to respond to the changes in the environment, survive and thrive in this dynamic business environment.

However, although this study has illuminated the relationship between ambidexterity and absorptive capacity, it's essentially important to acknowledge its limitations. Therefore, the next section will discuss the limitations of this study and pave the way for future research.

5. Limitations and Future research

Although this study provides insightful implications, there are some limitations that should be taken into consideration.

Firstly, the generalizability of this study is limited. Although the sample size provides meaningful results, the sample size that consisted of 31 companies could be limited to be generalized, and the 31 companies don't represent the whole population of the companies in the relevant industries.

Secondly, since the study is applied to a sample of companies that operate in Sweden, those companies apply for the conditions of the specific geographical area, the market and the market's conditions in which those companies operate. Therefore, the applicability of the findings on other companies that operate in other markets could be limited, due to the different market dynamics.

Moreover, it's essentially important to mention that the literature on ambidexterity and absorptive capacity is still an ongoing literature, and the dynamics by which these constructs function are still under exploration. Therefore, the results of this study should be consumed with caution and in the light of the existing knowledge.

Additionally, correlation doesn't imply causation. Although this study confirms that there is a positive relationship between ambidexterity and absorptive capacity in the examined sample, but without experimental design, the causality cannot be inferred.

Finally, there is a limitation that is applied for every quantitative research in general. Quantitative studies, including this study, may have limitations in understanding the intricate dynamics within the organization. While statistical methods provide valuable insights, they may not fully comprehend the complexity of the organizational processes.

However, to address these limitations, future studies could aim for larger samples and encompass a wider range of industries and geographical locations. This is to enhance the generalizability of the findings and provide a more comprehensive understanding of the relationship between ambidexterity and absorptive capacity.

Additionally, future research could use primary data sources to collect more comprehensive data about the ambidexterity and absorptive capacity and the exact dynamics by which they function.

Moreover, future research may also investigate and explore other factors that could influence the absorptive capacity and ambidexterity. For example, organizational culture or leadership styles. By addressing these limitations and conducting future research, a full understanding of the absorptive capacity and its relation to ambidexterity will be provided, and more comprehensive and insightful practical and theoretical implications can be provided.

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Appendices

The following appendix (Appendix A) shows the companies included in the sample with a brief description of every company's business. The appendix serves also as a reference for the readers who have in their aim to further explore the companies, the industry these companies operate in or the ones who want to get a better understanding of each company in general

Appendix. A

1. Elekta AB	Swedish company that provides clinical solutions for cancer and brain disorders.
2. Getinge AB	Swedish company that develops products for healthcare
3. Essity AB	Swedish company that develops and sells hygiene products
4. Raysearch laboratories AB	Swedish company that develops software solutions for radiation therapy
5. Camurus AB	Swedish pharmaceutical company that develops drug delivery systems
6. Immunovia AB	Swedish biotechnological company that develops blood based tests for early detection of cancer
7. Diamyd AB	Swedish pharmaceutical company that develops treatments for autoimmune diabetes
8. Mentice group AB	Swedish medical technology company that develops simulation software and hardware solutions for endovascular procedures
9. Ericsson AB	Swedish telecommunication company that provides technology and services to its customers
10. Tobii AB	Swedish company that develops eye-tracking and gaze interaction technology
11. Atlas Copco AB	Swedish industrial company that provides industrial equipment such as (compressor,vacuum)
12. SKF	Swedish and global industrial companies that produce industrial products such as (Lubrication systems, seals)

13. Autoliv Inc AB	Swedish-american company that develops automotive safety systems
14. Astrazeneca AB	Multinational company that operates in Sweden that develops innovative medicines for different types of diseases
15. Volvo group AB	Swedish multinational manufacturing company that produces vehicles, engines and construction equipments
16. Sandvik AB	Swedish manufacturing company that develops and sells equipments for mining and construction industries
17. Scania AB	Swedish company that develops and sells heavy vehicles, engines and buses.
18. Alfa Laval AB	Swedish company that develops equipments and solutions for heat transfer and fluid handling
19. Telia AB	Swedish multinational telecommunication company
20. Enea AB	Swedish company that provides software services such as (operating systems and middleware solutions)
21. Axis communication AB	Swedish company that design and develops network cameras and video encoders
22. Fingerprint Cards AB	Swedish company that develops and produces biometrics solutions such as fingerprint sensors
23. Precise biometrics AB	Swedish company that develops solutions for fingerprint recognition
24. Acconeer AB	Swedish company that develops radar sensor solutions
25. Sectra AB	Swedish company that develops secure communication and information technology solutions
26. Saltx Technology Holding AB	Swedish company that develops energy-storage solutions based on nano covered salt
27. Nilar AB	Swedish company that provides energy-storage solutions based on nickel metal hydride technology

28. Cellavision AB	Swedish company that develops solutions for automatic cell morphology analysis
29. Arjo AB	Swedish company that develops solutions for hygiene, patient handling and wound care
30. Xintela AB	Swedish biotechnology company that develops stem cell based products for cancer treatments