Shaping The Workforce For Tomorrow - Today

A qualitative case study of the emerging skills gap within the labor market of IT oriented professions

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Date: 2020-06-04

Master's Programme in Management

Lund University School of Economics and Management

ABSTRACT

Nature of the work:	Master's Thesis
Pages:	80
Title:	Shaping The Workforce For Tomorrow - Today
Authors:	Johanna Rhodin & Eleonora Sjöblom
Supervisor:	Bo Göransson
Date:	2020 - 06 - 04

Summary:

The labor market for IT-oriented professions, especially software engineers, is characterized by extensive skills gaps due to fast-evolving technology. The purpose of this thesis is to shed light on the work toward closing the skills gap in IT-oriented professions, especially for software engineers, by providing suggestions on how the workforce can be prepared with the skills needed for tomorrow - already today. The following three research questions have been addressed:

1. What are the main advantages of closing the skills gap?
2. What is the correlation between hard and soft skills when closing the skills gap?
3. What are the main obstacles and enablers affecting organizations' work towards closing the skills gap?

Using semi-structured interviews as the primary source of data collection, this exploratory case study investigated the magnitude of the growing skills gap from an academic perspective. This study has yielded that software engineers, managers, executives, and HR will struggle to close the skills gap, as the skills gap will always be apparent due to fast-evolving technology. The conclusion is that employees and employers can proactively work on decreasing the skills gap. The study shows that organizations can do this by building employees' hard and soft skills while simultaneously building a resilient workforce characterized by a growth mindset. A few essential enablers for building these capabilities are 'learning from failure culture' and 'reskilling'. What hinders it is the lack of time for learning activities. Another hinder is the lack of measurements of soft skills and the added value of learning activities. The two obstacles can be eased by implementing job rotation and managerial coaches. However, future research is needed on how learning activities can be measured and transformed into actionable business outcomes so proactive skill-building can emerge.

Keywords: skills gap, skills shortage, hard skills, soft skills, reskilling, building resilience, competitive advantage

Acknowledgments

First of all, we would like to pay gratitude and homage towards Lund University, School of Economics and Management, and specifically the Masters in Management program (MiM). Thank you for allowing us to obtain invaluable academic knowledge, practical experiences, and wonderful friendships. Moreover, we want to acknowledge and thank all professors within the MiM program who collectively prepared us for this final thesis. We would also like to send a significant acknowledgment to our supervisor, Bo Göransson, associate professor and senior lecturer at Lund University School of Economics. Thank you for your guidance, supervision, and thoughtful insights; they have been invaluable for us!

Secondly, we would like to acknowledge and send our gratitude to Ingka Group Digital and all the employees who assisted us with interviews and guidance. Thank you for your tremendous cooperation. Without you, it would not have been possible for us to carry out this thesis. Again, thank you!

Lastly, we want to send thankfulness to our peers in the MiM program. It has indeed been a strange and challenging experience to perform an entire master's virtually in the shadows of COVID-19. So thank you, all peers in the MiM program and class of 2021, for the many laughs, joy, and amazing insights you have brought us. Your support has been crucial for finding the motivation to carry on, mid pandemic.

Author presentation

We believe a short introduction of who we are will bring added value to the thesis. Primarily, as it will clarify our prior knowledge in the field, making it more transparent what perspective the thesis is written from. Furthermore, it is a way for us to articulate and understand our knowledge in the field and what "glasses" we view the thesis through. By understanding this, we believe we can limit potential biases and assumptions. Lastly, the author's presentation will provide a short but exciting description of how the interest in the topic initially emerged.

Both of us, Eleonora Sjöblom and Johanna Rhodin, have a bachelor's degree in Human Resource Management and Labor Relations, specializing in work-life pedagogy. We, therefore, have a natural interest in HR, organizations, and competence/skill development. Thus, we knew from the beginning that we wanted to write within those interests. Moreover, both of us are currently studying the Master in Management (MiM), within which this thesis is written. During this one-year Master's, we have gained a greater understanding of how our previously mentioned interest affects both business performance and competitive advantage. In MiM, we have also studied digitalization's impact on managerial work together with the reality of today's complex and fast-paced business environment.

With the knowledge and experience from our bachelor and master, we started to ask ourselves the following questions:
- How do organizations maintain skilled and "up to date" employees in a world where AI and algorithms replace many human-performed tasks?
- What understandings of digitalization will be essential for us as future HR managers?
- How does the ongoing process of maintaining a competitive advantage by having skilled employees look?

These questions paved the way for how we approached deciding what we wanted to investigate further. We do not *yet* know the answers to these questions, but we know there are not few easy solutions to successfully providing staff with correct competence and skills. Especially as the world is becoming more complex and unpredictable by the minute, take COVID-19 as an example. And it is from these interests, passions, and wonderings we began our thesis writing.

1. Introduction

The statement that *employees are organizations' most important resource* is not a new note: the statement has been around for decades, and a Google (2021) search of the italicized phrases generates over 257 000 000 results. Nevertheless, organizations do not only need employees to exist and operate. They need people who are engaged and have the *relevant skills* to work towards the company's mission. Ahl, Bergmo-Prvulovic, and Kilhammar (2017) argue that it is often the manager's and executive's responsibility to enable an environment where the employees can develop and work towards the company's mission/vision. However, according to the same authors, it is the HR department's responsibility to align the human capabilities with the organization's strategic goals and provide managers with the necessary tools to perform their job. In other words, the HR profession is intertwined with the strategic management of organizations, aiming to create a competitive advantage through competence development and engaged staff (Ahl, Bergmo-Prvulovic & Kilhammar, 2017).

With the knowledge that HR is a part of organizations' strategic management and that personnel development is necessary to maintain corporate competitiveness, it becomes crucial to understand the current trends and challenges HR faces in today's labor market. World Economic Forum (2020), in the following referred to as WEF, and Hediger, Hieronimus, Klier & Schubert (2019) suggest that one urgent problem is the growing skills gap happening in the general labor market due to fast technological development. WEF (2020) and Hediger et al. (2019), explain that the accelerated developments of digitization and automation of human-performed jobs have quickly changed the skills required in the workplace. They suggest that employees today need to possess a broader range of new, cross-disciplinary skill sets of both *soft* and *hard* skills. However, WEF (2020) clarifies that this is not only a challenge for HR. The growing skills gap is a problem affecting whole organizations, employees, managers, and HR. Thus, it is vital to address and investigate today's growing skills gap, as it holds great organizational, managerial, and employee relevance and is crucial to understand and solve to maintain corporate longevity.

1.1 Background

Actors in the business community (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020) present one primary explanation for the trend of the growing skills gap. The mentioned sources explain that automation and AI are not only replacing many human-performed jobs. Technology develops *too fast*, meaning employees in the global workforce do not have enough time to learn the new technology before it has changed again (IBM, 2020). McKinsey (2020) further reports that 25% of the global workforce will have to

broaden their skills-set as the demand for programming skills and knowledge and skills in agile processes increases fast. Therefore, it has become necessary for organizations globally to evolve their business strategy to close the growing skills gap (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020).

From an individual's and a societal perspective
Not only is it essential for organizations to understand, address, and work towards closing the skills gap. ManpowerGroup (2020) reports that for the Millenials and Gen Z (the two generations who will dominate the labor market in a few years), skills development and personalized learning are two motivational factors when applying for jobs. ManpowerGroup (2020) explains it as Millenials (1981-1996) and Gen Z (1997-2012) want a customized work experience, like a customized Spotify playlist, and at the same time be put in more demanding and complex work challenges. For instance, cross-team collaboration, skills development, and job rotations. Seen from an individual's perspective, it is vital for organizations' longevity to understand the essence of the skills gap, as skills development of more soft skills are the main motivational factors for future generations.

Working towards closing skills gaps is vital from a societal, political, and international perspective too. IBM (2020) describes how the skills gaps can have regional effects on GDP. If the gaps grow, there will be fewer job possibilities and lower-skilled employees, leading to lower-wage jobs. Consequently, regions can suffer from reduced tax revenues causing drops in GDP (IBM, 2020.

Addressing the problem
In reports conducted by actors in the business community (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020), it is described that executives, L&D (learning & development), and managers all believe that building employee's *soft skills* is the solution to the problem. Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020) categorize the following skills as soft skills: *leadership*, *communication*, *collaboration*, *complex problem solving*, *growth mindset*, and *critical thinking*.

Nevertheless, basic technological skills, so-called *hard skills*, will remain important. A global study from McKinsey (2020) describes that advanced and basic technical skills will remain important over the next ten years as technology evolves and changes. However, in the same report, they emphasize that organizations primarily must develop and build employees' soft skills, especially their critical thinking and decision-making abilities. The reason highlighted by

McKinsey (2020) is that the essential hard skills, accurate for today's work, might become insufficient for tomorrow's. WEF (2020) ties skills-building to competitive advantage, arguing that the prosperity and well-being amongst employees is the core of success. If organizations have this capacity, it will lead to substantial financial performance. Thus, investing in human capital is crucial when organizations work towards closing the skills gap (IBM, 2020).

1.2 Research gap

The question now is *what* executives, managers, and HR have to do to close the skills gap. Some of the articles suggest reskilling efforts (McKinsey, 2020), while others believe reskilling alone is a strategic dead-end (Deloitte, 2020). One report indicates that managers and executives should assume a more active role at the workplace (LinkedIn Learning, 2018), while another report suggests that managers need to create a personalized skills development experience for all employees (IBM, 2020). Indeed, all the abovementioned solutions are great and necessary, but they are highly general and lack practical hands-on suggestions.

A substantial number of theories describe how managers, HR, and employees can enable sustainable skills-building by applying reskilling initiatives, organizational development, and competency management in academic literature. These theories derive from the notion that maintaining an up-to-date workforce with accurate skills has *always* been vital for organizational performance and growth (Ahl, Bergmo-Prvulovic & Kilhammar, 2017). However, many of these theories have not been developed nor applied to the context of *today's* growing skills gap. Instead, they were developed in a time when the skills gap, described by Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020), was not as substantial as it is today. Today, due to the magnitude and speed of technological development, the turnover of knowledge regarding skills-building has increased, which has caused a research gap where *today's* growing skills gap has not yet been noticed in academic literature.

The role that *today's* enlarged skills gap plays for organizations' competitive advantage and longevity has thus not yet been widely reported from an academic perspective, merely from actors in the business community. Moreover, due to the high pace of the changing skills demands, few academic researchers have addressed and investigated the importance of hard and soft skills related to *today's* growing skills gap, examining if one is more necessary than the other, as McKinsey (2020) suggests. Consequently, there is a clear research gap based on the available theories in academic literature and the observations made by actors in the business community. It is, therefore, essential to study the topic of the growing skills gap from an

academic perspective, as there are not many *practical* suggestions from today's business community on how organizations can close the skills gap.

Although the entire global labor market is affected by the growing skills gap, WEF (2020) further reports that technological development will accelerate in upcoming years in cloud computing, big data, and e-commerce. Thus, as WEF's report indicates, the skills gap will be at risk growing specifically in those areas. We find it timely and quintessential to direct the focus of the research gap towards professions operating within those areas of it-oriented professions. It-oriented professions within cloud computing, big data, and e-commerce are professions such as *software engineers, system engineers, and java developers* (Gargaro, 2021).

1.3 Purpose and research questions

The purpose of this thesis is to shed light on the work toward closing the skills gap in IT-oriented professions, by preparing the workforce with the skills needed for tomorrow - already today. The following three research questions have been formulated to help fulfill the purpose of the thesis:

1. What are the main advantages of closing the skills gap?
2. What is the correlation between hard and soft skills when closing the skills gap?
3. What are the main obstacles and enablers affecting organizations' work towards closing the skills gap?

1.4 Research Demarcations

Four demarcations have been constructed to maintain the thesis's scope and fulfill the purpose and the research questions. Firstly, as stated in the research gap, the growing skills gap is accelerating fast in big data and cloud computing professions. Therefore, one demarcation concerns the skills gap related to IT-oriented professions, specifically *software engineers*. The demarcation is further amplified by the design of the thesis; it is a case study performed in a digital department where, among others, software engineers have been interviewed. Hence, for clarification, when referring to *employees* onwards in the thesis, it refers to software engineers. Moreover, when writing 'closing the skills gap', we *primarily* refer to closing the skills gap in the labor market for software engineers. Nevertheless, closing the skills gap *can* be generalized to the broader labor market (see section 3.4.1).

Secondly, this case study of the growing skills gap will *primarily* focus on the organization's existing workforce and how to utilize employees' knowledge to close the skills gap. Hence, the

focus will not lie in recruitment strategies. Moreover, the third demarcation is based on the fact that actors in the business community discuss how both the skills *gap* and skills *shortages* (defined in 2.1.2) are emerging issues in today's labor market. Both phrases are relevant, but in this thesis, the focus will mainly be on how organizations can close the *skills gaps* for software engineers and the organization. Not how organizations can work towards closing the problem of skills shortage in the labor market.

Lastly, many reports and articles we have studied from actors in the business community announce that during 2020, a new dimension within the growing skills gap has emerged due to COVID-19 (WEF, 2020). However, our fourth demarcation is that we have chosen *not* to look at how the growing skills gap in the software engineering professions has been affected by COVID-19. Primarily as we believe one can write an entire thesis on particularly the effects of COVID-19.

1.5 Disposition

After this introduction chapter (chapter 1), the disposition of the upcoming thesis chapters will look as described below.

Chapter 2 - Theoretical framework
The chapter is a compilation of theories and concepts relevant to the thesis purpose and research questions. Among others, essential concepts such as skills gap and hard and soft skills will be defined. Moreover, theories discussing these essential concepts in an organizational context will be presented, for instance relevant theories for building a resilient workforce within an organization.

Chapter 3 - Methodological framework
This chapter will present the applied methodology, research approach, and research quality for the thesis. The chapter will also describe how the empirical data was collected and coded and how the secondary data source (the theoretical framework) was constructed.

Chapter 4 - Empirical data analysis
The findings in the empirical data will constitute the content of this chapter. It is important to highlight that the data will not only be *presented* in the chapter. Instead, the content presented in the chapter is an *analysis* of the empirical data.

Chapter 5 - Discussion

In this chapter, the outcomes of the empirical analysis in chapter 4 will be discussed. More specifically, the empirical analysis will be discussed toward the theoretical framework presented in chapter 2. A deeper discussion on how the empirical data and the theoretical framework appear in relation to the thesis' purpose and research questions will also be conducted.

Chapter 6 - *Conclusion*

In this final chapter, the conclusions of the thesis will be presented. Potential topics (outside of this research's scope) that have emerged when writing this thesis will also be presented as suggestions for future research.

2. Theoretical Framework

The theoretical framework is divided into four sections. The first section will provide an overview of today's growing skills gaps, addressing the effects accelerated technological changes have on the problem. How closing the skills gap can be tied to competitive advantage will also be apparent in the first section. The ensuing section will present a definition of hard and soft skills and, something that in this thesis will be called a *skills debate*. In the debate, the correlation and importance of hard versus soft skills will be presented. In the third section, a concept theory of how organizations can close the skills gap by building a *resilient* workforce will be presented. Practical suggestions on how organizations can close the skills gap will be outlined in this third section. Lastly, the fourth section will be the summarized narrative of the chapter's essence. In other words, insights the reader should remember and bring with them when reading upcoming chapters.

2.1 The growing skills gap in today's labor market

Harrell (2016) states that numerous employers experience that the cycle time of today's technology has consolidated and will continue to do so in the upcoming years. WEF (2016) explains that the primary reason for this is the fourth industrial revolution with its rapid technological innovations and changes that affect the required skill sets and the shelf-life of employee's skills. Additionally, a study from IBM (2020) shows that employees do not have sufficient time to learn the new technology before it, once again, has evolved. One consequence of the high-paced technological development is growing skills gaps in the global labor market (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020). In the result from a survey by McKinsey (2020), the consultancy firm presents that 87% of the answering companies either face skills gaps or will do so within the next five years. Consequently, companies must close the growing skills gap by preparing the workforce for skills needed to stay competitive in today's business environment.

Two commonly used strategies for closing the skills gap are *recruiting* new employees and *developing* the existing workforce (Harrell, 2016). However, according to Harrell (2016) and McKinsey (2020), recruiting and hiring new skills might be a problematic approach to closing the skills gap due to the growing skills shortages saturating the labor market (skills shortages are defined later in section 2.1.2). Nevertheless, the same two references explain that many companies still use this approach. On the other hand, Harrell (2016) suggests that companies must build a culture of *continual reinvention,* instead of replacing existing employees with new talents. Furthermore, WEF (2020) argues that an organizational "mindset" of continuous skills

development is essential, as it can aid the organizations suffering from skills gaps to obtain a *competitive advantage*. Primarily, as it leads to prosperity amongst employees, which WEF (2020) argues to be the core of success. *Competitive advantage* was initially established by Porter (1985), who defined the concept as the strategic advantage a business has over its rivalries within its competitive industry.

From a more present perspective, Frankiewicz and Chamorro-Premuzic (2020) elaborate on *competitive advantage* and put it in the specific context of organizations undergoing a digital transformation. More specifically, the two scholars explain that "competitive advantage is to harness valuable data, having the necessary skills to translate that data into meaningful insights, and above all being able to act on those insights" (Frankiewicz & Chamorro-Premuzic, 2020, p.5). Consequently, the scholars argue for how competitive advantage is thus not solely achieved by hiring staff in the hope that it will close the skills gap and speed up the digital transformation. They emphasize that competitive advantage is achieved mainly by developing the staff's ability to translate hard skills into soft skills, enabling proactive skills-building towards potential future skills gaps. The debate on hard and soft skills will be described in more detail in section 2.2.2. However, other scholars explain the concept of competitive advantage to be somewhat fuzzy with different meanings, lacking a uniform definition (Sigalas, Economou & Georgopoulos, 2013). The same scholars suggest that competitive advantage can be divided into two significant streams, where one part defines it in terms of *performance*, whereas the other defines the concept in terms of its *resources*. Therefore, it is possible to conclude that investing in resources, especially human resources, to close the skills gaps correlates to business performance and competitive advantage.

Conclusively, due to the accelerated technological changes, higher demands have been put on organizations to stay relevant in a competitive market. Because of these rapid changes, it has become challenging for employees and organizations to keep up, and an extensive skills gap has occurred. According to WEF (2020), a growing skills shortage has emerged among the rising in-demand professions, such as software engineers, as a side effect of the enlarged skills gap. The demand for software engineers will rise in the upcoming five years, and WEF's (2020) prediction is that organizations will struggle to find skilled employees to hire. However, by focusing on skills development among software engineers and investing in human resources, organizations can close the skills gap and remain competitive. In the next section, the term *skills* and the phrases *skills gap* and *skills shortages* will be explained better to understand the magnitude of today's growing skills gap.

2.1.1 Definition of skills, skills gaps, and skills shortages

To be able to define the phrases *skills gap* and *skills shortages,* the term *skills* must first be defined. According to Cambridge Dictionary, the term skill is "an ability to do an activity or job well, especially because you have practised it" (Cambridge Dictionary, 2021a, n.p.). However, it is not easy to find other definitions of the term *skill*, as the more commonly used term in academia is *competence*. There are many definitions of the word competence, where the following definition harmonizes appropriately with how the word *skill* is used in the thesis. Ellström and Kock (2008) define competence from several perspectives, where one is called *competence-in-use*. The same authors describe competence-in-use as a combined version of an employee's competence in the field and qualifications required for the job. It is a dynamic process wherein the employee needs to learn how to mediate between its capacity and the job requirement (Ellström & Kock, 2008). Thus, in this thesis, the meaning of the word *skill* is the same as Ellström and Kock's (2008) definition of the word competence-in-use.

The phrase *skills gap* refers to how an employee's or organization's skills do not meet the required skills-set or qualifications needed for the job (Cappelli, 2015). In other words, when the organization's or employee's skill-set does not meet the skills required for performance, a *skills gap* occurs. Although the overarching problem in today's labor market is the increasing skills gap, the skills gap's subsequent *skills shortage* problem is vital to discuss. Mainly since the skills shortage makes it difficult for organizations to close the skills gap; they cannot just hire new employees with the right skills (McKinsey, 2020; WEF, 2020). To better understand how the concepts are connected, the phrase *skills shortage* must be defined. *Skills shortage* means a deficiency of individuals in a specific professional field, for instance, not enough software engineers (Cappelli, 2015).

Thus, the skills gap focuses more on the *internal* issues within employees and specific professions, while skills shortages look more towards the offers on the *external* labor market. It is possible to argue that the phrases are dependent on each other as skills gaps arise from skills shortages. However, skills shortages lead to a saturated market, making the skills gap larger. The ambiguity of the two concepts lies the foundation for a rather complex problem; organizations struggle to retain talented employees, but they also struggle to find personnel and fill positions with a saturated market. To understand how organizations can proactively utilize competence within and outside the organization and close the skills gap, the different skills categories, *hard* and *soft* skills, need to be elaborated in-depth. Mainly, as already been addressed in the introduction Ahl, Bergmo-Prvulovic, and Kilhammar (2017), managers, executives, and HR need

to build employees' skills to maintain a productive workforce. Thus, the next section will elaborate the concepts of *hard* and *soft* skills.

2.2 Hard and soft skills; specifying the difference

Rotatori, Lee and Sleeva, (2020) present that the concept of skills can split into two categories, usually referred to as *hard skills* and *soft skills,* and together they constitute the workforce's competence. The same authors also perform a *skills debate* concerning the importance of hard versus soft skills. Their skills debate addresses varying perspectives on the importance of hard and soft skills and if one is more necessary to prepare employees and organizations for the future labor market. To provide a clear description of the various perspectives in the skills debate, the concepts of *hard skills* and *soft skills* must first be defined.

2.2.1 The definition of hard and soft skills

According to Rainsbury (2020), hard skills often apply to the specific context in which the particular skill is required, meaning it associates with the technical aspects of performing a job. Montandon, Politowski, Silva, Valente, Petrillo, and Guéhéneuc (2021) agree, explaining that hard skills are dependent on the specific professional role. All six authors clarify that hard skills entail skills in programming language skills, data systems, and development tools for software engineers. Furthermore, Kagan and Kindness (2021) illustrate hard skills as learned abilities acquired through practice and education. The same two authors argue that hard skills are necessary for employees' productivity but that hard skills alone cannot be translated into business success, highlighting the need for soft skills.

Soft skills usually refer to interpersonal, human, or behavioral skills and emphasize an individual's behavior and ability to manage relationships (Rainsbury, 2002). Further, Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020) highlight the following soft skills as essential for closing the skills gap; leadership, communication, collaboration, complex problem solving, growth mindset, and critical thinking. Frankiewicz and Chamorro-Premuzic (2020) add another dimension to soft skills and argue that when an organization undergoes a digital transformation, the changes are more about people's ability to adapt (the soft skills) than it is about learning new hard skills. Thus, the authors argue that *technical and digital skills* are equal to soft skills and not hard skills due to today's fast-evolving technology environment.

Conclusively, hard skills are practical knowledge in, for example, specific coding languages which are possible to learn through practice. Meanwhile, soft skills are more interpersonal capabilities, such as communication, mindset, and the capacity to adapt fast to change. Soft skills are primarily learned from work-life experience. Although it is possible to define the categories separately, there is an ambiguity surrounding the classification of technical skills and whether it classifies as a hard skill or a soft skill. Thus, in the section below, the skills debate of opposing perspectives amongst scholars will be presented. More specifically, which constellation of hard and soft skills is most advantageous for organizations to obtain to close the skills gap.

2.2.2 The skills debate

The *skills debate* regarding which skills category organizations and employees should concentrate on developing, to maintain favorable business performance emerged in the 1950s. In 1959, Snow (1959) argued that organizations and employees should primarily focus on developing their *hard skills*, as that skills category will be most important when adapting to future technological change. However, recent reports from actors in the business community (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020) argue for a shift; building employee's *soft skills* is the solution to closing today's skills gap.

Other actors (WEF, 2020) and scholars (Rainsbury 2002) argue that organizations must combine the two skills categories and build *both* hard and soft skills in the workforce, to close the skills gap amongst software engineers. Although soft and hard skills, by definition, are two different sets of competencies requirements, Rainsbury (2002) stresses that successful individual performance requires a *combination* of the two. On the other hand, WEF (2020) reports that the in-demand skills for software engineers will change over the upcoming five years due to the fast technological development. Soft skills such as critical thinking, self-management, adaptability to complexity, and problem-solving will grow to be the most important skills (WEF, 2020). Nevertheless, the same reference states that the expected skills-set for software engineers is a *combination* of *hard skills* and *soft skills* but still highlights soft skills as more important.

Like many of the other references, Frankiewicz and Chamorro-Premuzic (2020) agree that specific technical skills are temporary, such as coding languages, but interpersonal capabilities and skills, such as growth mindset, always remain. However, as briefly mentioned in section 2.1, Frankiewicz and Chamorro-Premuzic (2020) elaborate on this perspective and add two other dimensions to the skills debate. On the one hand, the scholars argue that a good understanding of hard skills enables soft skills development. The authors explain this by saying, "having the necessary skills to translate data into meaningful insights and the ability to act on those insights"

(Frankiewicz & Chamorro-Premuzic, 2020, p.5). This means that employees must possess enough hard skills to read and understand the data in front of them, to later be able to make decisions in regards to the data. The capability of accurate *decision-making* is classified as a soft skill, arguing for how *hard skills* can enable soft skills development.

In section 2.2.1, hard skills are defined as the technical aspect of performing a job, and soft skills as the interpersonal skills, arguing for a very clear distinction between the skills categories. However, as described in the paragraph above, Frankiewicz and Chamorro-Premuzic (2020) add another twist to the skills debate. Instead of focusing on whether hard and soft skills should be separated *or* combined, they describe that technology *is* soft skills rather than hard skills. The authors add to the skills debate that there might not even be a question of whether the two skill sets are two different ones but that technical skills are soft skills. Thus, Frankiewicz and Chamorro-Premuzic (2020) argue that instead of focusing on developing one or the other of hard and soft skills, organizations should focus on those *who* are most likely to develop them, preferably employees with high learnability and curiosity to develop.

As a last perspective in the skills debate, Deloitte (2020) states in a report that organizations cannot mainly focus on building employees' short-term skills; instead, it is necessary to build long-term *resilience*. In the same report, it is described that building resilience is more important than building specific soft or hard skills, due to constantly shifting skills and capability needs in the labor market. It further demonstrates that building employees' resilience would enable the entire organization to be more resilient in today's fast-paced and ever-changing business environment. Thus, the next section in the theoretical framework will address the concept of *building a resilient workforce* to leverage employees and close the skills gap in the software engineering profession.

2.3 Building a resilient workforce

Already in the background, section 1.2, the importance that organizations build a workforce that can quickly adapt to ever-changing technological evolvement was stressed. The need to develop flexible or *resilient* employees is primarily triggered by *unanticipated* changes, such as COVID-19 or the fast-growing skills gap in the software engineering professions. Scholars, such as Lengnick-Halla, Beck, and Lengnick-Halla (2010), conceptualize the above statement by discussing how organizations can build a *resilient workforce.* The same authors define the concept as to how well organizations can adapt to changes in unstable environments and unpredictable markets.

This type of uncertainty is usually seen as something problematic for organizations. However, "resilient organizations are able to maintain positive adjustments under challenging conditions" (Lengnick-Halla, Beck & Lengnick-Halla, 2010, p. 243). If change is seen as a strategic opportunity rather than a problem, the organization may develop its strategic flexibility and capitalize and grow from the complex and uncertain events (Lengnick-Halla, Beck & Lengnick-Halla, 2010). A suggestion from actors in the business community is that organizations should focus on building a *resilient workforce* when working towards closing the skills gap, as it would allow them to maintain positive development of skills in challenging conditions fluctuating today's labor market (Deloitte, 2020; McKinsey, 2020).

2.3.1 Defining a resilient workforce in-depth

Cambridge Dictionary defines *resilience* as "the quality of being able to return quickly to a previous good condition after problems" (Cambridge Dictionary, 2021b, n.p.). Lengnick-Halla, Beck, and Lengnick-Halla (2010) elaborate on the concept from an organizational perspective. They define the organizational ability to be resilient as an organization's capability to regain operational shape and quickly return to the expected performance level after encountering challenges. An outcome of adapting and developing the organization after the challenging experience is developing new skills and capabilities. Further, the same authors explain that an organization's capacity to become resilient in the first place is partly rooted in individual employees' knowledge and skills and partly within the organizational routines and processes. Waterman, Waterman, and Collard (1994) elaborate this further, explaining that the phrase resilient workforce is a *concept* which entails many smaller perspectives but is fundamentally based on the idea that the employer and the employee should bear *joint responsibility* for the organizational performance. More specifically, Waterman, Waterman, and Collard (1994) outline that employees are responsible for their individual career development, and the employer (for instance, managers, executives, and HR) is responsible for providing the individual with the necessary tools and skills to develop. Ultimately, it is the individuals within the organizations who unitedly enable the organization to become resilient (Lengnick-Halla, Beck & Lengnick-Halla, 2010). Therefore, the organization and its employees need to build skills and employability collectively.

2.3.2 Collectively building employability

Instead of focusing on *employment*, Waterman, Waterman, and Collard (1994) express that both individuals and organizations (managers, executives, and HR) should focus on developing

employability. The same authors explain that it is the managers' responsibility to care for the employees and keep them skilled, whether or not they choose to stay with the company. They further elaborate that the idea of organizations supporting the employee to enhance their employability derived from the observation that employees who depended on the organization to make their career decision tended to become inefficient at work. By developing the individuals' soft skills, specifically the ability to make decisions about their careers, the same scholars' study showed that employees became more efficient and inclined to drive the company's operations forward. Waterman, Waterman, and Collard (1994) continue to explain that with the employees learning to make crucial decisions regarding their professional future, their general ability to make sustainable decisions was developed, which positively affected their decision-making skills for administrative determinations. Furthermore, the authors explain that building a resilient workforce will make organizations "thrive in an era in which the skills needed to remain competitive are changing at a dizzying pace" (Waterman, Waterman & Collard, 1994, n.p.). In other words, by continuously upskilling the workforce, organizations can maintain competitive staff, highly capable of adapting to quick changes in the business environment.

2.3.3 Reskilling - traditional initiative organizations can apply to close the skills gap

As the software engineering market is suffering from skills shortages, Fadairo, Williams, and Maggio (2020) report an increased global competition has emerged amongst companies for software engineering talent. The same scholars suggest that one approach to close the skills gap, beyond just hiring new employees, is to reskill the existing workforce. According to the Cambridge dictionary (2021c), *reskilling* is when an employee learns new skills, enabling the person to *do a different job*. Additionally, Lengnick-Halla, Beck, and Lengnick-Halla (2010) state that reskilling fits in the concept of building a resilient workforce, making it reasonable to add reskilling into this theoretical framework.

A report from McKinsey (2020) advocates for reskilling and explains that companies must look beyond hiring and utilize the competencies that already exist within the company. The article suggests reskilling employees from one part of the organization to another where the need for a specific role expects to grow, for example, different engineering roles. However, an article from Deloitte (2020) describes that simply reskilling itself is a strategic dead end. They further explain that the skills shortage is already too significant and the pace of change too rapid. The same article state that reskilling initiatives focus too much on short-term skills instead of building long-term resilience to form a workforce adaptable to accelerated changes. McKinsey (2020) also expresses some difficulties with reskilling, such as balancing the reskilling initiatives needs

with current business operations. Another challenge highlighted in the same report is to measure reskillings' impact on the business successfully.

Nevertheless, there are also many benefits from successful reskilling, such as higher employee satisfaction and contribution to a culture of lifelong learning (McKinsey, 2020), which Lengnick-Halla, Beck, and Lengnick-Halla (2010) declare as crucial for developing a resilient workforce. Presumed is that reskilling for near-future needs is not as useful and that reskilling, instead, must build long-term resilience to create a workforce adaptable to the only constant state; change (Deloitte, 2020).

2.3.4 Practical operations and actions
Lengnick-Halla, Beck, and Lengnick-Halla (2010) state that practical actions on how to develop resilient individuals can be gained by "looking to the underlying dimensions that allow the organization and its members to develop a capacity for resilience" (p.245). Meaning that organizations have to look towards what factors motivate employees and establish hands-on actions based on that. The authors categorize three main perspectives, where following two are of interest to this thesis: 1) a shared mindset of flexibility, opportunism, and ability to decide in uncertain conditions and 2) development of useful, practical habits that provide a first response to uncertain events.

1. Shared mindset of opportunism
As previously described, building prosperous resilience in an organization starts with developing the employees. According to Lengnick-Halla, Beck, and Lengnick-Halla (2010), it means teaching the employees how to learn from stressful and complex situations, so the employees do not let the experience negatively impact their work. Deloitte (2020) further argues that by building resilience within the people in the organization, the employees can learn to both adapt and grow from challenging experiences, which will have positive effects on performance. The same firm clarifies that a resilient mindset is not a capability that individuals are born with; instead, it can be trained and taught. Specifically by working on obtaining a *growth mindset,* a state of mind where individuals welcome challenges and see them as learning opportunities instead of fearing them (Dweck, 2019).

Han and Stieha (2020) explain that a growth mindset is a factor that enhances collaboration, creative problem solving, willpower, and workplace empowerment. All capabilities important to possess when working towards closing the skills gap (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020). Dweck (2019) states that the cardinal rule for a growth

mindset is the *desire to learn in every situation*, meaning a learning culture must exist within the organization. Teaching and spreading a learning culture and a growth mindset can, for instance, be done by spreading praise. Specifically by leaders and managers and how they choose to praise and encourage individuals. Terrence (2019) also emphasizes the importance of dealing with failure and that *praise of failure* is equally important, as it offers the individuals the thought of 'I failed, but I learned something'. Dweck (2014) provides some hands-on suggestions to enable both a growth mindset and a resilient mindset amongst employees in an organization. For instance, by 1) acknowledge and embrace individual weaknesses, 2) celebrate growth together with others, 3) by breaking down the work into smaller, more easily achieved goals, and 4) focus on what you (as an employee) can control.

2. Practical habits

Lastly, Lengnick-Halla, Beck, and Lengnick-Halla (2010) suggest that organizations must develop practical habits that the employees can turn to as a first response to change, to build a resilient workforce. One way to create practical habits is to raise cross-functional knowledge amongst employees by *job shadowing* and *job rotation* (Mankin, 2009). Job rotation means that periodically, employees shift jobs to experience different tasks under the same skills level (French, Rayner, Rees & Rumbles, 2015). French et al. (2015) also highlight the risk of job rotation, as it might decrease efficiency since the employee has to change their workplace. Nevertheless, the same authors argue that job rotation develops an individual's flexibility and organizational adaptability despite the risk of deficiency, which are two critical factors for closing the skills gap (IBM, 2020). According to Lengnick-Halla, Beck, and Lengnick-Halla (2010), they are also necessities for building a resilient workforce. Harrell (2016) explains that an additional approach to job rotation is job mobility, where the idea is for an employee not to perform the same role for more than three to five years. The same author mentions that this is because employees who stay too long within the same role will *not* grow and build new skills.

Another practical example of building resilient employees is to teach the employees to understand how to use information, shared knowledge, and skills effectively and correctly (Waterman, Waterman & Collard, 1994). McKinsey (2020) suggests that one way to do this is by allowing managers and executives to take on a more present role in the workplace. Waterman, Waterman, and Collard (1994) propose implementing *managerial counselors*, whose responsibility is to represent the employees' interests and facilitate/enable a learning environment. Having managerial counselors could also be referred to as having *managerial coaches*, whose responsibility is developing and moderating team members and their activities (Mankin, 2009). By implementing line managers, who is working on coaching the team, the

possibility of implementing a continuous learning strategy and knowledge sharing environment in the team rises (Waterman, Waterman & Collard, 1994). Mankin (2009) further argues that having managerial coaches is especially effective where one-on-one relationships between managers-employees often emerge. The same author explains that to ensure that the work of managerial coaches provides the best effect, the coaches need to have relevant and basic knowledge of the work team-members perform together with good communication and interpersonal skills.

2.4 Summarized statements

The theoretical framework holds arguments from a range of scholars and consultancy companies, who argue that a growing skills gap characterizes today's labor market for software engineers. The growing skills gap primarily exists due to rapid technological changes. However, by focusing on skills-building, the actors and scholars argue that organizations can close the skills gap and remain and regain competitive advantage. A complexifying factor, which complicates HRs', managers', executives', and employees' skill-building towards closing the skills gap is that the labor market suffers from a skills shortage; there are not enough software engineers.

In the theoretical framework, it is further debated, by varying scholars and consultancy firms, *what* skills need to be prioritized to close the skills gap. The importance of developing hard *and* soft skills simultaneously is stressed by the majority of the references. The hard skills are stated as the *role-specific* skills such as coding, and soft skills are the interpersonal skills such as communication and problem-solving. Subsequently, few scholars argue for looking beyond the separate definitions and instead view hard skills and soft skills as the same thing.

Building a resilient workforce has been argued as an alternative approach for organizations to close the skills gap. It allows organizations to develop employees' hard *and* soft skills while simultaneously adapting skill-building to the fast technological changes characterizing today's labor market. Primarily as the essence of *building a resilient workforce* is an organization's ability to regain organizational shape quickly when encountering changes. Within the scope of building a resilient workforce, suggestions on practical actions on enabling flexibility, faster adaptability to change, and skills-building have been presented where the primary takeaway suggestions are *job rotation, managerial coaches*, and *reskilling*.

3. Methodological Framework

This chapter will outline the methodological framework of the thesis. In the first section, we will present the fundamental research design, arguing why we have chosen to classify this study as an *exploratory case study*. The subsequent section will treat the data collection process describing *how* we assembled it. The section following the data collection will address the process of *analyzing* the data. Lastly, ethical considerations, together with validity and reliability, will be presented in a section of its own. In the final section, we will present the *methodology reflection,* concluding if our chosen research approach and data collection were suitable for the thesis.

3.1 Research design - an exploratory case study

To be able to understand and investigate the growing skills gap presented in recent reports by companies in the business community we decided the best method to use would be an *exploratory case study*.

According to Brown (2006), an *exploratory* approach is often used when the study's topic has not been widely nor clearly defined. As already stated in the research gap, section 1.2, today's growing skills gap has not been widely reported from an *academic* perspective, arguing that an exploratory approach to the topic is suitable. Brown (2006) also explains that the result of the exploratory study is seldomly conclusive, meaning the findings of this thesis will merely offer *one* perspective on how to close the skills gap, not *the only* correct answer. Brown's descriptions of exploratory research align with our aim for the research, as the thesis's purpose is to provide organizations with *suggestions* on how to close the skills gap.

Furthermore, we have chosen to treat the thesis as a *case study*, as we believe it to be the most practical design for fulfilling the purpose and answer the research questions. Our choice of viewing the thesis as a case study was based on Bryman's (2011) definition, where he described that a *case* is the specific place or area where the study was conducted. The *case* can be anything from a geographical area to a specific organization. Bryman (2011) further explains that a case study often involves studying a particular problem within the case/area the data was gathered from. As we have collected empirical data on the problem of growing skills gap from one organization (Ingka) and, more accurately, one specific function (Group digital), we believe it is reasonable to treat this research as a case study where Ingka Group Digital is our case. In the section below we will present why Ingka Group Digital is a good case for our research topic.

3.1.1 Why Ingka Group Digital is a suitable case

Creswell (2007) explains that the researcher must determine if the case is suitable for the research problem when performing a case study. The author further described that the case's details need to be presented and refined to clarify why the chosen case is suitable. In the paragraphs below, we will present why Ingka Group Digital was a suitable case for collecting data regarding the problem of growing skills gaps.

The Ingka Group is the main franchisee operating the IKEA brand; a company with a long-established presence in the business community, with great insights and experience from different trends fluctuating the labor market. Ingka operates in over 30 markets and three business areas, where main operations lie within IKEA retail (Ingka, 2021). Furthermore, during an interview, one informant (interview, 28 April 2021) explained that Ingka holds the department Group Digital, which is one of southern Sweden's largest employers. The organization's long existence in the business community and its large scale of employees are two factors we believe argue for why Ingka Group Digital is suitable as a case; it ensures that the business existed when the trend of growing skills gaps emerged.

The empirical data have been collected in *one* particular function within Ingka, specifically Group Digital. Group Digital is the functional name for the Digital and IT organization within the Ingka Group. The legal entity (in Sweden) is IKEA IT AB. Group Digital holds a broad range of employees within IT-related professions, particularly *software engineers*. As one demarcation for this thesis is to study the growing skills gap in the software engineering professions, and Group Digital has many employees within this role, we believe it is reasonable to argue that our chosen case is suitable for the thesis research problem.

Despite that Ingka/IKEA not traditionally being seen as a digital employer, the company is currently performing a substantial digital transformation, bringing a digital aspect into the core of all organizational operations. Due to this, Group Digital has been highly collaborative and cooperative, which has greatly facilitated the work and execution of this thesis. Our contact person at the department also contributed majorly to why we see it as advantageous to use Ingka Group Digital as the case. She/he allowed us to outline what topic we wanted to study unobstructedly and then facilitated us with thoughtful insight on the subject matter. In acknowledgment of this, we reckon the case is suitable for the thesis research problem. However, to clarify, this thesis has *not* been an evaluation effort of Group Digital's operations. The data has merely been collected from employees within the department to understand the problem of the growing skills gap from a more general view. Consequently, the result presented in the thesis is

not organization-specific. After deciding that the research was going to be an exploratory case study, we decided how we would approach theory, previous research, etcetera. In the next section, we will therefore present our *research approach*.

3.1.2 A qualitative research method with an abductive approach

Whether to choose a qualitative or quantitative method approach depends on what question the researcher is looking to answer and *how* the researchers find an answer to the question (Bryman, 2011). As already stated in section 3.1 we have chosen to, from an exploratory perspective, investigate today's growing skills gap to create a broader knowledge surrounding the concept. We, therefore, chose a *qualitative* approach for this thesis since we seek to *explore* the problem to understand it more in-depth. (Bryman, 2011). Moreover, in studies where the researcher aspires to understand a specific phenomenon or *happening*, it is most applicable to use a qualitative research method (Trost, 2010). Conclusively, this thesis falls within the frames of a qualitative research method, as we also have in section 1.3 stated that the purpose of the thesis is to study the *happening* of the growing skills gap and broaden current knowledge of how to close them.

However, a risk in qualitative studies is that the examined problem tends to be sensitive or tied to the specific context in which it is being studied (Creswell, 2007). The same author further explained that qualitative studies often are interpretative with a naturalistic approach, meaning the study often examines the subject matter in its natural setting to make sense of the problem as close to reality as possible. When applying Creswells (2007) statements to our case study, one could argue that the thesis empirical data collection was at risk of ending up in the pitfall. For instance, by arguing that the data has not been collected in its *natural setting*. The data has been collected virtually via Zoom due to COVID-19 and not in real life, which is usually the normal work environment for employees at Group Digital. However, the reality (or natural setting) of today is, in fact, not in real-life work. Today's reality for many organizations and employees, including Group Digital, is working from home and via digital meetings. Thus, we would like to argue that the case study has been performed in its natural setting and that it is, therefore, possible to make sense of the data collected on the problem of the growing skills gap.

An abductive reasoning strategy

Alvesson and Sköldberg (2008) explain that when using abduction, the researcher first observes a specific context/situation where a problem is often perceived. Afterward, the researchers apply theory to understand the given problem more in-depth. Once the researcher has created a broader

knowledge of the perceived problem, the empirical data collection starts. After collecting data, Alvesson and Sköldberg (2008) explain that the researcher develops the applied theories to be able to analyze the empirical data and thus, create new insights of the perceived problem. In other words, the researcher moves between theory and data collection, analyzing the data and developing the theoretical framework parallel to each other.

We have used abduction in this thesis, as we have constantly moved between literature and data collection. As explained in the author's presentation, we observed the problems that fast digital development causes already at the beginning of this year. When starting to write this thesis, we turned to theory and literature to create an in-depth understanding of how these problems appear in a work-related environment. The literature, primarily presented by actors in the business community, highlighted an ongoing problem of the growing skills gap. Reports and articles from actors in the business community helped us create a broader knowledge of the problem, and these reports helped us create the "scaffolding" for our theoretical framework. Once the theoretical framework had been outlined, we started to collect our empirical data, which will be discussed more in-depth in section 3.3. Simultaneously, while performing the data collection, we elaborated on the theoretical framework. Moving between creating the theory and collecting the data argues for why we can state that we used an abductive reasoning strategy in this thesis. The abduction movement continued when we compiled the result of the data collection and wrote the empirical analysis, as we simultaneously wrote the theoretical framework.

The above description of how we carried out the writing of this thesis argues for how we used an abductive reasoning strategy, and we believe it has been beneficial since we worked in somewhat of a time constraint. We have had approximately two months to complete this thesis, so moving between data collection/analysis and simultaneously creating the theoretical framework has allowed us to utilize the time beneficially. However, a more in-depth description of *how* the data was collected and how the theoretical framework was constructed is necessary to present to fully understand why the different chapters in the thesis are structured the way they are. In the upcoming two sections (3.2 and 3.3), we will therefore present the data collection and the data analysis and how the two processes determined the structure of chapters 2, 4, and 5.

3.2 Data collection

The section above described the thesis's general design, an exploratory case study with a qualitative research approach. In this section, we will present how we performed the *data collection*. Our primary source of data collection has been semi-structured interviews, and the

secondary source of data is academic literature. Using the abductive reasoning strategy, we have mitigated creating the theoretical framework and collecting the empirical data. Thus, we will also present how the abductive strategy provided us with the structure of the theoretical framework, the empirical analysis, and the discussion. It is essential to address this due to two reasons. One is to clarify why the interview guides (appendix 1, 2, 3) do not correspond to the themes in the theoretical framework and the empirical analysis. The other is to argue why our theoretical framework is constructed the way it is, and why we refer to it as a secondary data source.

3.2.1 Selection and sampling

Our primary source of data collection in this thesis has been semi-structured interviews. We believe our choice of data collection suits the characteristics of the thesis well, as Trost (2010) describes that semi-structured interviews are commonly used when conducting a case study. Additionally, Bryman (2011) explains that semi-structured interviews are a suitable data collection method to use when the researcher aims to understand how a group of individuals perceive a particular phenomenon or happening. Conclusively, as we are performing an exploratory case study, with the purpose of broadening the knowledge of how organizations can close the growing skills gap, semi-structured interviews are suitable to use. Before describing the design of the semi-structured interviews, we will describe how we selected and sampled the interviewees.

According to Bryman (2011), the case itself outlines who the researcher interviews, meaning the case determines *where* the selection and sampling of people to interview occurs. Our case is Ingka Group Digital. Thus, the selection and sampling of interviews have happened in Ingka Group Digital. As we *purposely* chose to study the growing skills gap in a specific organization and *purposely* chose Ingka Group Digital (already explained in 3.1.1) we argue that our selection and sampling fall under *purposive sampling*. Bryman (2011) explain that purposive sampling is when the researcher both chooses the case for the study, and how many individuals to interview within the case. As we have aimed to make the study's results as generalizable as possible, and to understand the work towards closing the skills gap from as comprehensive a perspective as possible, we *purposely* chose to interview a wide range of employees within Ingka Group Digital. The interviewees are operating in different roles, but their work is connected to the software engineering role in one way or another.

We chose which organization the study would be conducted in, the type of role we wanted the interviewees to work in, and lastly, how many people we wanted to interview. However, our contact person at Ingka Group Digital helped us reach out to the employees working within the

roles we desired to interview. Our contact person was the one who chose the *specific* employees we interviewed, but we determined the role and range.

We interviewed eight people within three different roles; two software engineers, three managers, and three from learning & development (L&D). All interviewees, regardless of role, have different lengths of experience working with IT and digitalization, both within and outside Ingka Group Digital. Our aim was to interview nine employees in total, three from each role. However, one software engineer did not answer our request, thus we only interviewed two, not three, software engineers. In table 1 below, we have presented the sampled and selected interviewees.

Name	Role	Employee Responsibility
Informant 1	Manager	Yes
Informant 2	Software Engineer	Yes, partly
Informant 3	Manager	Yes
Informant 4	Manager (higher management)	No
Informant 5	L&D	No
Informant 6	L&D	No
Informant 7	Software Engineer	No
Informant 8	L&D	No

Table 1: List of interviewees including their alias, their professional role and if they have employee responsibility

The interviewees have been renamed a number between 1-8, completely random, to maintain their anonymity. As we have 'only' interviewed eight employees, we have chosen *not* to present how long they have worked within their role and/or at Ingka Group Digital. This is in regards to the anonymity we promised them. Furthermore, we do not analyze how their answers vary depending on work-life experience. Therefore, we do not see it as relevant to the thesis purpose to present how many years they have worked in their role.

3.2.2 Semi-structured interviews

As described above, we have conducted eight semi-structured interviews. Due to COVID-19, we could not perform the interviews in real life, meaning all eight interviews were held virtually via Zoom (2021). No technical issues were encountered in any of the interviews, implying the virtual setting was well functioning. We ensured that our cameras, and the informant's camera, were on

at the beginning of every meeting, before starting the actual interview. Having the cameras on allowed us to create a dynamic environment and maintain the human interaction, which we believe may have been lost if the cameras would have been turned off. We, the two researchers, performed all interviews together where we beforehand had divided the responsibilities of who would ask what questions.

All interviews were between 35 minutes to one hour long, with an average length of 48 minutes, and the first interview was held the 19th of April, and the last interview was conducted the 10th of May. We recorded all eight interviews, after written *and* spoken permission from the informants (this ethical aspect will be further elaborated in section 3.4.2). The interviews were recorded, to later be transcribed and the transcribed interviews provided the foundation for the data analysis, a process which will be elaborated later in section 3.3. After finishing the interviews, we separately transcribed them. All interviews were conducted as described above.

The interview guide
Bryman (2011) states that the purpose of semi-structured interviews is to enable the interviewee to give as elaborative an answer as possible. When preparing for a semi-structured interview, Bryman (2011) suggests that the researcher creates an *interview guide,* which should be used as a template when conducting the interviews. The interview guide should not be too specific in its questions. Instead, it should consist of a few overarching themes, where the respective theme has some sub-questions. He explains that the researcher should use the interview guide as a guiding template to ensure essential topics are covered. However, the researcher should not follow the interview guide too strictly as it might hinder the interviewee from giving elaborative answers.

We planned and structured our interviews based on Bryman's proposal of an interview guide consisting of overarching themes. Since we interviewed employees in different roles, we chose to construct one interview guide per role (see appendix 1, 2, and 3). This was to ensure that the interviewee could provide an elaborative answer based on their particular professional knowledge regarding the growing skills gap. Furthermore, as suggested by Bryman (2011), we did not follow the interview guide *strictly*. For instance, several times during all eight interviews, we asked follow-up questions that were not pre-written. These follow up-questions emerged dynamically and were a way for us to guide the conversation and get the interviewee to develop interesting thoughts and perspectives, valuable for the thesis. Regardless of different sub-questions and follow-up questions, all interview guides were based on the same four themes: *skills gap, competence needs, work processes*, and *workplace learning*.

The four overarching themes we chose for the interview guides were based on the theoretical framework we (at the time of the first interview) just had begun to develop. At the time of the first interview, our theoretical framework mainly consisted of a 'skeleton' of theories and perspectives, primarily based on articles and reports from actors in the business community. Recurring themes and topics in these reports concerned things like workplace learning, growth mindset, perspectives on skills-building, the importance of good communication (Deloitte, 2020; IBM, 2020; McKinsey, 2020). However, to minimize the risk of the interviews becoming too biased to what these reports were saying, we chose the four large themes presented above, allowing the interviewee to address other topics and processes if she/he wanted to. Nevertheless, we ensured that the specific topics addressed by actors in the business community could fit these four themes, for instance, growth mindset as they were the foundation for our theoretical framework. Figure 1 below illustrates how articles from actors in the business community helped us create the interview guides and the four themes within them.

Figure 1: Clarifies how the interview guide was created

After we had conducted about half of the interviews, we realized that the initial theoretical framework we had constructed did not cover the processes and perspectives presented by the informants. Moreover, as we have used an abductive reasoning strategy, we collected the data while simultaneously developing the theoretical framework. As a result of this abductive process, we chose *not* to structure the theoretical framework (chapter 2) after the four themes: skills gap, competence needs, work processes, and workplace learning. Rather, the theoretical framework, as well as the empirical analysis and discussion, were structured based on the results of the first

coding of the interviews. Thus, in section 3.3, we will describe how we analyzed and coded the empirical data to then, at the end of that section, present a figure that illustrates how the final structure of the thesis arose. Before that, the next section will address our secondary data collection; academic literature.

3.2.3 Secondary data collection; academic literature

According to the abductive reasoning strategy we have used, we wrote the theoretical framework while simultaneously performing the semi-structured interviews. Our first draft of the theoretical framework (not corresponding with the current one) was the basis for our purpose, research questions and interview guides. Thus, we see it as a necessity to describe how we compiled the theoretical framework, as we believe the theoretical framework to be a secondary *source of data collection*.

As mentioned in the author's presentation, our interest in the rapid development of technology and its effects on today's labor market emerged at the beginning of this year, February 2021. We were interested in the effects digitalization has on *competence needs* and *skills-building*. When beginning the writing process, we started to research these two topics more in-depth, whereby we came across articles and blog posts on the growing skills gap. The first literature we read on the topic were blog posts from Simplilearn (2020), and Continu (2019). Based on these articles, we began creating purpose, research questions, and the theoretical framework. Simultaneously, we booked a meeting with our contact person at Ingka Group Digital (the 4th of March) and discussed potential thesis topics. Our contact person was open for suggestions and excited about the topics we presented.

However, after creating a first draft of the theoretical framework based on the initial blog posts and articles, we chose to rework the use of sources. Primarily as we found it difficult to ascertain their degree of accuracy. At this point, we had also found articles from well-known actors in the business community such as Deloitte (2020), IBM (2020), LinkedIn Learning (2018) and McKinsey (2020) who all addressed the growing skills gap. Due to their well established presence, we chose to use the articles/reports from the actors in the business community as the foundation for our theoretical framework instead. These reports, as mentioned, also helped us create the four themes in the interview guides; see the figure 1 above.

In section 3.2.2, we described how we (after performing about four interviews) realized that the theoretical framework we had created did not fully reflect the interviewees' answers and statements. As we also were following an abductive reasoning strategy, it was around this time

we chose to add more academic and recognized literature to our theoretical framework. The articles from Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020), all hilights theories on growth mindset, resilient workforce, re-skilling, and up-skilling. These perspectives, processes and theories all exist within the frames of academic and peer-reviewed literature. For instance Dweck's (2014) theories on growth mindset. Thus, to create a theoretical framework that reflects both the semi-structured interviews and the reports from actors in the business community, we performed a solid search from peer-reviewed literature. When doing this, we found the theories that today constitute the entire theoretical framework (chapter 2). However, the theoretical framework was not structured into the three larger themes it is today. That structure occurred after the empirical analysis had been written. Therefore, the next section will present the data analysis and how it provided the final version of the theoretical framework.

3.3 Data Analysis

As described in section 3.2.2, the data analysis determined how we finally chose to construct the theoretical framework, which in turn determined the structure for the *empirical analysis* and the *discussion*. Hence, the following section explains how the study's empirical material has been processed and analyzed.
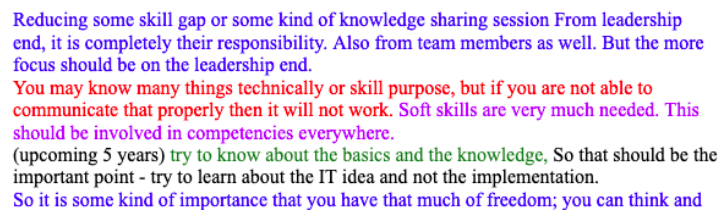
Transcribing

According to Fejes and Thornberg (2015), the data analysis process is when the researcher systematically analyzes and organizes the collected data to outline the result. The same authors further suggest that the researcher begin the data analysis by *transcribing* the interviews, as it allows the researcher to reflect and investigate the material in-depth. In other words, listen to the recorded material and write down the interview verbatim. We followed the authors' suggestions and systematically transcribed the eight recorded interviews. As transcribing interviews takes a relatively long time, we divided the transcribing between us. We transcribed two full interviews each, by ourselves, before we started to divide the work. We later split the work, transcribing one half of the interview each, so we could both, already during the transcribing, get a greater understanding of the collected data. To utilize the time, we transcribed each interview directly after it was made while simultaneously writing the theoretical framework, as described in section 3.2.2. Once the transcription was done, we deleted the recorded interviews. An additional reason we transcribed the interviews word-by-word was to ensure the quality of quotations in the empirical analysis.

First step of coding the data

After the last interview and transcription were completed, we began to analyze the data. We followed the suggestions from Fejes and Thornberg (2015). They describe that the first step after finishing transcribing is to read through the transcripts thoroughly and make notes of reflections and highlight valuable information. Together, we read through each transcription and highlighted interesting thoughts and reflections that the interviewees discussed, based on the theoretical framework and thesis purpose. Once we had done this, we cut the highlighted text from all interviews and put it in a new, separate document, without any specific order or structure.

Second step of coding the data

Once we had collected all introductory statements from the separate transcriptions in one document, we moved on to identifying various themes in the informants' statements as suggested by Fejes and Thornberg (2015). The authors suggest that the researcher first determines several minor themes and then reorganizes and clusters them into four-five larger themes. However, due to time limitations, we did the two steps concurrently. We chose to color-code the data because we thought it was easier to categorize the themes that way. The data was color-coded into four different themes, which were identified based on the theoretical framework, the structure of the interview guide, and the topics that were commonly addressed amongst the informants. Figure 2 illustrates the smaller subject areas, the larger theme included.

Reducing some skill gap or some kind of knowledge sharing session From leadership end, it is completely their responsibility. Also from team members as well. But the more focus should be on the leadership end.
You may know many things technically or skill purpose, but if you are not able to communicate that properly then it will not work. Soft skills are very much needed. This should be involved in competencies everywhere.
(upcoming 5 years) try to know about the basics and the knowledge, So that should be the important point - try to learn about the IT idea and not the implementation.
So it is some kind of importance that you have that much of freedom; you can think and

Figure 2: Exemplifies how the data was colour coded

Once we were done color-coding the data into the four themes, all colors and themes were mixed in the document. To ensure the high quality of the empirical analysis, we ordered each theme into separate documents and subsequently compiled the color-coded text into a coherent analysis. After each theme had been analyzed and compiled separately, we merged them into a shared document and completed the empirical analysis. We consider it essential to highlight that chapter 4 is an empirical *analysis*, not just a presentation of the result. We have not only presented what each interviewee has said. Instead, we have analyzed their joint and contradictory statements and discussed them against each other, to create a representation of how the interviewees address the

growing skills gap. This is in accordance with TechTarget's (2017) description of empirical analysis.

Fourth step of coding the data

After the empirical analysis had been compiled, we noticed the four themes were overlapping, and many times the written text discussed the same things twice. Thus, to ensure the empirical analysis's quality and clarity, we decided to recategorize, rewrite, and restructure the themes. The process was made manually by printing the compiled text, to visualize it easily. Once the results had been visualized and restructured, we had narrowed down the four themes into three. We then rearranged the empirical analysis in our computer to match the structure we had created in real life. Once the empirical analysis was intact on the computer, we shredded all the printed data.

After compiling the empirical analysis into the three new themes, we developed the last parts of our theoretical framework and arranged it to follow the same structure as the empirical analysis. This is yet another example of how we applied an abductive approach in the implementation of our thesis. The three themes we categorized the empirical analysis into were 1) understanding the skills gap, 2) the interplay of hard and soft skills, and 3) closing the skills gap. What can be deduced from, for instance, the table of contents is that the discussion (chapter 5) follows the same structure and headings as the empirical analysis. The theoretical framework also correlates with the empirical analysis, where the theoretical is also divided into three themes. The theories within these three themes coincide with what has been presented in the empirical analysis. Figure 3 illustrates the second half of figure 1. Figure 3 on the next page further illustrates the process of creating different thesis chapters and broadcasting how we have continuously used abduction. It is worth adding that since empirical analysis *and* the theoretical framework are our data sources, both of those chapters end in a section called "summarized statement." The reason for this is to facilitate which key takeaways the reader should bring into the next paragraph.
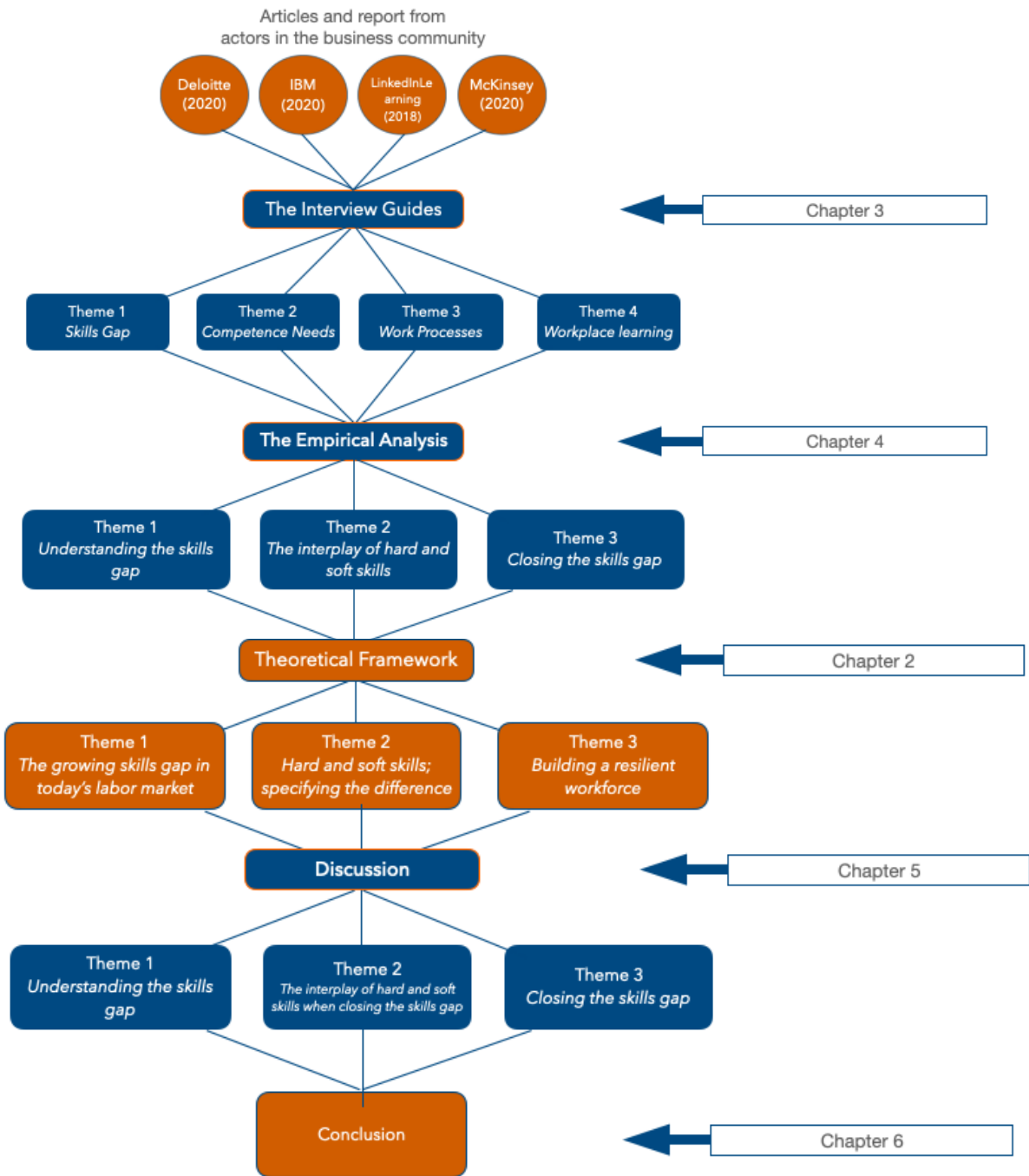
Figure 3: Our model of how the abductive reasoning strategy facilitated the structure of the thesis, by showing in what order the chapters 2-6 was written.

3.4 Research quality

In the above sections, we have argued for the thesis methodological approach and strategy and how it has influenced and enabled data collection and data analysis. However, we see it as essential to address how we have applied ethical aspects and consideration when collecting and analyzing the data, as we believe it ensures the credibility of the results from the qualitative study. Firstly, the validity and reliability of the thesis will be addressed, followed by a description of applied ethical considerations. Subsequently, there will be a discussion of the legitimacy of the references, to lastly finish with a methodology reflection.

3.4.1 Validity and reliability

Validity means that the study measures what it is supposed to, and reliability means that the measurement is consistent and gives the same outcome independent of internal and external factors (Maul, n.d). Bryman (2011) further explains that validity can be divided into *internal* validity and *external* validity. The same author describes internal validity concerns the project and the immediate relation between the empirical and theoretical concepts. As we have applied an abductive reasoning strategy, where the creation of the theoretical framework enabled the creation of the empirical data collection followed by the empirical analysis determining the structure of the theoretical framework, we believe the thesis holds high internal validity.

Moreover, external validity refers to the project in its entirety and the possibility to generalize data for a larger population. External validity refers to the generalizability of the case, meaning to what extent organizations within a similar context and industry facing similar organizational dilemmas can apply the conclusions (Bryman, 2011). The results of our study are *not* tied to our specific case, as skills gaps are a widespread problem affecting the software engineering profession in general, as identified in the background (section 1.2) and theoretical framework (2.1). Additionally, since most organizations hold an IT department today, and since the IT skills gap and shortages affect the broader labor market, we believe that our research holds high generalizability.

Reliability is also split into internal and external reliability, according to Bryman (2011). The same author explains that external reliability refers to the replicability of a study. Since the purpose of the thesis is to *shed light* (not determine) on the growing skills gap and provide *suggestions* (not one correct action) on how to close it, we believe that replicability is high. Primarily since the purpose is not to strive to find a correct answer but merely to collect perspectives from different roles connected to the software engineering profession to understand

the situation better. Thus, other researchers could study the same topic and interview employees within the roles as presented in table 1, arguing for high external reliability.

Bryman (2011) explains that internal reliability is that the researchers agree on interpreting what they see and hear when collecting the data. We both attended and collectively performed all interviews to secure internal reliability. The one who did not ask the questions had the opportunity to ask follow-up questions to the answers at the end of each theme. Moreover, to ensure that we interpreted what we saw and heard in the same way during the interviews, we coded and analyzed the data together.

3.4.2 Ethical considerations

It is in all studies necessary for the researcher to consider ethical aspects as they protect the participants and are an essential part of qualitative studies (Vetenskapsrådet, 2017). The same reference presents four different ethical requirements to take into account when conducting a study: 1) information requirement, 2) the consent requirement, 3) the confidentiality requirement 4) the utilization requirement. We followed all four points as we, via separate emails to each interviewee, provided them with information on the thesis purpose and research questions. In the same email, we also presented which four themes the interview would be based on, so that the informant could decide on participation. We were also mindful of their anonymity by already in the email, ensuring that we would not refer to them by name in the thesis. In the same informational email, we asked the informant if we were allowed to record the interview to later be able to transcribe it. We asked the informants to come back with a positive answer if they were OK with recording the interview. Lastly, we began each interview by re-communicating the information in the email and asking if the information was OK with being recorded. All informants answered yes to both the written and oral proceedings. As we treated the interviewees' participation with great carefulness, we argue we have applied substantial ethical considerations. To ensure full anonymity and ethical consideration, we deleted the recorded interviews as soon as the transcription of them was done.

3.4.3 Reflection of the sources

To increase the quality of the thesis, we want to present how we have reasoned when obtaining sources. The subject matter for the thesis - the growing skills gap in today's labor market - is a relatively contemporary problem. As described in research gap (section 1.2.), it is mainly recent reports and articles from companies and consultancy firms in the business community that address today's problem of the skills gap. Thus, to perform the research and shed light on the

growing skills gaps and how organizations can close them, we have used several sources that do not come from peer-reviewed academic literature. For instance, LinkedIn Learning (2018) and IBM (2020), to name a few. We primarily used these more contemporary sources to argue why our thesis topic is of relevance and to outline the magnitude of today's reality. We are aware that literature of this kind is often constructed for a specific purpose, i.e., for-profit, and thus may hold biased information. We have therefore been careful not to include the organizations' individual and charged opinions on the subject. Merely include the facts that *all* of them have stated about today's reality. We see that it has been to the thesis' advantage to use reports and articles from companies in the business community. They operate in the labor market and, hence, can capture and identify new upcoming trends and solutions immediately.

Regarding the academic literature, we have been careful to check that dissertations, books, and websites have been peer-reviewed to ensure their legitimacy. To help us search for peer-reviewed material and other scholarly material, we have used websites such as Google Scholar, LUBSearch, LUBCat, EBSCOhost, and Swepub. On those sites, we have set the search requirement to be peer-reviewed. In cases where we have found scientific journals and articles through other paths, we have checked that these are peer-reviewed or that the journal itself carries out a quality check, for example, the source Harvard Business Review.

When examining articles and journals, we have looked at which sources they refer back to as a tool for ensuring data quality. For example, many sources refer back to Rainsbury (2002). Several of the more contemporary articles refer back to the World Economic Forum (2020) report, whereas we chose to incorporate it in our thesis. Since we have done extensive literature searches and processed the theoretical framework carefully (as described in section 3.2.3), we believe that the sources used are relevant and do not impair the quality of the thesis.

3.4.4 Methodology reflections
This reflection has been written retroactively; after the whole thesis was completed. The reason for this is to give a correct and concrete reflection.

Throughout this methodology chapter, we have presented a detailed description of the method used in the thesis. For instance, how the semi-structured interviews were performed and how the theoretical framework was composed. Why the thesis can be classified as an exploratory case study has further been presented, together with a model (figure 3) describing how we have applied the abductive reasoning strategy. As we have maintained good quality through the data collection and analysis and applied careful ethical considerations, we conclude that the chosen

method has been suitable for the thesis. Mainly as we managed to answer the thesis purpose and research question. We have shed light and contribute with a greater understanding of today's growing skills gap, how organizations can manage them through some practical suggestions, and address the importance of hard and soft skills.

We understand that eight interviews are just below average, but we have treated the data more thoughtfully and analyzed it thoroughly and in detail, which we believe brings great credibility to the conclusions and parallels we draw. As we also have interviewed employees in differing professional roles, and not just within the software engineering role, we would like to argue that we have gathered a broad and comprehensive understanding of the growing skills gap from a more *general* perspective. Thus, we believe the thesis result is not limited to only Ingka Group Digital, which is advantageous as the conclusion will be more generalizable to other organizations of similar size and character.

4. Empirical analysis

In this chapter, a compiled result of the semi-structured interviews will be presented. The displayed result is not solely linked to the specific organization from where the data has been collected. Instead, it is an accumulation of the prevailing problem the *entire labor market* (specifically software engineers) encounters regarding the growing skills gaps. The chapter is divided into three sections. How closing the skills gap links to competitive advantage and how the interviewees perceive the concept of skills gap will be presented in section 4.1. In section 4.2, how closing the skills gap ties to (and are dependent on) the development of hard and soft skills is presented. In the last section, 4.3, the interviewees' view on who bears what responsibility in closing the skills gap, and suggestions for how to close it, will be presented. The informants are named in the range of informant 1 to informant 8 when being quoted. The numbering is not made in any particular order to secure confidentiality.

4.1 Understanding the skills gap

All interviewees described that every employee within a company needs to have relevant and up-to-date skills for their role, to ensure their work contributes to the business outcomes and performance. Having relevant skills is, therefore, necessary to be able to close the skills gap. On the question of why it is essential to close the skills gap, informant 6 explained that "if companies want to keep up, they have to have the relevant skills," meaning the organization must obtain skills in how to handle fast development and to be able to stay relevant in the market, in other words, develop *soft skills*. Some interviewees also argued that if the digital offers do not meet the demand or do not function properly, it will affect the financial performance, e.g., customer usage, an argument for the importance of *hard skills*. Thus, both obtaining and developing soft and hard skills is vital for organizations to maintain competitiveness. The definition and topic of soft and hard skills will be elaborated on in section 4.2.

The first question in every interview was "What were your initial thoughts on this subject after reading our purpose and research questions?" to which all interviewees answered it is an exciting and timely topic. Additionally, all interviewees expressed appreciation that the growing skills gap is being addressed and brought up for discussion. Informant 7 expressed that her/his "initial thought is that it is super welcomed because it is a very interesting and a very much needed area of interest". Informant 8 expressed it as "I think it is an interesting topic. But challenging one, I would say", whereas the latter informant's statement highlights the complexity of the topic. Informant 1 elaborated on the complexity by answering," It would be hard to give a written answer to the questions". According to the interviewees, the subject is complex and challenging

to understand because organizations are trying to acquire knowledge that is still unknown to them. It is also seen as complex as most interviewees expressed that there will *always* be skills gaps. However, what individuals and organizations can strive for is to *minimize* them.

4.1.1 Perceptions of skills gap and skills shortages

To fully understand the complexity of skills gaps and shortages, the definition of them both must be broken down into smaller pieces. Informant 4 expressed it as "I would say someone has a skills gap, but a skills shortage is something we have as a collective." Informant 8 expanded on this, emphasizing that a whole organization and sector can suffer from the skills gap, "people together move from point A to point B, and the gap is then in-between". In other words, there can be a deficiency of skills within a single employee and collectively within an organization, and if the missing skills cannot be obtained, there is a skills gap. Informant 1 presented an interesting perspective to the definition of skills gap, by saying that "sometimes skills gap is an opportunity, sometimes a frustration and sometimes a risk". On the other hand, the phrase *skills shortages* are mainly used by the interviewees in the broader sense; the whole engineering market is saturated, meaning there is a shortage of skilled personnel. Informant 7 expressed it as "the need for good IT-skills is enormous. However, the supply is not nearly meeting that demand." This indicates that the two concepts of gap and shortage move in a paradox, where they are partly dependent on each other, and partly stand as separate. Therefore, in the section below, what the informants see as the main underlying reason why skills gaps and shortages appear will be analyzed.

The thesis has a demarcation to focus on ensuring that existing employees within an organization can develop the necessary skills to close the skills gap. Despite this, the informants were asked if they believe the most efficient way of closing skills gaps is developing existing personnel or hiring new employees. This question was asked to control the demarcation and understand the work towards closing the skills gap from a more considerable perspective. All interviewees highlighted that it needs to be a mix of them both to close the skills gap. An organization cannot only focus on hiring, as well as not only focusing on developing. Augmented by most interviewees, even if the company gets the business knowledge for free when reskilling existing personnel, it has to hire individuals with new perspectives to maintain an innovative development.

4.1.2 The reason why the skills gap appear

The interviewees expressed multiple reasons and perspectives on *why* skills gaps and shortages appear, where one reason recur in every interview. Informant 6 described it as:

> Your skills change so quickly in IT; there is always a new language or a new way of doing something. It is forever evolving, and that the skills you have, you have to refresh so often.

The quote indicates that the reason for the appearing skills gap and shortages is the development of technology. However, it can further be understood from a collective perspective, as several interviewees expressed that technical software engineering skills have half a life, meaning that whatever technical skill an individual learns, the skill will be out of date within two years. There is always a new programming language or new ways of doing things. During the past 5-10 years, the working routines have shifted from analog to scrum to agile, cloud, etcetera. Informant 5 expressed that something new comes along "basically every half year," meaning new ways of performing the actual work arise frequently. The same informant states that "to keep up with that creates a gap if you are not staying actively ahead of the curve". Thus, it is possible to conclude that several informants believe that software engineers and organizations need to understand the rapid changes in technical skills and work processes. If the parties do not understand, address or balance these, then skill gaps appear. Conclusively, the skills needed within the engineering role and the IT sector are evolving rapidly, and the employees have to keep their skills relevant. Therefore, the next section will focus on the skills debate and whether hard or soft skills are the preferred solution to closing the skills gap.

4.2 The interplay of hard and soft skills when closing the skills gap

In section 4.1, the terms hard and soft skills were briefly mentioned, and it was highlighted how they interact with each other. In the initial question of whether the informants believe that it is possible to distinguish hard skills from soft skills, most informants answer yes. On the other hand, it appears in subsequent questions that all informants find it challenging to discuss the concepts separately. Thus, a shorter description of how the informants describe hard skills and soft skills will first be presented. This will then be followed by a more elaborated paragraph on how the concept interacts with each other will be highlighted.

4.2.1 Hard skills

What hard skills are essential for a software engineer depends on the specific role of engineering. Most interviewees refer to hard skills as technical skills concerning role-specific tasks. Moreover, two interviewees believe that the characteristics of hard skills will change in the upcoming years, as hard skills have already significantly changed during the past decade. Informant 4 expressed it as:

> Hard skills five years ago were very different from hard skills today. And hard skills in five years are going to be different. Soft skills are going to remain the same.

Additionally, some interviewees provided a future-oriented perspective by describing that hard skills will be even more specialized in the future where processes, such as e-commerce solutions, will be divided into even smaller pieces. Informant 4 informant, therefore, argued that hard skills will come to be in greater focus, as in the future, there will be specific languages for everything. Informant 4 further elaborated that breaking processes down into more and smaller pieces is a way for handling increased *complexity* within engineering.

The interviewees, therefore, expressed that it is vital to maintain good knowledge and continuously understand the new hard skills that come in the software engineering field. The informants have expressed that having the right hard skills for the profession (by staying updated on what is new) is vital to close the skills gap. On the other hand, the informants clearly state that this does not mean that software engineers can stagnate in their development and be experts in only one specific programming language. Informant 8 explained it as:

> You cannot come and say, 'I am an expert in C++ or Python.' You need to know many of them and be able to change and adapt. As a specific coding language can actually change.

Conclusively, maintaining updated knowledge in the field of hard skills is necessary for both the employee to maintain their employability and for the organization to be competitive. Thus, it is collectively important amongst both parties when working towards closing the skills gap.

4.2.2 Soft skills

There is a consensus amongst the interviewees that soft skills are the behavioral and people aspect of skills. Based on the informants' answers, the following soft skills are most mentioned;

adaptability/flexibility, communication, decision making, and *collaboration*. To exemplify, informant 4 said, "they need to be decision-makers, they need to be able to navigate in complex situations, they need to be good in communication". The informants continue the discussion by clarifying that it is crucial to actively talk about soft skills for mainly three reasons. The first is that software engineers need to possess the soft skills to work in teams. The second is to understand the user/end product, and the third is to communicate effectively; all critical components when working towards closing the skills gap.

Furthermore, the interviewees specifically emphasize the importance of soft skills in adaptability and flexibility. According to the informants, primarily as those skills are necessary for employees to have the ability to handle the fast pace of technological development, as described in section 4.1.2. Additionally, to the mentioned soft skills above, informant 4 highlights the importance of *empathy* and *humbleness*:

> Empathy, that is understanding and listening to other people. Also humble, in terms of that you can not possibly know everything, and that is being humble in terms of 'I don't know everything' and empathy to understand that other people don't understand everything either...This is for me the most important ones.

Informant 4's quote, together with the paragraphs above it, indicates that soft skills are both multifaceted and complex. From the interviews, it is possible to conclude that all the abovementioned soft skills are essential for establishing a mindset of *complex thinking* within employees. The ability to handle complex situations (by managing complex thinking) is something that the interviewees established to be necessary, as it helps employees navigate and adapt when faced with change.

One of the most discussed soft skills of all interviewees is *communication* because it is a skill and organizational condition important for all departments and roles in an organization. As mentioned earlier, communication is important to spread what jobs and development opportunities there are within an organization and communicate what results have been produced or what tools an individual or a team needs to be able to perform. Good communication skills are also important for sufficient team collaboration, as it is not only coding that drives teamwork and production forward. Informant 7 expressed it by saying:

> People, they do not want programmers. They want engineers. Programming is just one tool you use to solve the problem. But in essence, you are supposed to be solving a problem. And if you solve it by having discussions, or drawing diagrams, or whatever, then fine.

In essence, soft skills in communication are vital for software engineering when working towards closing the skills gap, as it both enables teamwork and that information spreads more transparently through an organization.

4.2.3 The complexity of separating hard and soft skills

Although the interviewees initially say yes to the question of whether the concepts can be separated, it emerges during the interviews that it is challenging to discuss hard and soft skills separately. A quote from informant 4 broadcast the ambiguity of the two concepts:

> Hard skill... Maybe... Is it a hard skill or a soft skill to be eager to learn and to be able to see new perspectives and change their… Maybe a good hard skill is not to be too locked into your current hard skills - that is a soft skill.

During all interviews, it is stated that soft and hard skills need to be used in combination. The interviewees expressed that if necessary, the two skill-sets can be separated and that human beings tend to do so. The reason why people tend to divide skills into categories is because they believe it will help to structure and understand complexity. However, a few interviewees continue to say that categorizing is not the most effective thing to do since it often leads to wasting time. Informant 5 expressed it as "you could separate but why do we do that? It is more important to decide upon what skills it is we would like to have", emphasizing the combined importance of them both. Nevertheless, informant 1 provided the perspective that "hard skills are somewhat measurable and soft skills are harder to test", providing a suggestion to how the both are separated in real life.

The interviewees further discuss how combining hard and soft skills are important for the specific software engineering role. Informant 6 clarifies this by saying "that it is needed to combine soft and hard skills to do a job successfully, and that soft skills probably make the job easier". Informant 7 elaborates it further by saying, "you are not only supposed to be writing code, but you are supposed to be understanding the product you are building and how it is

working in production". In other words, the interviewees collectively say; employees need to think about everything simultaneously, the high level and the detailed level.

Informant 7 places the idea of combining hard and soft skills in the context presented in section 4.1.2, the fast-paced work environment. Informant 7 expressed how she/he has been working as a software engineer for over a decade and already have seen several different trends (agile, cloud, etcetera) and said, "it is moving really fast, and we need to keep up". This statement can be clarified by a quote from informant 5, "so the hard facts will change very quickly while the soft skills... if you are really good at that, that enables you to follow the hard practice".

Conclusively, it is not just that the technical skills are essential for the software engineering role, nor that it is just the combination of hard and soft skills that is important. Instead, it is the soft skills that enable the hard skills to develop, which indicates how both are inseparable.

4.3 Closing the skills gap

Each interviewee discussed what responsibility employees, managers, and senior management hold when working towards closing the skills gap. The discussion of responsibility emerged continuously through each interview, often in conjunction with *continuous learning*. Continuous learning is expressed by *all interviewees* as *absolutely vital* for organizations to obtain, to even possess a chance to work towards closing the skills gap. Informant 5 described that "continuous learning is essential, it is as simple as that", and informant 6 highlighted that "we have to continuously learn to evolve to grow both personally and in our roles". Thus, the collective belief is that continuous learning is necessary to enable continuous development of relevant skills. Without it, employees *and* the whole organization would struggle to procure the necessary skills to close the skills gap. All interviewees expressed that a joint responsibility between managers, employees and the organization (referring to higher management, c-suite executives, etcetera) is necessary to close the skills gap. These responsibilities will be elaborated in the section below.

4.3.1 Employee, managerial and organizational responsibility

The general perspective amongst the interviewees was that *employees* (software engineers) are *creative problem solvers*, and informant 7 expressed that the primary goal for software engineers is to "solve problems in interesting ways". Informant 3 related problem-solving to *soft skills* by saying that "the soft skill is also when you see problems and break them down to something actionable", arguing that being a problem solver is tightly intertwined with soft skills

development. Many interviewees also expressed that the *employees* are responsible for taking ownership over their development and ensure they possess relevant skills for their role.

More than half of the interviewees stated that one *managerial* responsibility is to develop employees' ability to solve challenging and complex problems. Capabilities that (in section 4.2.2) have been declared as *vital* for closing the skills gap. The proposal from several interviewees for how managers should empower complex problem solving was through promoting *self-leadership* and for the managers to act as *role models*. Informant 8 expressed that the manager should "be the role model for learning. And also allowing time for learning". Therefore, self-leadership is essential as it enables employees to take ownership of their individual development and ensure they maintain up-to-date in their skills. A few interviewees also suggest that a manager's responsibility is to customize the learning experience amongst employees to ensure the essential skills for that particular individual are being addressed and developed so that the individual can close her/his own skills gap. By stating this, the interviewees indicated a managerial responsibility of *detecting* what skills an employee or a team needs to develop to avoid that the skills gap grows.

Lastly, the average perspective amongst the interviewees is that the *organization* is responsible for providing the employee with the tools needed to acquire relevant skills to close the skills gap. For instance, providing them with learning platforms and articulating that time should be spent on learning. Also deducted from the interviews is that the interviewees highlight that the organization holds a great responsibility to set business goals that allow employees to set off time for learning (and similar activities).

4.3.2 Two obstacles which can hinder skills-building

On the other hand, the interviewees problematized the perception of responsibilities towards how it looks in reality. The interviewees highlighted how there can exist different obstacles within the responsibilities, hindering the skills-building, which indirectly leads to slower work towards closing the skills gap. The interviewees discussed primarily two hinders to skills-building; *lack of measurements* and *lack of time*.

Lack of measurements

Several interviewees stated that the higher management in organizations often views learning as a priority and as something important. However, the interviewees described that software engineers and managers usually are not measured on learning activities. They are primarily

measured on business outcomes. Therefore, employees, teams, and managers mostly spend time *producing* to meet business goals*,* making it difficult to transfer the prioritization of skills-development into a practical context. Informant 7 conceptualized the problem by saying "if you just measure the business value that the team is creating, then obviously that is what they will focus on doing." Thus, *one* thing that prevents employees from scheduling time for learning is insufficient measuring tools for skills-building's impact on financial performance.

Lack of time

During the interviews, a few interviewees explained that, in reality, the responsibility of time and who is responsible for scheduling learning activities is not always clear. More specifically, a few interviewees described how it can be difficult for the employees (software engineers) to set aside time for skills-building. Informant 7 expressed that "trying to find people who are interested in the same things and book meetings and set up stuff takes time". To solve the problem of planning learning activities, for instance, setting up study groups in coding, a few informants suggested that the responsibility for scheduling time for learning should not solely lie on employees. It could, for instance, be split between employees and managers. Nevertheless, all interviewees problematized this aspect too, as managers, just like employees, often have much responsibility and many work tasks and therefore usually do not have the time to organize a study group.

4.3.3 Three processes that can ease skills-building

The interviewees expressed three particular processes that can ease organizations' work towards closing the skills gap in the engineering profession; *learning by doing and learning from failure, implementing a growth mindset,* and *reskilling the existing workforce to close the skills gap.*

Learning by doing and learning from failure

Several interviewees explained that the best way to spread continuous learning (and by so continuous skills-building) is to implement a mindset of *learning by doing* amongst software engineers. Thus, the interviewees highlighted that learning by doing, or learning in the flow of work, is the most rewarding factor in *how* organizations can close the skills gap.

Some other interviewees problematized this a bit further, arguing that if the practicing appears only while doing and not sometimes in a safe setting where it is OK to fail, unnecessary errors increase. As the employee's responsibility is to be a *creative problem solver,* a few interviewees argued that software engineers need scheduled time to practice actual coding. Informant 5

illustrated it by saying, "Like with any tool, you need to sharpen your knives sometimes...And it goes for engineers as well". Thus, a few interviewees argue that software engineers need to practice in a *safe space*, where it is possible to make errors and try new ways of producing code without having the specific item going to production. The belief amongst some interviewees is that it is still, in the end, a way of learning by doing, only in a more sustainable way. If an employee first learns how to do and then practices the new skill in a different safe context, employees would have a foundation for *learning by doing* and how to act when faced with the real problem.

However, due to lack of time (as described above), there is often no possibility of such learning practices. As discussed above, there is also a certain ambiguity among the interviewees, where some believe that it is up to the employees themself to schedule time for practicing. In contrast, others believe *both* employees and managers must facilitate the learning activity for it to be carried out. To solve the issue of who bears what responsibility, a few interviewees promote the implementation of a community manager. The community managers would not have employee responsibility. They would instead be in charge of scheduling and planning learning activities such as study groups for coding. The interviewees argued that having a community manager would allow skills-building, which has already been explained to be the main factor for closing the skills gap.

Implementing a growth mindset

All interviewees explained that a growth mindset among the employees is a crucial element of closing the skills gap. They believed it lay the foundation of always wanting to learn and develop. Informant 2 expressed it as "if I don't want to enhance my knowledge personally and professionally, then I will not be able to grow along with my organization." A few other interviewees elaborated on the importance of a growth mindset by explaining how it connects to failure and, in particular, learning from failure. Informant 3 explained that "growth mindset is connected to fail fast. To do something quick and fail along the way because that will empower individuals and develop them". Feeling empowered is something most interviewees believe is important. They argued it connects to decision making; how empowered employees feel to make a decision and how much knowledge they have to make a decision determine their capability of working towards closing the skills gap.

A hands-on suggestion on how to implement a growth mindset within an organization was job rotation and job shadowing. Informant 5 expressed it as:

> ...have some job rotations so one developer goes and work in the store, and one from store go and work in development, and be a part of the team and brings in new perspectives and then already that shows you a completely different reality.

Moreover, several interviewees argued that these initiatives would develop employees to thrive in new, unfamiliar environments.

Reskill the existing workforce to close the skills gap

A couple of informants elaborated on reskilling and upskilling in-house and discussed the tremendous possibilities and benefits larger organizations have regarding utilizing the existing knowledge within their company. For instance, move and train employees from other parts of the organization into a more engineering/coding role. The interviewees explained that employees from different positions in an organization would most likely relate to customers and the product differently, which would be beneficial as it brings a new perspective into the development. Informant 6 expressed that the "benefits of growing your own talent is they know the organization, and they know the business". However, the same informant problematized the situation by explaining that a critical factor and difficulty is finding a way to spread throughout the organization to capture employees outside of the engineering role. The main reason is that employees in other positions may not know the full scope of the organization.

To the discussion above, the following question was asked, "How do you think that awareness could be captured, and capture the employees so they do stay?" whereas the informant explained it ties back to *communication*. More specifically, managers in different parts of a large organization need to become better at communicating and raising the awareness of the internal development possibilities. Especially, as stated earlier, the organization would get the company knowledge for free. Meaning the employee would adapt to the new position quicker, which in the long run would amplify the possibilities to close the skills gap.

4.4 Summarized statements

It can be concluded that the skills gap within the engineering profession is a timely topic and that there needs to be a balance between developing the existing workforce and recruiting new employees to close the gap. However, the informants find several benefits with developing the current employees to utilize the skills and business knowledge that already exists within the

organization. Developing existing personnel can be achieved by skill-building employees who currently work within the engineering field or by reskilling employees from other parts of the organization to work within the IT department. Regardless of strategy, it is crucial to close the skills gap within the software engineering profession to obtain competitiveness and keep up with the rapid changes in the labor market.

Furthermore, for the organization to close the skills gap, it is stated that *all* employees need to uphold relevant and updated skills. The skill-sets needed are a combination of hard and soft skills, both essential to closing the skills gap. Hard skills are for the employee vital to remain employable and for the organization to stay competitive. Soft skills are important since they enable teamwork, ease the flow of information, and enable knowledge-sharing. Consequently, it is not just the combination of hard and soft skills that is important. Instead, it is the soft skills that enable the hard skills to develop, which indicates how both are inseparable and equally important to closing the skills gap.

It has been expressed that the employee, the manager, and the organization bear joint responsibility to work effectively towards closing the skills gap. The employees are responsible for maintaining a mindset of *wanting* to develop. Managers are responsible for *implementing* this mindset among the employees, and the organization is responsible for *providing* necessary tools for employees and managers to enable skills-building. However, the joint responsibility has been problematized in the empirical analysis. *The lack of time* for skills development, and *lack of measurement* for learning, have been expressed as two obstacles that might hinder skills-building. On the other hand, three enablers have been highlighted as processes that can ease skills-building; *learning by doing and learning from failure*, *implementing a growth mindset,* and *reskilling the existing workforce* - processes that can ease organizations' work towards closing the skills gap.

Conclusively, all above mentioned analysis is essential for an organization to be aware of to close the skills gap. In the upcoming chapter (chapter 5), the empirical analysis will be discussed with the theoretical framework on organizations' work towards closing the skills gap.

5. Discussion

Through an exploratory case study, the growing skills gap in the software engineering role has been examined and analyzed both from a theoretical perspective and through empirically collected data. Noticeable, when reading chapters 2 and 4, is that there are several similarities in how to close the skills gap between the theoretical framework and empirical analysis. Equivalently, there are several differences too. Thus, in this chapter, the findings in the empirical analysis will be discussed towards the theoretical framework to provide an elaborated answer to the research questions. Similar to the empirical analysis and the theoretical framework, this chapter is also divided into three sections.

The first section will discuss why organizations must close the skills gap by declaring the main advantages of closing them. Indirectly, the discussion in the first section relates to the thesis's first research question, "What are the main advantages of closing the skills gap?". Thereafter, section two will elaborate on hard and soft skills and discuss the synergy between the two skills categories. Consequently, the second section associates with the second research question, "What is the correlation between hard and soft skills when closing the skills gap?". Lastly, section three in the chapter connects to the third research question, "What are the main obstacles and enablers affecting organizations' work towards closing the skills gap?". The discussion in this section will primarily touch on the concept of resilience and practical actions for how organizations can close the skills gap.

5.1 Understanding the skills gap

In many ways, the results of the empirical analysis concur with the theoretical framework outlined in chapter 2 of the thesis. The first one is the belief that one way for organizations to obtain competitive advantage is through closing the growing skills gap within the software engineering profession. The second concurring result between the theoretical framework and empirical analysis is how the phrases skills gap and skills shortages are defined, and the third is the underlying reasons for the growing skills gaps. These three coinciding perspectives will be discussed below.

5.1.1 Competitive advantage

All interviewees see the thesis purpose and research questions as interesting, relevant, and very timely to address and investigate. Especially as they believe all organizations, sooner or later, will face the challenge of how to close the growing skills gap within the software engineering profession. The interviewee's collective perspective that the thesis raises an urgent issue

coincides with the reports and articles companies within the business community have performed. Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020) have in their reports and articles argued that organizations worldwide must close the skills gap amongst their employees and in their organization; if the gap grows too big, companies risk a decrease of their organizational performance which will affect their durability. Thus, closing the skills gap will lead to competitive advantage and strong financial performance; an argument initially presented in section 1.1 and later presented is the theory, section 2.1.3. Conclusively, the theoretical framework and the empirical result align with each other.

The paragraph above can further be discussed towards Lengnick-Halla, Beck, and Lengnick-Halla's (2010) article on resilience. According to the three scholars, building a resilient workforce is based on improving employee *performance* by providing them with the necessary *resources* to build skills. In turn, Sigalas, Economou, Georgopoulos (2013) defines competitive advantage as the combination of *performance* and *resources*. Thus, it is confirmed that investing in human resources and developing employees' skills for closing skills gaps correlates to maintaining a competitive advantage, as it helps employees advance in their role, grow and in the end, achieve business goals.

We believe that organizations must look towards what both the first paragraph discusses in combination with what is raised in the second. What we argue is that organizations will not automatically achieve a competitive advantage by identifying a skills gap and closing it. Instead, what organizations need to do is to include the interplay between *performance* and *resources*. One aspect is understanding and predicting what *performance* is necessary for the market, and the other aspect is what *resources* must be invested in, for skills-building personnel to meet those performance requirements. Thus, it is more about incorporating into the organizational skills-building strategy that if an organization does not acknowledge there are skills gaps to close, it will be challenging to achieve organizational longevity.

5.1.2 The definitions of skills gap and skills shortages

The empirical analysis concludes that the interviewees believe both employees and whole organizations can suffer from a skills gap. In the empirical analysis, *skills gap* is defined as an individual, a team, or a collective that does not have the right skills (competencies) to perform a job and move from point A to B. This definition of skills gap aligns with Capelli's (2015), where he states that a skills gap means that an organization's or employee's current skills-set does not meet the demanded or desired one. Furthermore, the empirical analysis explicates that skills shortage is something the whole software engineering market is suffering from; there are not

enough software engineers to employ, so today's high demand for skilled software engineers cannot be met. This definition aligns with Cappelli's (2015) definition, where he explains that skills shortages refer to a deficiency within a professional field.

Furthermore, during the interview, all informants were asked what strategy they consider most appropriate to close the skills gap; either recruit new employees or develop the existing workforce. As described in section 4.1.1, all interviewees considered it essential to *balance* the two strategies, but that skills-building of existing personnel should be the priority. To prioritize skills-building is coherent with what is being stated by Harrell (2016) since there is a shortage of technical talents in today's labor market, making recruitment a complicated strategy for closing the skills gap. By investigating if the necessary competencies might already exist within the organization, it might be possible to circumvent a saturated market in terms of engineers. Hence, a difference between the theoretical framework and the empirical analysis can be identified, where the interviewees described the importance of hiring new employees, with new perspectives to close the skills gap. Meanwhile, the theoretical framework highlighted the recruiting strategy for closing the skills gap as a problematic approach. Thus, it can be concluded that it has to be a combination of the approaches but that it is vital to look into the organization to utilize the competencies that might already exist to circumvent a market consisting of a skills shortage.

5.1.3 Reasons to why the skills gap is growing

From the empirical analysis, it has been concluded that fast technical development is one of the main reasons the skills gap has emerged. The empirical conclusion aligns with what companies in the business community have argued to be the reason for the growing skills gap; technology develops faster than employees and organizations have time to (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020). The aligning finding can further be discussed towards Lengnick-Halla, Beck, and Lengnick-Halla (2010). The three scholars see it crucial that employees and organizations develop the employees' skills to build a resilient workforce that can adapt to the fast changes in the labor market. It is also clearly articulated in the empirical result that closing the skills gap within employees and within the organization is vital, as it is in a long-term and short-term perspective will help organizations adapt to the fast pace of technological development. What can be concluded through this discussion is that organizations and employees need to work on building a resilient workforce that adapts fast to change and complex problem solving, as the main reason for the growing skills gap is the fast-paced technological development. However, as described in the empirical analysis, closing the skills gap might not be possible, as employee's skills only have half a life. This data from the empirical

analysis can be connected to WEF's (2020) report, where it is stated that the fast pace of technological development leads to skills becoming outdated fast, making it hard for organizations and individuals to close the skills gap entirely.

We believe it is important to execute a joint analysis of the various discussions above; analyzing the definition of skills gap and shortages towards the reason why the skills gap is growing. Primarily, as we would like to argue that the two topics of discussion are dependent on each other, something McKinsey (2020), IMB (2020), and Deloitte (2020) also discussed, see section 2.1.2. The two concepts are moving in a paradox, as concluded in the empirical analysis, section 4.1.1, where skills gap leads to skills shortages and vice versa. As this is the case, and as both employees and organizations can suffer from a skills gap, we believe it is reasonable to argue that organizations can suffer from an internal skills shortage too. In other words, organizations will in the future not only be affected by the external skills shortage, they will most likely suffer from an internal one too - which most companies likely suffer from already due to the fast technological development and automation. If skill shortages in the labor market grows, it will most likely be inevitable that the shortages grow also within the organization. It is, therefore, essential for organizations to utilize the existing workforce, to be prepared for potential shortages, both within and outside the organization. How to enable this utilization will be elaborated on in section 5.3. Thus, employees, managers, and higher management need to understand the seriousness of the growing skills gap *and* shortages this thesis has raised and see beyond how closing the skills gap is only part of competitive advantage. It is rather more complex, and may jeopardize the existence of organizations if not addressed.

5.2 The interplay of hard and soft skills when closing the skills gap

The importance and correlation of hard and soft skills have been addressed in several chapters, 1, 2, and 4 to be specific, arguing for the importance of shedding light on the skills categories when discussing how organizations can close the skills gap. Thus, the following section will elaborate on the concepts of *hard* and *soft skills* and the *skills debate.*

As discussed above, the main problem is a growing skills gap in the software engineering profession, with a subsidiary problem of growing skills shortages. Thus, the competition amongst businesses to obtain employees with the relevant skills has increased, and consequently, the problem organizations face is rather complex. Companies need to find solutions to closing the skills gap within their IT departments (the software engineering profession). However, as the market suffers from skills shortages, companies cannot just hire new employees to fix the

problem. Thus, what is argued by Rainsbury (2020) and concluded from the empirical analysis is that organizations must find a way to develop the combination of hard and soft skills amongst their existing personnel. Nevertheless, as the empirical analysis coincides with the theoretical framework in many aspects, for instance, how hard and soft skills are defined, the two skills categories will be discussed separately below.

5.2.1 Hard skills

As concluded in the empirical analysis (section 4.2.1), hard skills are the *technical* skills required for a specific engineering role. The empirical conclusion concurs with the theoretical framework where *hard skills* are defined as the technical aspects of performing a job (Rainsbury, 2002). The definition also corresponds to Montandon et al. (2021), who argue that *what* hard skills are required depends on the particular professional role. In regards to the theoretical framework and the empirical analysis, it can be concluded that hard skills refer to practical/technical skills necessary to perform adequately in the software engineer role.

Moreover, the empirical analysis concludes that the desired hard skills will change during the upcoming years, as the hard skills necessary today will most likely be a legacy in a few years. Thus, the empirical analysis argues that it is difficult to predict *what exact* hard skills will be necessary for the future, implying that there will be a higher demand on organizations' capabilities to skills-build their workforce and enable employees to *adapt* quickly to fast-emerging skills. This empirical conclusion correlates with the theoretical framework (section 2.1) and specifically what companies in the business community recently have reported. The consultancy firms (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020) argue that due to rapid technological changes, employees no longer have sufficient time to learn the new (hard) skills needed for the job before the skills, once again, have evolved.

5.2.2 Soft skills

In the empirical analysis (section 4.2.2), soft skills refer to adaptability, flexibility, communication, decision making, and collaboration. This definition in the empirical analysis corresponds with the theoretical framework (section 2.2.1) in a sense that both refer to soft skills as interpersonal skills. However, Deloitte (2020), IBM (2020), LinkedIn Learning (2018), and McKinsey (2020) emphasize slightly differing soft skills as necessary for closing the skills gap. The consultancy firms stress the soft skills of *complex problem solving*, *growth mindset*, and *critical thinking*. We, therefore, conclude that *what* soft skills software engineers need to obtain to close the skills gap are rather multifaceted. Thus, it is evident that soft skills are critical for employees to obtain, to retain their skills-set intact and aligned to today's labor market

requirements. It is further, as mentioned, argued by companies in the business community (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020), as well as the scholars Lengnick-Halla, Beck, and Lengnick-Halla (2010) to build soft skills within employees to ensure advantageous business performance. Moreover, it has been confirmed by empirical analysis too. This leads in on what has been named the *skills debate.*

5.2.3 The skills debate

As explained in the background (section 1.1), many firms in the business community (Deloitte, 2020; IBM, 2020; LinkedIn Learning, 2018; McKinsey, 2020) highlight an increased demand for building employees' *soft skills* as an 'action' to close the skills gap. However, this solution can be problematized against the empirical analysis, in particular section 4.2.3. There, it is described that in real life, hard and soft skills can be *distinguished* as hard skills can be measured through business performance, while soft skills cannot be measured. This implies that, in reality, it is harder to focus on building and acknowledging soft skills as they are not *measured*. As later described in the empirical analysis, section 4.3.2, the lack of measurement is one obstacle that hinders skills-building. Thus, we can conclude it is impossible to solely build soft skills to close the skills gap.

In the empirical analysis, it has been stated that software engineers need to combine soft and hard skills to do a job successfully and that soft skills probably make the job easier, but hard skills are necessary to even be able to perform in the role. This empirical conclusion can be analyzed towards Ellström and Kock's (2008) definition of *competence,* where they explain that an employee needs *both* competence in the field and *qualifications required* for the job to perform. We argue that *competence in the field* can be translated to hard skills, and *qualifications required for the job* can be translated to soft skills, which then indirectly argue that there is no possibility of dividing hard and soft skills. They are both parts of the more common definition *of competence,* and they are both essential to build, to obtain a competent workforce that works according to business performance.

As explained in the theoretical framework, Frankiewicz and Chamorro-Premuzic (2020) argue that it is not possible to define a skill as soft or hard, as many skills are often both. For instance, *communication* is defined as a soft skill. However, it could be classified as a hard skill since it is technically possible to communicate through code. To produce code, one needs to know specific coding languages. Just as skills gap and skills shortage work parallelly, we can argue that so do hard and soft skills too. This perspective can be connected to the empirical analysis, where it is explained that organizations need to decide what skills they would like to have among their

employees instead of defining if it is a hard skill or a soft skill. Thus, it is unnecessary to *determine* whether a skill belongs to the hard or soft category, especially as the skill requirement is constantly changing.

What can be concluded from the discussion above is that both hard and soft skills are necessary to close the skills gap. However, the following problem is that organizations cannot wait for employees to assimilate this combination of skills through, for instance, work-life experience, as it will take too long time, enabling the skills gap to grow too large (McKinsey, 2020). Thus, building resilience to form an organization ready and adaptable in the changing business environment has been proposed to circumvent this issue. Hence, the following section will address the *concept* of building a workforce that adapts quickly to change and explore how it can be considered an approach to closing the skills gap.

5.3 Closing the skills gap

As in sections 5.1 and 5.2, much of the empirical analysis coincides with the theoretical framework. Although the interviewees do not explicitly discuss building a resilient workforce to close the skills gap, it can be argued that all of their different proposals and suggestions on how to close the gap fall within the framework of the 'concept theory' resilience. For instance, it has been confirmed in the empirical analysis that the interviewees see continuous learning as a vital element to enable skills-building, which in turn is crucial to close the skills gap. This empirical conclusion coincides with some of the main principles of building a resilient workforce (Lengnick-Halla, Beck & Lengnick-Halla, 2010; Waterman, Waterman & Collard, 1994). Another example is how the empirical analysis highlights the importance of having employees who are adaptable and able to handle complexity. These two capabilities are, in turn, the essence of the concept of resilience, as the idea behind building a resilient workforce is to create employees who can adapt quickly to change and thrive in complex challenges (Lengnick-Halla, Beck & Lengnick-Halla, 2010; Waterman, Waterman & Collard, 1994).

5.3.1 Employee, managerial and organizational responsibility

In the theoretical framework, in sections 2.3.1 and 2.3.2, it has been explained that employees and the organization bear joint responsibility for building a *resilient workforce* that can adapt quickly to unexpected, complex, and challenging changes. For instance, the rapidly growing skills gap. More specifically, Waterman, Waterman, and Collard (1994) explained that the employee is responsible for keeping the necessary skills for their professional role up to date. The organization is responsible for providing the employees with tools enabling continuous

skills-building and development. This theoretical argument for the division of responsibilities concurs with the empirical analysis, especially section 4.3.1. Although the interviewees did not use the specific term resilient workforce, their statements on employee respectively organizational responsibilities are consistent with those provided by Waterman, Waterman, and Collard (1994) and Lengnick-Halla, Beck, and Lengnick-Halla (2010). Thus, as concluded in the theoretical framework and the empirical analysis, the employees, the manager, and the entire organization bear collective responsibility in constantly developing the workforce. As Lengnick-Halla, Beck, and Lengnick-Halla (2010) explained, the individuals within the organizations unitedly enable the organization to become resilient. Hence, it will be impossible to obtain a resilient organization to close the skills gap if not jointly building resilient employees.

Based on the discussion in the paragraph above, we conclude it is reasonable to review the empirical analysis toward the resilient workforce concept. Moreover, we argue that the repercussions of the growing skills gap and shortages (already described in section 5.1) organizations risk facing could be minimized or even avoided if organizations build *resilience* amongst the employees. Mainly, as *building resilience* means building personnel who can quickly adapt to the quick changes of desired skills-set fluctuating today's labor market (Deloitte, 2020). Hence, we argue that building resilience is a way for organizations to work proactively on closing the skills gap, as it allows them to build the future workforce for tomorrow, today.

We also argue it is vital that organizations actively discuss the value of *joint responsibility* when proactively working towards closing the skills gap. We argue this, as we have perceived when analyzing the data, that organizations' longevity and competitive advantage lies within collectively building the employees' *employability*. The idea of building employability was initially argued by Waterman, Waterman, and Collard (1994), and can be tied to what is stated in section 1.1. In the introduction chapter, section 1.1, we presented how ManpowerGroup (2020) reported that future generations in the labor market (Millenials and Gen Z) will be motivated by a continuous yet personalized skills development while, at the same time, being put in demanding and complex work challenges. These desires align with how Waterman, Waterman, and Collard (1994) suggest that organizations and employees collectively can build *employability* (presented in section 2.3.2). The authors explained that by providing the individuals with personalized skills development, employees will become more efficient and inclined to drive the company's operations forward. This further aligns with Lengnick-Halla, Beck, and Lengnick-Halla's (2010) statement that organizations need to look towards the underlying motivational factors for employees and implement activities designed in regards to these motivational factors. One example we believe would promote personalized skills development is

implementing more widespread usage of *job rotations* and *job shadowing*. French et.al. (2015) and Mankin (2009) argue that these processes aid the development of soft skills such as adaptability amongst employees. At the same time, we would argue it is a way to place individuals in new, challenging situations, which is a motivational factor for future generations.

Thus, we argue that if the employees and organizations collectively work on building employability, future generations' motivational factors would be fulfilled. In the long run, this would make the employees more efficient and fulfilled with work-life satisfaction affecting their performance positively, which would benefit the company's growth and competitive advantage.

However, the discussion in the paragraph above implies a more blurred line between the division of responsibilities that the empirical analysis in section 4.2.1 and Lengnick-Halla, Beck, and Lengnick-Halla (2010) suggest. For instance, to proactively work with closing the skills gap, *both* the organization and the employees would have to be responsible for understanding what skills are needed *and* scheduling activities to develop them. This division of responsibilities has been problematized in the empirical analysis, where the informants, amongst others, explained as it can be difficult for the employees to set aside time for skills development. Therefore, obstacles that can hinder skills-building and collectively building a resilient workforce will be discussed in section 5.3.2 below.

5.3.2 Two obstacles which can hinder skills-building

In the empirical analysis, the division of responsibilities is problematized, highlighting primarily two obstacles hindering the skills-building; the lack of *time* and the lack of *measurements*. Indirectly, these obstacles can cause reduced efficiency when working towards closing the skills gap.

Lack of time

In the empirical analysis, the problem with time is primarily conceptualized through the perspective that despite being responsible for setting aside time for learning, employees seldomly have the actual time to do so. We also believe that if the employees do not have the actual time to, for instance, sit down and practice coding, they will not know *how* to design the learning activity when they actually have time for it. By that, we do not mean that software engineers are incapable of practicing coding in various forums. However, it can be difficult to 'just start' without a pre-designed framework or environment to practice in, especially if they are not used to it. In other words, we believe it can be connected to motivational factors and that not having enough time to plan learning is an unmotivating factor that leads to learning activities not

becoming planned in the first case. One suggestion could then be to split the responsibility of who plans the learning activity, for instance, having managers doing it instead. However, it is further problematized that as managers also are working within time constraints and towards business demand from higher management. Meaning they also have little time to organize it.

As both employees and the managers have difficulties finding time to coordinate skills development, a mediator could be the solution, for instance, having a community manager. This is an example suggested in the empirical analysis and French et.al. (2015) and Mankin (2009). The idea is to have a community manager or a managerial coach who *does not* have employee responsibility. Their responsibility would be to facilitate a learning environment and enable constant skills-building and knowledge sharing, something Lengnick-Halla, Beck, and Lengnick-Halla (2010) and Waterman, Waterman & Collard, (1994) argue as vital for building resilient employees who can adapt quickly to change, and develop their skills proactively and according to the business's urgent needs. Vital to acknowledge is that having a community manager would entail additional costs for the organization. Yet, if it means that it eases the process of knowledge sharing and leads to more efficient collaboration for cross-functional teams, then it most likely leads to positive outcomes in the long term.

Lack of measurements
As stated in the empirical analysis, measurement guides the team focus and affects what activities the employees and the managers spend their time on during a workday. However, what is expressed in the empirical analysis is that organizations, in general, mainly focus on measuring business outcomes rather than time spent on learning or skills-building. What is expressed as a necessity is that likewise measuring business outcomes, it is vital to measure learning since it sets the tone for enabling employees to prioritize learning and skills development. However, in the theoretical concept of building a resilient workforce, measurements are not yet widely or actively discussed. Hence, it is possible to problematize the need for measurement and question the importance of *measuring* the time spent on learning. Furthermore, we want to question if the discussion even should concern *how to measure* soft skills, as it is an issue that has not yet been solved according to the theoretical framework. Perhaps one way would be to equalize the measurement of learning *hard skills* to learning *soft skills*, as learning hard skills in many situations leads to the development of soft skills.

Moreover, what we also suggest is that instead of focusing on who bears what responsibility or how learning can be measured, an idea would be for organizations to involve community managers or managerial coaches to ease the process of knowledge-sharing and skill-building.

The role of the community manager would, for instance, be to collect employees' and managers' perceptions of how learning activities impact teams' performance. Additionally, the managerial coach could facilitate personalized skills-building so that the workforce can develop the skills needed for tomorrow already today and thus proactively work towards closing the skills gap within the engineering profession. Additionally, the managerial coaches would function as the link between managers, employees, and higher management and enable the joint responsibility to build a resilient workforce and employees' employability. Conclusively, it can be discussed whether the focus should be on the lack of measurements, or if that focus instead should be on finding other tools and suggestions, such as managerial coaches, to enable time for skills-building and by that close the skills gap within the engineering profession.

5.3.3 Three processes that can ease skills-building
In section 4.3.3, in the empirical analysis, we have identified three processes that can ease skills-building to close the skills. The processes that will be discussed are the following: *learning by doing and learning from failure, implementing a growth mindset,* and *reskilling the existing workforce to close the skills gap.*

Learning by doing and learning from failure
The most efficient way to build skills is in the empirical analysis (section 4.3.3), explained as learning by doing and learning in the flow of work. Although learning by doing is not described as a specific or separate concept in the theoretical framework, it is again possible to connect it to resilience. The learning aspect is in the theoretical framework (section 2.3.4) presented as; teaching employees how to use information, share knowledge, and effectively utilize skills (Waterman, Waterman & Collard, 1994). These hands-on suggestions facilitate an understanding of how managers can teach and implement a mindset, enabling employees to learn in the flow of work. Indeed, because it in the empirical analysis is concluded that learning by doing is a *mindset,* needed to be taught.

However, learning by doing, and more specifically, learning in the flow of work, is in the empirical analysis problematized. The explained reason is that this method lacks a "safe space", where it is possible to practice, knowing that it is OK to make mistakes or fail since the item is not going to production. Further, this problematization indicates a necessity to balance different learning methods, empowering employees to build skills in their preferred way. On the other hand, it also connects to learning by doing as a *mindset*. Hence, we argue that it is necessary to balance learning in the flow of work and learning by doing in a safe space, meanwhile facilitating a mindset that it is OK to make mistakes.

McKinsey (2020) suggests that to enhance employees' capability to utilize information and share knowledge effectively is by having managers who take a more active role within the workplace. The discussion then again ties back to the shared responsibility of skills-building to close the skills gap, where *the time aspect* is acknowledged as a potential obstacle. Therefore, we suggest implementing managerial coaches, whose job is to enable and facilitate a learning environment (Waterman, Waterman & Collard, 1994). Activities the managerial coaches can drive are, for instance, exercises where the purpose is to fail, so it is not as big of a deal when failing in real life. We also consider it beneficial to have knowledge-sharing sessions, such as *Failure Friday,* where employees discuss different work-related "failures." The purpose is partly to learn from each other and facilitate a knowledge-sharing environment focusing on both successful tips and lessons learned from trying and failing.

Conclusively, to enable learning by doing and learning from failure, organizations need to personalize the learning experience, explained in the background (section 1.1) as essential for the two generations (Millenials and Gen Z) that soon are dominating the labor market. Hence, it is important to balance employees' various needs to maximize each individual's potential and ease skills-building to close the skills gap.

Implementing a growth mindset
As mentioned above, learning by doing is a *mindset* (empirical analysis section 4.3.3). In the empirical analysis, having a growth mindset is expressed as vital to close the skills gap and directly related to employees' willingness to learn. It is similarly highlighted as a necessity in the theoretical framework (section 2.2.1 and 2.3.4).

However, a growth mindset is not only vital for the process of *learning by doing.* In the theoretical framework, it was explained that a growth mindset is crucial for building a resilient workforce and closing the skills gap. It is further emphasized that this mindset would enable employees to navigate in and learn from unpredictable and complex situations, for instance, changes due to rapid technological development. Thus, the essence is to be proficient in handling stressful situations, with a desire to learn in every situation. Nevertheless, the question of *how* to promote a growth/resilient mindset to close the skills gap remains.

Moreover, different hands-on suggestions for building a mindset necessary for closing the skills gap are elaborated on in both the empirical analysis and the theoretical framework. As described in the empirical analysis, one suggestion entails having job rotations and shadowing to

implement new perspectives throughout the organization. We would also like to argue that it is a way to utilize the knowledge and perspectives that already exist within the organization. This suggestion coincides with what is presented in the theoretical framework, where it is highlighted as an approach to stimulate cross-functional knowledge sharing (Mankin, 2009). Besides, it would also be a method to enhance resilience. By job rotation/shadowing, the employee will experience new, preferably challenging situations and thus develop flexibility and organizational adaptability, explained as two critical factors for closing the skills gap (IBM, 2020). Another suggestion for building a resilient workforce with a growth mindset is acknowledging and embracing individual weaknesses (Dweck, 2014). This suggestion can be connected to what has been elaborated on in the section above (*learning from failure)*. On the other hand, the theoretical framework also emphasized that celebrating growth is equally essential (Dweck, 2014).

It can be concluded that a growth mindset in the sense that learning is possible, even from failure, is very important for closing the skills gap. It is argued that if employees view failure as an opportunity to learn from, they will develop soft skills in employees such as adaptability and critical thinking, which emphasize the importance of soft skills.

Reskill the existing workforce to close the skills gap
The two sections above have discussed the essence of learning by doing/learning from failure and a growth mindset to closing the skills gap. However, another, more traditional approach to closing the gap is by reskilling the existing workforce to unlock the workforce's potential. According to the empirical analysis, reskilling initiatives can entail both skills-building *within* the digital/IT department with existing engineers. However, it can also entail more extensive reskilling initiatives with employees from other departments being reskilled to work within the digital/IT department. As defined in the theoretical framework, the Cambridge dictionary (2021) and McKinsey (2020) explain that reskilling is when a person learns new skills to do an entirely new job. Therefore, regarding this aspect, the empirical analysis, and the theoretical framework harmonizes.

As presented in the theoretical framework, reskilling lies within the concept of building a resilient workforce (Lengnick-Halla, Beck & Lengnick-Halla, 2010), since an employee, by being reskilled, develops skills related to the resilient concept. Nonetheless, essential to discuss is that there are different opinions regarding the efficiency of reskilling initiatives to closing the skills gap in the theoretical framework. The debate presented is that reskilling by one part is considered a beneficial approach (McKinsey, 2020), while another part considers it a strategic dead-end (Deloitte, 2020). On the other hand, if turning to the empirical analysis, reskilling the

existing workforce is concluded to be beneficial for two reasons. One is that it can ease knowledge sharing between different departments, and the second is that the organization gets the reskilled employees company knowledge for free.

As discussed in the paragraph above, the empirical analysis concludes that reskilling and growing talents in-house are beneficial since "they know the organization, and they know the business "(section 4.3.3). We want to connect this statement to the discussion in section 5.1.2 that we believe organizations in the future will suffer from internal skills shortages, not only external ones. Suppose organizations implement systems to take advantage of the knowledge and interests that already exist in the company. In that case, we argue that they can reduce the risk of suffering from internal skills shortages, as they would proactively utilize the existing knowledge within the company. We further argue that this proposal can be supported by Waterman, Waterman, and Collard (1994), *collectively* building employability. By reskilling employees from different departments in an organization, the employee and employer would *collectively* build the employee's employability while simultaneously minimizing the skills shortage. As further argued by Waterman, Waterman, and Collard (1994), collectively building employees would entail developing the employees' *soft skills*, which earlier has been concluded as *vital* to close the skills gap. We thus consider reskilling to be a beneficial approach because it probably will be a future necessity when circumventing the labor saturation to close the skills gap. Because perhaps, the skills needed already exist within the organization.

Concerning the debate in the theoretical analysis whether reskilling is beneficial or not, the concluded argument is that, if reskilling, organizations must focus on long-term skills and resilience instead of reskilling for the near future. However, we wonder if the future of reskilling lies within long-term reskilling initiatives. We would argue that as the technological changes are happening fast, large and lavish reskilling initiatives may be overwhelming and inefficient. Primarily due to the extended risk of the skills becoming inaccurate fast. We suggest organizations view reskilling from Dweck's (2014) proposal to break down goals into smaller parts. Not only would that allow the organization to manage complexity better and implement a growth and resilient mindset. It would allow them to work proactively to maintain skills within the organization and among the workforce, arguing reskilling is the new skills-building to proactively being able to adapt to new, emerging skills gaps.

6. Conclusion

The most evident conclusion of the thesis is that organizations will have a hard time *closing* the skills gap, as the business environment and reality always will change and develop. What can be concluded from this is that organizations, if anything, can work towards *decreasing* the skills gap, not *closing* it. Especially as the fast development of technology is not a state of mind; it is today's reality, which concludes that skills gaps amongst the software engineering profession are inevitable to avoid. Organizations therefore need to embrace the fact that the required skill sets for software engineers *always* will change, and view that complex situation as an *opportunity*. Organizations need to build a *resilient workforce* to enable a mindset of opportunism and see today's fast-changing environment as an opportunity rather than a hinder. It would allow organizations to proactively ensure that the skills gap *and* shortage within the organization does not grow. This would also mean that organizations establish a competitive advantage, as they then build skilled software engineers that can quickly adapt to the fast-paced technological development.

One advantage of proactively working towards decreasing the skills gap is that it will enable economic growth and organizational longevity. Another advantage is that organizations would not be affected by software engineers' external and potentially internal skills shortages. In other words, the benefit of proactively decreasing the skills gap and building a resilient workforce is that organizations maintain skilled, up-to-date employees ready to navigate and manage the fast-changing business and technological development. Thus, to answer the first research question; *the main advantage is a competitive advantage.*

The evidence from this study further concludes that building software engineers' hard *and* soft skills are directly correlated to decreasing the skills gap. From the theoretical framework, empirical analysis, and discussion, it can be concluded that there need to be an interplay between the two skills-set. Hence, organizations will not be able to proactively work towards decreasing the skills gap if only focusing on developing soft skills. Likewise, it will be challenging if mainly focusing on developing hard skills. The main conclusion is that it is inefficient to discuss which of the skills category (hard and soft skills) organizations should focus on building, as the required skills - independent skills category - are constantly changing due to rapid technological development. Moreover, as evidence from the study shows, hard and soft skills cannot be separated. On one hand, hard skills *are* in many cases the soft skills; you can, for instance, communicate through *code* where coding is the hard skill and communication is the soft skill. On the other hand, learning hard skills enables learning new soft skills and vice versa; you need to learn a new coding language (hard skill) to adapt to the changing environment (soft skill). To

answer the second research question, the correlation of hard and soft skills is that they *relate, enable each other, and depend on each other.*

Lastly, managers, executives, and HR can ensure they obtain engaged employees who have the relevant skills to work towards the company's mission by constantly building the employees' hard and soft skills. One way to do this is to build a workforce that views challenges as opportunities and quickly adapts to change; building a resilient workforce characterized by a growth mindset and who is learning in the flow of work. Some practical suggestions for how managers and executives can implement these characteristics is to use job rotation as a tool for knowledge sharing and skills-building. Moreover, to enable an environment where the employees can develop and work towards the company's vision and learn in the flow of work, managers and executives need to implement safe environments for *practicing failure*. Lack of time and lack of measurement are two obstacles hindering these learning initiatives. One solution to both of the hindrances is managerial coaches, whose job would be to plan the learning activity and report how it concurs with the business performance and outcomes. Another main enabler would be implementing shorter sprints of reskilling initiatives, as it would allow organizations to proactively work towards decreasing the skills gap. Primarily as the organization would capture the 'company knowledge for free'.

To conclusively answer the last research question, the main obstacles for decreasing the skills gap are *lack of time* for learning and *lack of measurement* for measuring learning activities. However, the main enablers are implementing *resilience, growth mindset, adaptability*, and more substantial *reskilling*. The answer to implementing these larger enablers lies in the more diminutive initiatives, such as job rotation, job shadowing, and managerial coaches.

6.1. Future research

This thesis has raised timely and contemporary research of current problems fluctuating today's labor market, namely the skills gap in the software engineering profession. As mentioned in the research gap, today's issue of the growing skills gap has not yet been widely studied and reported in academic literature, which was one reason for the chosen purpose of this thesis. However, since the study has been conducted as a case study with eight interviews, we suggest that future research can entail a comparative study between different cases to further the result and contribution of this thesis.

Additionally, when investigating the skills gap, we have realized the broadness of the subject, with many possibilities for various areas, for instance, growth mindset and measurement, which can be interesting for future studies to target. Consequently, as future research, we suggest a study of growth mindset and its correlation with the skills gap and the work towards decreasing it. Another suggestion is to do an in-depth investigation on how employees and organizations believe that learning activities can be measured and transformed into actionable business outcomes. Lastly, since handling complexity throughout this thesis has been addressed as an essential skill for employees to possess, we suggest future research within the field, especially since there exist multiple theoretical concepts on complexity.

Finally, the purpose of the thesis has been to shed light on how organizations can close the growing skills gap in IT-oriented professions, specifically within the software engineering role. We believe we have fulfilled the purpose, as we have throughout the entire thesis provided theoretical examples, empirical data, and reliable discussions on the topic. Our contribution with this thesis is that we have created a better perception of how individuals in the labor market can decrease their growing skills gap. We are referring to *individuals* and not one specific role, as we believe the material in the thesis is generalizable to other organizations and individuals going through a digital transformation or suffering from the effects of fast digital development. Mainly, we believe the thesis holds high generalizability since we have interviewed several different professional roles, not only one. Thus, the result of the thesis is applicable for software engineers and managers, executives, HR, and higher management. They all can read this report and better understand how they, in their everyday work, can decrease the skills gap.

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Appendix

1. Interview guide learning & development

Introduction questions
1. How long have you worked in Ingka group/IKEA?
    a. In specifically group digital?
2. Describe your role at Ingka!
    a. How long have you been working within it?
3. Do you have any questions for us before we proceed with the interview?

Open Question
4. What were your initial thoughts on this subject after reading our purpose/research questions?

Skills gaps
5. What does the concept of skill gap mean to you?
6. What does the concept of skill shortages mean to you?
7. Have you encountered the trend of growing skill gaps and shortages when working with L&D questions for it-oriented professions?
    a. What do you think is the reason for enlarged skills gaps and skills shortages?
8. Why do you think it is essential to work on closing skill gaps and skill shortages?
9. Can you tell us how you as a learning developer work towards decreasing the skills gap?
10. Can you tell us about some hands-on suggestions on how you work with skill development?
    a. Would you say you work with it proactively, and how?

Competence need
11. What is your definition of soft skills and hard skills?
12. What hard skills and soft skills do you believe to be the most important for the engineering role?
    a. Why do you believe this?
13. Do you think it is possible to clearly separate soft skills and hard skills from each other?
    a. Do you believe that soft skills and hard skills can be combined?
    b. How does that carrie out in the engineering role?
14. How do you believe that the skills requirement has changed within the IT-sector during the past 5 years?
    a. How do you believe it will look in the upcoming 5 years?
15. What can managers do to create a stimulating workplace learning?
    a. How can you as a Learning developer support managers in doing so?

Work processes
16. Do you believe the most efficient way of decreasing skill gaps is to develop existing personnel or hire new employees?

17. What are your thoughts on the processes of reskilling and up-skilling when developing employees?
    a. How do you believe these concepts are connected to decreasing skills gaps?
18. Based on your experience, can you tell us about some initiatives that are related to the work towards decreasing skills gaps/shortages?

Workplace learning
19. How large role do you believe continuous learning (learning in every situation) plays in decreasing skill gaps?
20. What is your definition of growth mindset?
21. In what way is a growth mindset important for decreasing skills gaps?
22. What initiatives can organizations make to ensure employees have a growth mindset?

Question from literature
23. In contemporary literature, we have found that it is becoming increasingly important in IT related jobs to possess skills in handling complex situations, communication and decision-making. It is said to provide added value for the company when decreasing skill gaps, but also for the individual to stay adaptable and employable.
    a. Do you think that these skills are discussed actively in the organisation? If not, how would you want them to be addressed?

Concluding questions
24. Is there anything you would like to clarify?
    a. Do you have any questions for us?

2. Interview guide managers

Introduction questions
1. How long have you worked in Ingka?
    a. In specifically group digital?
2. Describe your role at Ingka!
    a. How long have you been working within it?
    b. Do you have any employee responsibilities/people reporting to you?
3. Do you have any questions for us before we proceed with the interview?

Open Question
4. What were your initial thoughts on this subject after reading our purpose/research questions?

Skills gaps
5. What does the concept of skill gap mean to you?
6. What does the concept of skill shortages mean to you?
7. Do you believe there in general are enlarged skill gaps within the tech/IT-sector?
    a. What do you think is the reason for more enlarged skill gaps?
8. Why do you think it is essential to work on decreasing skill gaps within the IT sector?
9. How do you work in your role with closing skill gaps?

10. Can you tell us about some hands-on suggestions on how you work with skill development?

Competence need
    11. What is your definition of soft skills and practical skills?
    12. What practical and soft skills do you believe to be the most important for employees to be able to perform in the role as an engineer?
        a. Why do you believe this?
    13. Do you think it is possible to clearly separate soft skills and practical skills from each other?
        a. Do you believe that soft skills and practical skills can be combined?
        b. How does that carrie out in the engineering role?
    14. What competencies do you look for in engineers?
        a. Have you noticed that the competence needs within the IT-sector has changed during the past 5 years?
        b. How do you believe it will look in the upcoming 5 years

Work processes
    15. Can you tell us about some of the actions you take as a manager to ensure that your employees have the right skills to perform their work?
    16. How do you as a manager identify if there are any skills gaps in your team?
    17. Do you believe the most efficient way of closing skill shortages/skill gaps is to utilize existing knowledge (personeel) or hire new employees?
    18. How do you ensure that employees actually are spending time on learning?
    19. What can you as a manager do to create a stimulating workplace learning?
        a. What would you say hinders you from creating a stimulating workplace learning ?

Workplace learning
    20. In what ways can you, as a manager, encourage employees to develop themselves and take responsibility for their own learning?
    21. What is your definition of growth mindset?
    22. Do you think a growth mindset in general is important for decreasing skill gaps?
    23. How can you as a manager contribute to employees having a growth mindset?

Question from literature
    24. In contemporary literature, we have found that it is becoming increasingly important in IT related jobs to possess skills in handling **complex situations, communication and decision-making**. It is said to provide added value for the company when closing skill gaps, but also for the individual to stay adaptable and employable.
        a. What do you think about this, are these competencies you see as important? in your role as an engineer?hoppar ja
        b. Do you think that these skills are discussed actively in the organisation? If not, how would you want them to be addressed? Akademikern och vilden i hjärnan

Concluding questions

26. Why do you believe Ingka is a beneficial company to study our purpose (skill gaps in IT)

27. Is there anything you would like to clarify?
    a) Do you have any questions for us?

3. Interview guide team members (software engineers)

Introduction questions
1. How long have you worked in Ingka group/IKEA?
   a. In specifically group digital?
2. Describe your role at Ingka!
   a. How long have you been working within it?
3. Do you have an academic background or how have you gained the needed skills for working as an engineer?
4. Do you have any questions for us before we proceed with the interview?

Open Question:
5. What were your initial thoughts on this subject after reading our purpose/research questions?

Skills gaps/skill shortages in IT in general:
6. Do you believe there in general are enlarged skill gaps within the tech/IT-sector?
   a. What do you think is the reason for more enlarged skill gaps?
7. Why do you think, from your personal perspective, it is essential to work on closing skill gaps within the IT sector?

Competence needs/development in the engineering position:
8. What skills do you believe are the most important once to be able to perform in your role as an engineer?
   a. Why do you believe this?
   b. To be able to perform your **profession for a longer time,** do you think you have to change or develop your skills?
9. What roles do you think soft skills vs practical skills have in performing your work successfully?
10. Have you noticed that the competence needs within the IT-sector has changed during the past 5 years?
    a. How do you believe it will look in the upcoming 5 years?
11. What are your thoughts on the idea of organization's internally utilizing existing knowledge to close skill gaps in tech?
    a. What actions do you think is important for an organization to take in order to utilize existing knowledge?

Work processes for how to utilize knowledge:
12. What do you need from your manager and the organization in general to maximize the utilization of your knowledge?

13. Since you have worked in the organization for x years, you have some wider knowledge of the organization as a whole. Do you ever reflect on how you use the overall knowledge about the company in your engineering role?
    a. Do you document it? For example, through an action plan or something else?

Workplace learning and growth mindset:
14. In what ways do you take responsibility for your own learning?
    a. Do you have enough time to do so? How much time do you spend on learning each month?
15. How large role do you believe continuous learning (learning in every situation) plays in closing skill gaps?
16. Do you think a growth mindset in general is important for the work towards closing skill gaps?

Question from literature:
17. In contemporary literature, we have found that it is becoming increasingly important in IT related jobs to possess skills in handling complex situations, communication and decision-making. It is said to provide added value for the company when closing skill gaps, but also for the individual to stay adaptable and employable.
    a. What do you think about this, are these competencies you see as important in your role as an engineer?
    b. Do you think that these skills are discussed actively in the organisation? If not, how would you want them to be addressed?

Concluding questions:
18. Is there anything you would like to clarify?
    a. Do you have any questions for us?