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Utilizing AI in Buyer-supplier Relationships Through Procurement

Case: UPM-Kymmene Oyj

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ABSTRACT :

Teknologinen vallankumous jatkaa kulkuaan niin siviili- kuin työelämässäkin. Yksilöt ja organisaatiot ympäri maailman etsivät ja kohtaavat alati monipuolisempia keinoja teknologian hyödyntämiseen omissa toimintaympäristöissään. Teknologian aallonharjalla oleminen voidaan tätä myötä nähdä myös yhtenä yrityksen kilpailuetuna. Kehityshuuman myötä työntekijöiltä edellytetään uusien työkalujen omaksumista entistä nopeammalla syklillä. Uudistumisen tarvetta kasvattaa myös omalta osaltaan yksilöitä työllistävien organisaatioiden kohtaama kasvanut säätelyn määrä, ja esimerkiksi vastuullisuuteen panostaminen ja siihen liittyvään regulaatioon vastaaminen. Tähän tarpeeseen vastaamisessa niin yksilöt kuin organisaatiotkin toivovat apua muun muassa tekoälyn saralta. Tämän tutkimus tarkastelee, miten tekoälyä voidaan hyödyntää yrityksen osto-organisaation näkökulmasta. Hankintatoimi ja ennen kaikkia toimitusketjujen hallinta ovat kohdanneet viimeisten vuosien aikana globaalin mittakaavan haasteita, mikä omalta osaltaan lisää hankintatoimen roolin merkitystä yritysten pyrkiessä säilyttämään kilpailuasemansa ja -etunsa sangen epävakaassa markkinatilanteessa.

Nykytutkimus tarjoaa rajallisen määrän aineistoa mitä tulee tekoälyn konkreettisista käyttökohteisiin sekä kyseisen teknologian implementoinnin hyötyihin. Tämä selittyy omalta osaltaan teknologisen kehittymisen nopean syklin myötä. Täydentääkseen nykyiseen tutkimustarjontaan, tämä tutkimus käsittelee tekoälyä ja sen mahdollista vaikutusta toimittaja-asiakassuhteisiin. Tutkimus tuo esiin keinoja, joiden avulla yrityksen osto-organisaatio voi hyödyntää tekoälyä omassa roolissaan. Toimittaja-asiakassuhteet ovat ensisijaisesti rajapinta, jossa yrityksen osto-organisaation odotetaan tuottavan lisäarvoa yritykselle varmistamalla mahdollisimman tehokkaan ja laadukkaan ulospäin suuntautuvan kassavirran hallinnan. Tutkimus tarkastelee edellä mainittuja teemoja Suomessa pääkonttoriaan pitävän pörssiyhtiö UPM-Kymmene Oyj:n osto-organisaation näkökulmasta, ja yrityksen monipuolinen tuoteportfolio esittää omat haasteensa myös yrityksen osto-organisaatiolle. Tutkimuksen tulokset pohjautuvat haastattelukierroksen tuottamaan aineistoon, ja haastateltavien joukkoon kuuluu monipuolinen joukko niin toimittajia, ostajia kuin toimittaja-asiakassuhteita johtavasta asemasta lähestyviä ja tarkastelevia henkilöitä.

Tutkimus osoittaa, että tekoäly nähdään hyvin potentiaalisena vaikuttavana osatekijänä tulevaisuuden toimittaja-asiakassuhteissa. Tutkimustuloksista ilmi käyvä viitekehys hyödyntää Krajlicin toimittajakategoriamallia ja se tarjoaa osto-organisaatiolle lähestymistavan tekoälyn hyödyntämiselle eri toimittajakategorioissa. Osto-organisaatio voi implementoida tekoälyn tarjoamia mahdollisuuksia ja pyrkiä suoraviivaistamaan ja vahvistamaan asemiaan arvoketjussa tuomalla tekoälyn omaksi omia sisäisä prosesseja kuin hyödyntämällä sitä myös omissa toimittajasuhteissaan.

KEYWORDS: Buyer-supplier relationships, Procurement, Artificial intelligence, AI, Procurement process, Supplier portfolio matrix

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1 Introduction

There are plenty of questions to be answered about how the disrupting technological developments will impact our working lives in the coming years. Companies' ability to develop their operations on this aspect, and therefore ways of working, will have a major role on both our economic as well as our social landscape (Seppälä et al., 2023, p. 7). When it comes to procurement organizations and their ability to create value, the adjustments for the current operational climate have also been relevant for the sourcing and procurement activities for quite some time now (Tassabehji & Moorhouse, 2008, p. 56).

Based on the discourse around digitalization, it can be argued that this ability to adjust role-based capabilities needs to be present in the future as well. Due to the recent and still existing global market disruptions, e. g. Russia's invasion in Ukraine and the Covid-19 pandemic, operational excellence in supply chains has gathered more interest from management's perspective (KPMG, 2022, p. 3). In addition to Karttunen's (2018) review, Bals et al. (2019, p. 6) discovered through their research that the majority of the key future competencies in procurement and sourcing management has changed from the previous study conducted by Tassabehji and Moorhouse (2008). Deloitte (2017) urges leaders in this function to see this disruption as an opportunity for improvement, while Boston Consulting Group (2023) argues that companies who are not able to adjust their operations in order to utilize these technologies, such as artificial intelligence (AI), internet of things (IoT) and blockchain, will struggle with their competitive advantage. Therefore, it could be well argued that the question is not if these technologies will impact our working lives, but how they will do so.

However, there seems to be only a limited amount of research done about the specific ways these technological advancements will change companies' operating models (Weking et al., 2020). While conceding to digitalization's role to further buyers-supplier relationships, Veile et al. (2020, p. 1258) suggest that technological impact on buyer-supplier relationships could benefit from combining both perspectives to the research. Bals et al.

(2019, p. 3) have also recognized this gap in the field of research, and a requirement for deeper understanding of this subject had risen during their own research. Their interviews suggested that it has become more uncertain what precisely are the competencies with which the future professionals in the field of procurement should equip themselves (Bals et al., 2019, p. 6). While the environment in which the procurement professionals operate can be seen as something which evolves through time based on the temporal requirements (Tassabehji & Moorhouse, 2008; Bals et al., 2019), it is clear that discussions around the procurement competencies should be present in the modern business climate as well. There are also questions whether the human input in the sourcing and procurement activities will exist at all after the next 20 years (KPMG, 2016, p. 4). Research also indicates that there seems to be a demand for digitalize the current status of buyer-supplier relationships even further (Veile et al., 2020, p. 1254; Patrucco et al., 2022, p. 54). In the midst of these changes, Sjödin et al. (2021, p. 2) argue that it is imperative to acknowledge that the value created through technologically advanced sourcing and procurement activities will be materialized in buyer-supplier relationships (BSR). In order to understand how these trending technologies will impact the competence requirements of sourcing organizations, it is useful to try to gain a better understanding about how they will impact the buyer-supplier relationships (Jahani et al., 2021, p 2.; Veile et al., 2021) . Based on their study, Bals et al. (2019, p. 11) suggest that there are plenty of new competencies for sourcing and procurement professionals and organizations to adapt in order to ensure their ability to create value in the future as well. Chopra (2019) further elaborates by suggesting that AI related competencies could spearhead the talent acquisition in the future.

Based on the previously mentioned arguments and aspects on the subject, there seems to be a clear need for deeper research concerning how these somewhat disrupting digital technologies can be utilized in buyer-supplier relationships. Arguably, these technologies should be assessed as a driver, not a barrier for the trust factor which can be seen

as a key component in BSR's. From the set of these previously mentioned modern technologies, this study will concentrate on artificial intelligence, or AI as it is commonly abbreviated. Based on this, the paper's research question is:

"How can AI empower buyer-supplier relationships and how can a procurement organization benefit from implementing AI to its buyer-supplier relationships?"

Therefore, this study will be focusing on how companies can enhance and support their buyer-supplier relationships and especially their procurement organizations through the utilization of various AI related technologies. As there can be numerous arguments made on how sourcing operations should be organized, the paper will review this subject from a manufacturing and process industry company's perspective, which is also the industry where the case company, UPM-Kymmene Oyj, operates. This sharp focus ensures that the research can have a clear focus on the otherwise rather large phenomenon. The study will be conducted using the qualitative research method. It will be done as a case study involving a company which operates in a process and manufacturing industry. The company's sourcing operations have recently executed a study about the maturity of sourcing operations which serves as a current state analysis also on sourcing competencies. This research and study on the other hand aims to provide some needed perspectives from the sourcing operations point of view especially on how to approach the potential impact artificial intelligence poses for the buyer-supplier relations and therefore procurement organizations. To ensure the prospect of high-quality research, the arguments concerning this matter also from the suppliers' side are embedded to the study through the round of interviews.

The contributions of this study are threefold. First, the study aims to deepen the conception about the requirements when it comes to introducing artificial intelligence to buyer-supplier relationships. Further research is required following Pathak's (2023, p. 128) suggestion that the allocation of roles remains somewhat ambiguous when it comes to the relation of human interventions and technological advancements in buyer-supplier relationships. Especially, as these relationships rarely remain stagnated (Flint et al., 2002, p.

102). Second, the study will provide valuable insights on how a sourcing and procurement organization should approach the issue of AI implementation to its processes. The concrete manners in which the procurement organizations could utilize AI are still quite scarce (Guida et al., 2023). This means that the study could open the door for discussions concerning how the company's procurement capabilities should be enhanced so that capitalizing on the potential that AI holds can become a reality. This can be seen as a crucial factor to the value creation strategies for the sourcing and procurement operations, as arguably the most important external stakeholders for sourcing operations are the company's suppliers (Moeller et al., 2006, p. 70). Third, the structure and perspective applied on the study can be addressed as a framework for procurement organizations on how to use supplier categorization as a complementary tool for the implementation of AI related technologies. Adapting the supplier network to the business operations timely requirements arguably lies in the core of the procurement organizations responsibilities (Christopher & Holweg, 2014, p. 64).

The study includes five different chapters. Following the introduction, the study will present a theoretical background for the subject. The theoretical background focuses on procurements role within the buyer-supplier relationships as well as on artificial intelligence on a general level. This will be followed by the presentation of the research method used in the study which is followed by the fourth chapter that introduces the research findings of the study. The concluding chapter, discussion, will begin with the theoretical and managerial implications of the study which will then be followed by the limitations of the study as well representation of future research avenues regarding the subject discoursed in this study.

2 Theoretical background

The theoretical background of the study combines two main elements. The first one of these elements discusses the buyer-supplier relationships focusing more to the procurement aspect of the two sides involved in these relationships. The latter part of the theoretical background focuses on the artificial intelligence covering its fundamentals as well as presenting various aspects on how artificial intelligence could be implemented to companies' operating environments. To conclude the theoretical background, a theoretical framework will be presented which serves as a foundation for the study's data collection.

2.1 The role of procurement in buyer-supplier relationships

This chapter contains the first part of the theoretical background to this thesis, and it has two subchapters. The first of these subchapters familiarizes the reader to the concept of buyer-supplier relationship and aims to clarify what are the key dynamics which enable the forming of these relationships' as well as what elements contribute to the management of these relationships. The latter part of this chapter then presents a more profound understanding of the buyer-supplier relationships by viewing it from the buyer's point of view, more precisely through the lens of procurement. These aspects serve as a foundation for the study's approach on buyer-supplier relationships and aim to validate the argument of relationships value to companies' success.

2.1.1 Dynamics of buyer-supplier relationships

Various internal as well as external relationships hold invaluable roles in companies' ability succeed within their operating environment (Uzunca, 2018, p. 3284; Kim et al., 2019, p. 1319). The general nature of buyer-supplier relationships can be defined to consist of the relational actions, and the agreements those actions are based on, between two

parties: a buyer and a supplier (Gullett et al, 2009, p. 329; Hogue & Rana, 2019, p. 5). At some point, each of us have most likely carried out both of these roles, the role of the buyer and the supplier, in our lives. One can even see the relationship between an employee and an employer as a buyer-supplier relationship, as there employee offers services for the employer in exchange of some mutually agreed compensation. As mundane as these roles may seem to us when examined separately, they arguably become much more diverse when observed through the relationship point of view, which they often constitute.

Hogue and Rana (2019, p. 5) highlight the importance, and the challenge, of managing these relationships. Their argument is supported by Bag et al. (2022), who claim that these relational networks require a systematic approach from the managerial aspect in order to utilize the value potential between stakeholders. This highlights one crucial aspect in the dynamics of any relationship: they need to be nurtured in order to grow and prosper. Due to their complex nature, it would be challenging to argue for a single manner of approach which could guarantee successful outcome from managing these relationships. The following Table provided by Gullet et al. (2009, p. 331) can be seen as a tool to structure a general perspective while approaching buyer-supplier relationships.

Table 1. Dimensions and characteristics of buyer-supplier relationships (Gullet et al., 2009).

Dimensions	Characteristics
Goals	Clear and operations & strategy related
Information sharing	Openness & activity from both parties
Relationship structure	Interpersonal & functional channels
Coordination mechanisms	Formal & informal managerial actions
Locus of decision making	Top management verified process
Top management commitment	Joint supporting attitude towards the relationship
Compatibility	Compatible management philosophy & organizational structure

Buyers and suppliers tend to find themselves within a relationship where their objectives and aspirations can differ profoundly. From the above-described Table, we can observe the dimension of information sharing as an appropriate practical example of a defining element within the buyer-supplier relationship that has clear value for both parties. Should either one or both parties fail to communicate (to a certain extent) most accurately how the landscape of the relationship seems from their vantage point, it will most likely decelerate the development of the relationship through confusion. Equally important example could be highlighted regarding the goals dimension: the more common goals there can be determined and achieved, the brighter will the future outlook for the relationship be. Naturally, to fully comprehend the managerial aspect buyer-supplier relationships, it can be seen useful to further deepen the viewpoint and take a closer look to the dynamics of buyer-supplier relationships.

While conceding to the fact that the field of buyer-supplier relationship is diversly covered in research literature, in their research Shamsollahi et al. (2021) wished to gain a deeper understanding of the dynamics of the buyer-supplier relationships:

> …our knowledge of BSRs from a descriptive standpoint is comprehensive, while our understanding is more circumscribed when it comes to understanding BSR dynamics where relationship dynamics is defined as temporal variables, processes, or trends that explain a relationship's development and change over time (pp. 418-419).

As stated, these relationships are constantly evolving (Flint et al., 2002, p. 102). Therefore, the four overarching themes concluded by Shamsollahi et al. (2021) systematic literature review can be utilized as a theoretical lens in buyer-supplier relationships dynamics regardless of whether the relationships are examined from the buyers' or the suppliers' point of view. The four themes are continuity, learning, stages & trajectories, and fluctuations. They are presented in the following Figure (Shamsollahi et al., 2021, p. 423), which is followed by an explanatory conclusion concerning each theme.
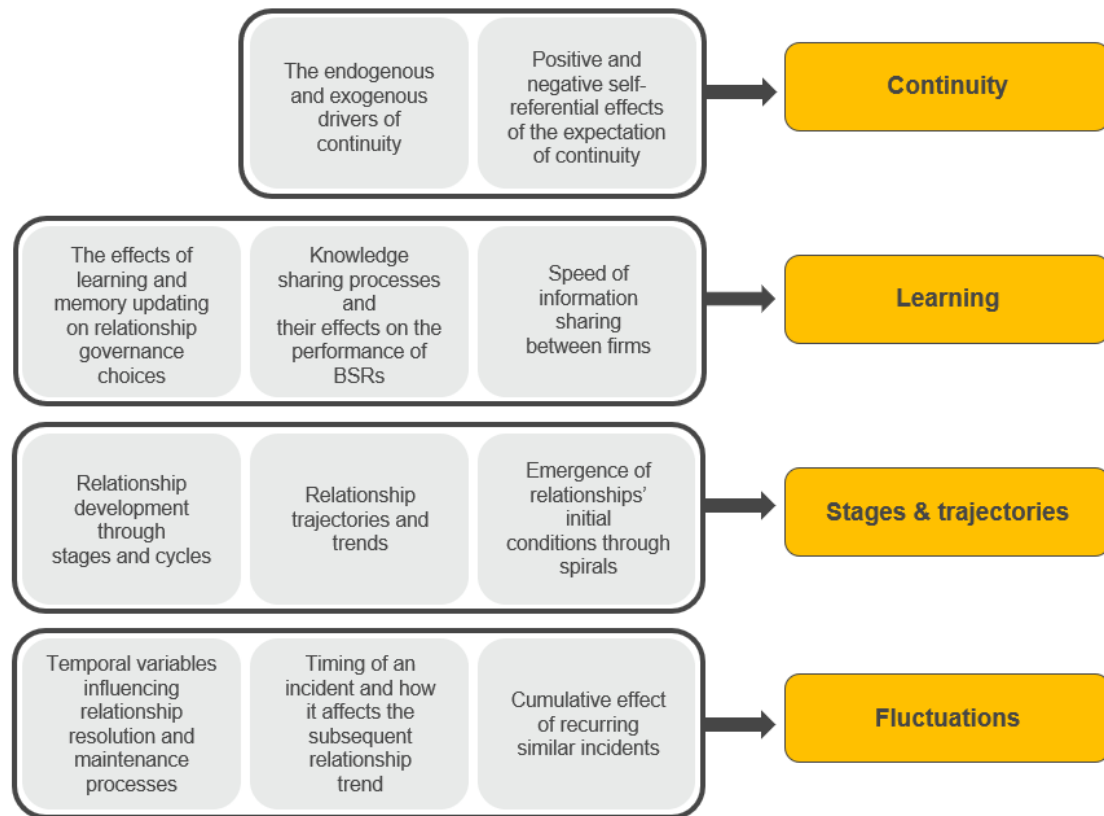
Figure 1. Conceptual map of dynamic BSR studies (Shamsollahi et al., 2021).

Continuity in buyer-supplier relationships has its foundations in companies motivations to elevate their operating models from mere transactional parties to something more time standing models. This can be seen as something that requires more or less constant nurturing over time (Shamsollahi, 2021, p. 422). This naturally requires willingness to put effort to the relationships by both engaged parties, hence the terms endogenous and exogenous drivers. Kaufmann and Carter (2006, p. 670) discovered in their research that these actions could very well vary based on the culture of the organization executing them. As relationships rarely remain stagnate over time, potential disagreement situation could be harnessed to novel ways for reinforcing the trust between parties (Brattström et al., 2019, p. 1705). Sting et al. (2019, pp. 130-131) also suggest that revisiting the nature of the collaboration between parties can be used as a driver for maintaining required operation standards. Therefore, the continual approach to these relationships offers both parties stimuli to uphold their best practices and culture to further improve the relationship in question.

Continuity paves way for **learning**, which according to Shamsollahi et al. (2021, p. 424) happens through time and processes, while relying on understanding of the performance levels. Ariño et al. (2014, p. 397) suggest that this learning curve is not necessarily straightforward: for example, time spent on contract negotiations usually decreases after initial learnings from one's counterpart, but they can also see an increase again as more deeper layers of relationships are conquered. This approach adds to Flint et al.'s (2002, p. 115) findings that learning about and understanding the organizational developments of the relationship's other half will ultimately shape the collaborations nature. Regardless of whether the trust between the relationship parties is reputation-based (competence) or knowledge-based (learnings), the evolution of the relationship relies significantly on the constant learnings based on interorganizational actions (Weber, 2017). Learning leans heavily on getting the right information at the right time, something which might be challenging to constitute as the process varies based on the organizational structures and relationships (Lipparini et al., 2014, p. 593).

Stages and trajectories theme includes the various developmental stages and trends that buyer-supplier relationships go through over time in their lifecycles (Shamsollahi et al., 2021, p. 425). Vanpoucke et al. (2014, p. 28) suggest that challenges do not demise as the maturity of the relationship increases, yet they are presented in a different form. What makes these stages and trajectories challenging to manage, is that according to Hollmann et al. (2015, pp. 264-265) they are built through both internal events (actions taking place within the interface concerning both relevant parties) and external events (actions happening outside the interface of relationship parties). Autry and Golicic (2010, p. 90) summarize the core of the relationship to be forged through variety of incidents, which will either strengthen or weaken the relationship based on the outcome of the dyadic interaction.

Fluctuations can be seen as actions interfering the relationship, for example conflicts and crises, which are not related to the day-to-day interplay within the relationship (Shamsollahi et al., 2021, p. 426). It is worth noting, that these occurrences can also be utilized in order to create a mutually win-win situations instead of the perhaps more

traditional ways of sanctioning the breaching party or even terminating the contract (Johnson & Sohi, 2016, p. 201). Mir et al. (2017, pp. 15-16) suggest that relationship parties are more inclined to revisit the status of the relationship based on the severity and the manners which have led to the breach in collaborative actions. According to Seggie et al. (2013, p. 85), restricting the urge for an opportunistic approach and desire to use leverage when relationships related performance level are not met should work in favor of both relationship parties in the future.

It is safe to conclude that buyer-supplier relationships are multifaceted by their nature. Therefore, they present a challenge for both parties in question, the buyers as well as the suppliers. While both parties bring a variety of internal qualities to the Table, these relationships are also tested through external factors. Conceptual map (Shamsollahi et al., 2021) offers a practical framework to survey this phenomenon, as it summarizes the key themes from the research field in question. To remain focus, the next subchapter of this theoretical background will focus more on the procurement perspective of the buyer-supplier relationships and aims to highlight the key aspects and objectives of the buyer organizations operating in these relationships.

2.1.2 Procurement in buyer-supplier relationships

Moeller et al. (2006, p. 70) present procurement as the crucial value delivering interface between organizations procurement functions and its external suppliers. As an internal function, procurement holds a prominent role in companies' ability to becoming and staying competitive, as it is not unfamiliar to meet an organization who has more the majority of its total expenditure managed by its procurement function (Kaufmann & Carter, 2006, p. 653; Hallikas et al., 2011, p. 9; Guida et al., 2023, p. 1). Therefore, companies are not solely purchasing raw materials and tools in order to manufacture their products or services. Describing companies' different functions in their value chain, Porter placed procurement as one of key supporting functions, alongside firm infrastructure,

human resource management and technology development as stated in the following Figure (Yun & Yigitcanlar, 2017, p. 2).
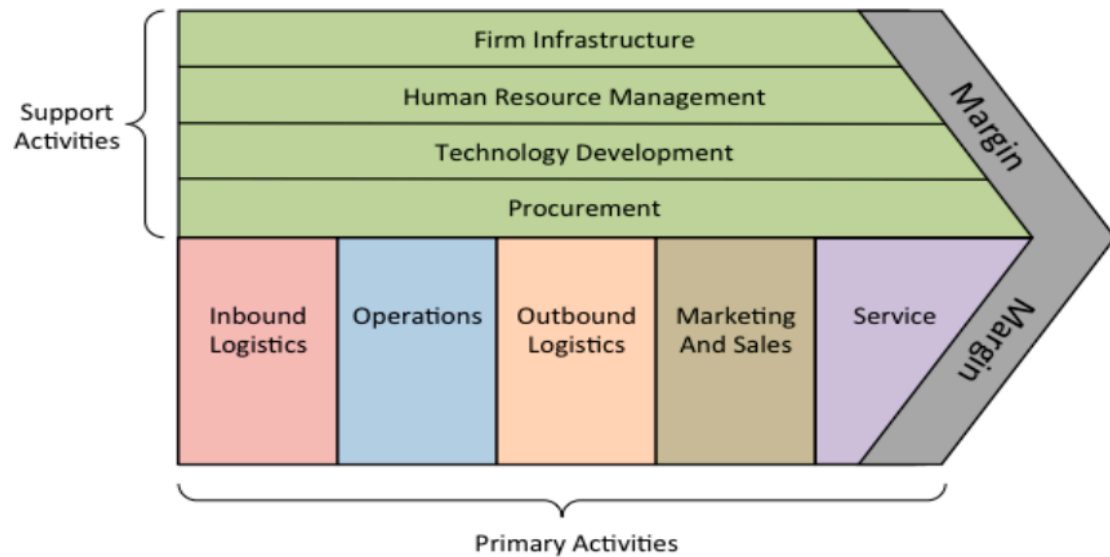
Figure 2. Michael Porter's value chain (Yun & Yigitcanlar, 2017).

Consensus towards Porter's argument of procurement role becomes effortlessly, as whatever revenue streams companies accumulate, their ability to control the cost expenditure has a clear impact to their profitability and therefore operational sustainability. Procurement organizations can benefit from fostering approach towards their buyer-supplier relationships (Patrucco et al., 2019, p. 360). While acknowledging procurements ability to influence through efficiently carrying out purchasing related activities, Hong and Kwon (2012, pp. 453-455) present the function's role developing towards becoming a more strategy related value creator that holds a distinctive role in firms' sustainability over time. The journey towards an effective strategic function should consider emphasizing the role and scope of procurement function, as well as building the functions ability to respond to growing expectations by investing personnel capabilities, technological maturity and impactful performance measurement (Hong & Kwon, 2012, p. 460).

Like many other business functions, procurement also consists of multiple different elements which are set up and upheld to serve as foundations for profitability of firms' and to serve as tools for management aspirations as well as process efficiencies. The following Figure depicts a process model that is provided by Guida et al. (2023, p. 2), which is modified based on the motivation to respond to requirements posed towards modern procurement organizations.
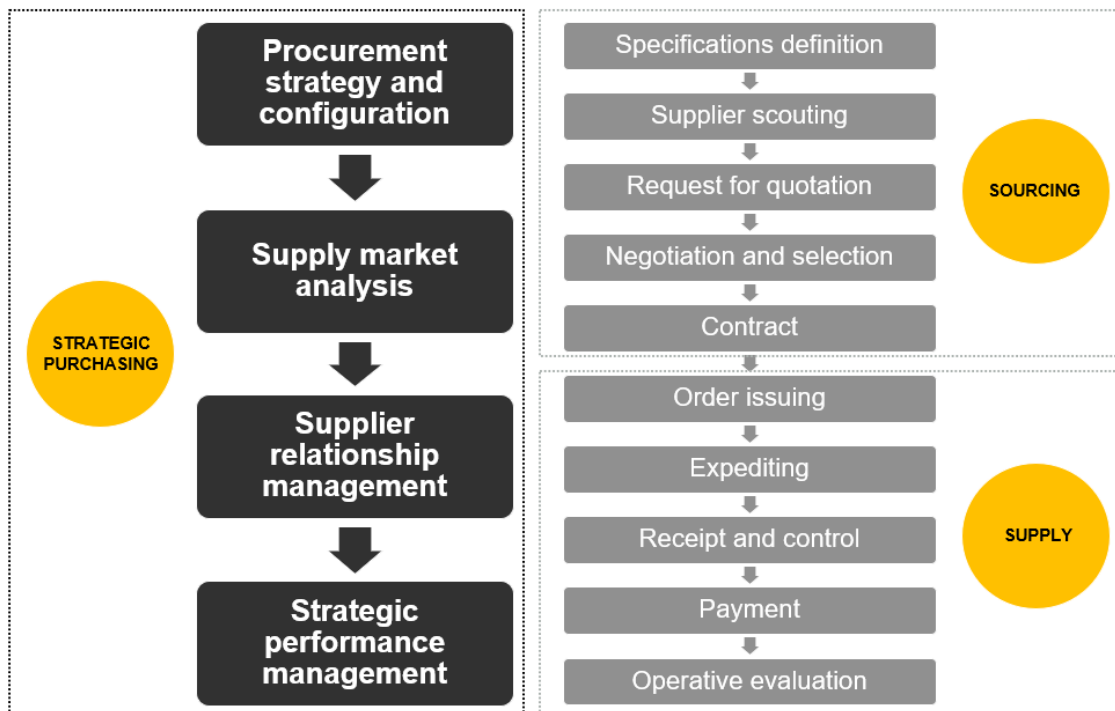
Figure 3. The procurement process (Guida et al., 2023).

In the Figure there can be seen the main process which is documented as strategic purchasing, and two supportive processes: sourcing and supply. Within the process of **strategic purchasing** there are four main elements which address the requirements of procurement activities to be considered to develop and maintain a functional procurement function. Strategy work and its implementation set up the landscape which will then be further completed through the analysis and management of the supply market that is available. All these will then be evaluated and potentially re-organized by the strategic performance management.

Sourcing as a supportive function assists the strategic purchasing by sourcing the markets for suppliers and choosing the appropriate suppliers which assist the organization's ability to create value through its operations. Through negotiations and agreed contracts sourcing then enables the supply subprocess to manage the daily procurement activities such as purchase order documentation and, delivery accuracy measurement and finally the payment of the incoming invoices for purchased materials and services.

Different operating functions require different sets of skills to meet the demand set by their counterparts. Tassabehji and Moorhouse (2008, p. 56) came to a suggestion that adjustments for the operational climate have been relevant for the sourcing and procurement activities for quite some time. Given the timeframe of their findings, it would be safe to argue that the requirements of these adjustments most probably have not diminished due to the (still) on-going technological development within our societies. This update on skill requirements can be presented by following Tables.

Table 2. Matching competencies – competencies identified by Tassabehji and Moorhouse (2008) and found in the interviews (Bals et al., 2019).

Technical skills	Interpersonal skills	Internal/external enterprise skills	Strategic business skills
Basic knowledge of PSM role & process	Analytical skills	Change Management	Business Acumen
Computer Literacy	Conflict resolution	Communication	Financial Acumen
Contract Management	Creativity	Cross-functional abilities & knowledge	PSM Best Practice Intelligence Scouting
Cost savings	Decision making	Engineering	Risk management
eProcurement Technology	Effective questioning techniques	Finance	Strategic thinking
Intellectual Property	Integrity	Logistics	
KPI Reporting Design	Interpersonal communication	Manufacturing/Production	
Languages	Knowledge sharing	Marketing	
Negotiation	Leadership	Quality (QHSE)	
Process optimization	Leadership	R&D	
Product knowledge	Prioritization	Supply Chain	
Project Management	Remote Virtual Working	Sales	
Quality assurance	Results focus driving for results	Cultural awareness	
Strategic sourcing	Team-working in teams	Customer Focus	
Tools and Systems Implementation		Networking	
		Stakeholder & Supplier Management	

Table 3. Additional competencies – competencies NOT identified by Tassabehji and Moorhouse (2008) and found in the interviews (Bals et al., 2019).

Technical skills	Interpersonal skills	Internal/external enterprise skills	Strategic business skills
Automation	Curiosity		Critical thinking
Big Data Analytics	Deal with ambiguity		Holistic supply chain thinking
Innovation sourcing	Humility		Sustainability
Innovation sourcing approaches	Mobility		
	Openness, Open minded		
	Passion		
	Resilience		
	Self-confidence		
	Self-reflection		
	Self-reliance		
	Learning agility		

The first of the Tables (Table 2) presents the skill requirements divided between four different categories acknowledged by Tassabehji and Moorhouse (2008) which match with the competencies that were brought to Bals et al.'s (2019, p. 7) attention as well during their research. The second Table (Table 3) then presents skill requirements which Bals et al. were able to identify which were not present at Tassabehji's and Morehouse's original findings (2008). Collectively these Tables indicate that majority of the skills requirements surfaced during both of the two interviews which were separated over a decade.

There are still intriguing findings in both sets of listings. While procurement sees over a significant portion of companies' expenditure, strategic business skills requirements lack

severely to other skill requirements, at least quantity wise. The other notable factor is the substantial addition to skill requirements on interpersonal level that were discovered by Bals et al. in 2019. These skills can also be referred to as soft skills, which implies to the ability to interact with other humans, and it is an interesting addition to procurement competence requirements in a time when technological development is very much present. It is also worth noticing, that while all other skill categories were complemented with additional requirements, the internal/external enterprise skill category remained stagnated.

Suppliers form the supply chains whose operating ability and consistency provide the foundations for buying organizations own operations and profitability. Current operating environment has witnessed much turbulence through multiple global crises, Covid-19 epidemic and Russia's invasion to Ukraine serving as examples. Supply chain management is therefore crucial field within procurement, and while verifying supply chain management's role, Christopher and Holweg (2014, p. 64) also highlight the importance for this activity to be refreshed so it has the ability to meet the timely requirements. Resilience towards supply chain volatility can be pursued by adapting the following framework by Roberta Pereira et al. (2014, p. 637):
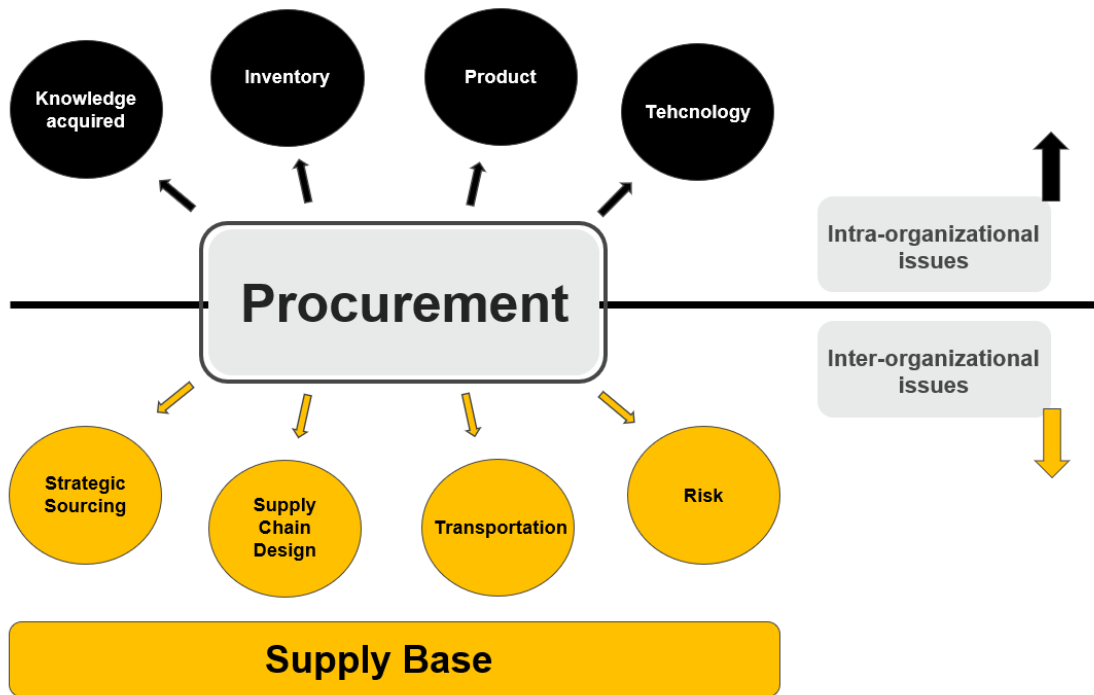
Figure 4. Framework of intra- and inter-organisational issues from a procurement perspective to create supply chain resilience (Roberta Pereira et al., 2014).

The Figure separates depicted actions to intra- and inter-organizational issues. Intra-organizational issues are driven by how the company has organized its own operations in order to be competitive in the markets, while inter-organizational issues provide answers to requirements posed by company's operations. Naturally each company should solve the equation provided by the framework to suite their own operating landscape. For example, risk and transportation issues require very much different set of attention and activity whether the company has an international supply base or if they are collaborating with domestic suppliers only.

Understanding the strengths of different suppliers helps companies in positioning themselves in a most fruitful manner towards the possibilities the company's supply base offers. In the early 1980's, Krajlic (1983) began to recommend that the purchasing activities should be reorganized in favor of supply management. His thoughts have stood against

the test of time and his portfolio matrix is arguably one the most commonly used tools when it comes supplier categorization (Montgomery et al., 2018, p. 192).
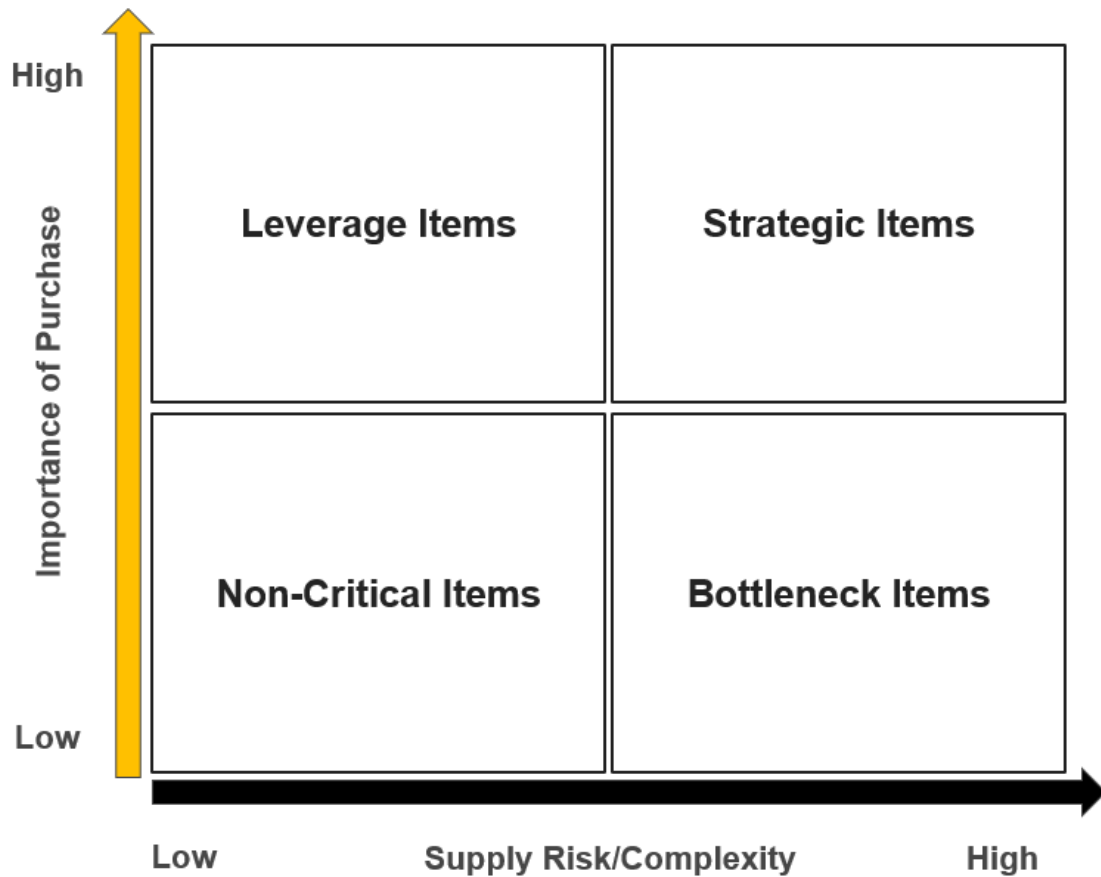
Figure 5. Kraljic's portfolio matrix (Montgomery et al., 2018).

The matrix presents a two-by-two categorizing template for suppliers based on the impact various internal factors have by aiming for maximized buying power while minimizing the risk in the supply chains (Montgomery et al., 2018, p. 192). The non-critical items are often somewhat mundane items, which are nevertheless required in internal processes. The bottleneck items can become quite challenging, as they require a sufficient number of resources due to their uniqueness but offer limited value to the business. The leverage items are most likely to receive quite a lot of attention from the procurement

organization as they enable profitability yet are purchased from markets which hold alternative suppliers. The strategic items should be well represented on the key measuring reports, as they hold a significant role in the company's own ability to differentiate in the markets. The reasoning behind the matrix's durability becomes quite effortlessly as it captures the essence of the procurement functions potential in value creation: each company should be able to find the right partners and solutions which over time will make them sustainably profitable. It also provides valuable insight for organizations when they are allocating their resources between suppliers.

Efficiently functioning procurement has the ability to control the cost expenditure and at the same time it exploits the potential which lies in the company's supplier base. As described above, while procurement firmly holds its own position in the buyer-supplier relationships, it is not a straightforward issue with lots of different viewpoints. Additionally, procurement in general is coming accustomed to at least some of the latest megatrends: sustainability (Etse et al., 2023, p. 525) and technological development (Nguyen et al.,2022, p. 176). The following subchapter focuses to one specific technological aspect, as it aims to open the fundamentals artificial intelligence and the utilization possibilities concerning the subject.

2.2 Artificial intelligence

Although AI seems to be gathering a substantial amount of interest in some industries based on the increasing number of research (Sardanelli et al., 2023, p. 2), as a research field it still seems to hold great potential (Zawacki-Richter et al., 2019). In this second chapter of the theoretical background to this thesis the reader is introduced to artificial intelligence, commonly referred as AI. This chapter also has two subchapters. The first of these subchapters covers the fundamentals of AI, while the second subchapter views AI from a more organizational perspective, as in what is required to manage AI and how it could be capitalized by organizations. Through these perspectives the aim is to build a general understanding of AI's attributes and potential while building a bridge for its implementation towards utilization within the business context.

2.2.1 Fundamentals of AI

Encountering oneself with some kind of technologically assisted improvement of life becomes quite effortlessly these days. For example, smartphones with their numerous applications have arguably become a somewhat integral part of our lives. Currently we are witnessing the technological phase of Industry 4.0, where amongst other technologies is also artificial intelligence, AI (Bai et al., 2020, p. 3). While AI as a subject has in recent years seen an increase of interest, as a study field and a subject of scholars' interest it lacks novelty.

The origins of AI can be tracked back to the mid-20th century, when in 1950 Turing published his paper considering machine intelligence (Kaplan & Haenlein, 2019, p. 7; Tripathi et al., 2022; Nguyen et al., 2022, p. 177) and the term Artificial Intelligence was first used by McCarthy during a summer research project in 1956 (Jiang et al., 2022; Zawacki-Richter et al., 2019, p. 3; Kaplan & Haenlein, 2019, p. 7). According to Kitsios and Kamariotou (2021, p. 6), the first time AI was discussed as a way to differentiate happened during the 1980's. What actually is and is not AI might be quite challenging to compartmentalize

(Duan et al., 2019, p. 1; Enholm et al., 2022, p. 1712; Nguyen et al., 2022, p. 177;). How-ever, many technological innovations that are nowadays in mainstream use, have at some point been qualified as AI, such as online banking for example. When a technolog-ical innovation described as AI becomes reality, it has gone through the AI effect (Kaplan & Haenlein, 2019, p. 6).

In general terms, "AI broadly refers to using computational infrastructure and program-ming code to create socio-technical systems that mimic, augment, or replace humans" (Hoffman et al., 2022, p. 10). Addressing the issue from an evolutionary perspective to offer some relativity to the velocity at which the field of AI has advanced: it is useful to understand that many of the actions this technology aims to mimic are possible for us humans courtesy of our brains, which took millions of years to develop to its current operating ability (Vallender et al., 2008, p. 1). From that perspective, it is no wonder somewhat 70 years later, that we are arguably still treading the phase where AI holds a considerable amount of potential. It is very much a current topic, as according to Enholm et al. (2022, p. 1709), AI as a phenomenon is already having a partially driving role on companies' decision-making processes, but not without any friction.

Arguably the most influential factor impacting the interest in the possibilities provided by AI is the increase in computational capacity and efficiency, which provides the plat-form for large amounts of data to be gathered and processed in a decreasing timeframe. Courtesy of Rodrique (2023), the following Figure capsulates this capacity increase which is commonly known as Moore's law.
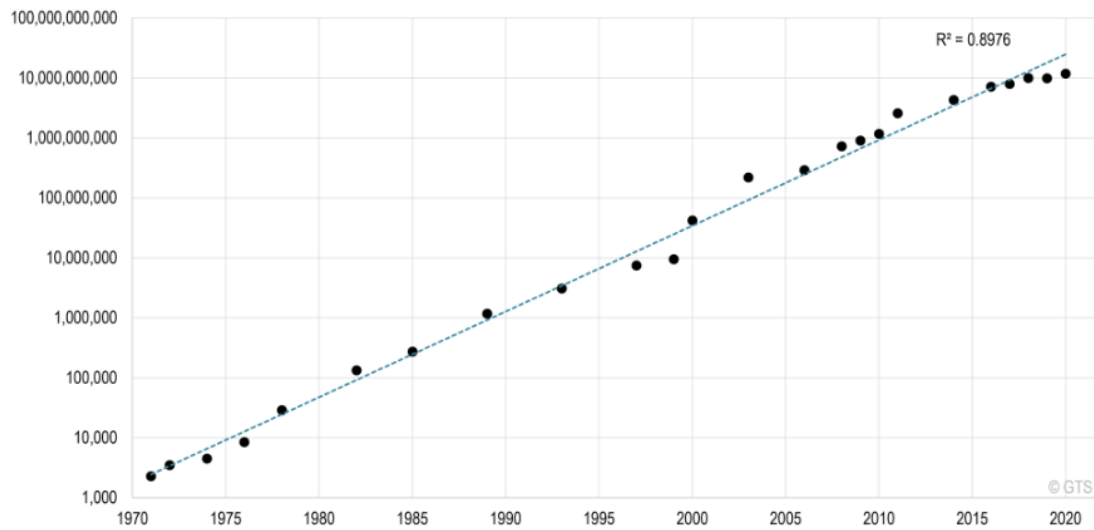
Figure 6. Moore's Law (Transistors per Microprocessor), 1971-2022 (Rodrique, 2023).

Moore's law concerns the semiconductor technology and it is grounded on Gordon Moore's original forecast already in the 1960's. In the picture, the vertical axis indicates the quantity of the transistors per microprocessor, and the horizontal axis indicates the progression of time in years. Moore predicted that computers' capacity to process data would increase exponentially based on the premises that the transistors within a silicon chip would double within every two years (Mack, 2011, p. 202; Li et al., 2019, p. 169;). This illustration is relevant to the current enthusiasm towards AI´s potential, as both the transistors size and capacity hold a crucial role in computational speed and ability concerning data processing (Taha et al., 2022, p. 2). Although Moore's original prediction was aimed to cover merely the first decade of development on this field, it has stood the test of time admirable well.

There are concerns that the silicon transistors have reached their physical limitations, which could decelerate the development presented by the previously illustrated development. That does not mean that the potential related to AI has reached its peak, since according to Taha et al. (2022, p. 2) the next evolutionary steps towards more powerful yet smaller solutions in the field of data transfers already exist. The benefits of being able to process and utilize large amounts of relevant data swiftly and reliably are quite

self-evident, regardless of the industry. That enables companies to optimize their resources and processes, which can further assist them towards sustainable profitability.

From this perspective it is no surprise that companies in various industries are currently looking into the possibilities that could offer (Tariq et al., 2021, p. 3; Nguyen et al., 2022, p. 176). AI can be described as an umbrella term, which contains multiple different technologies aiming for the previously mentioned mimicking actions usually carried out by humans. As there are multiple interested fields in multiple available (and continually developing) technologies, the current climate indicates that there is no definitive allocation which technology would be best utilize in which area of operations. The following Table by Sarker (2022, p. 15) offers assisting guidance regarding examples about different AI technologies and their appliance within different life areas.

Table 4. A summary of AI tasks and methods in several popular real-world applications areas (Sarker, 2022).

AI techniques	Application areas
Machine learning	Healthcare
	Cybersecurity
	Smartcity
	Recommendation systems
Neural network and deep learning	Healthcare
	Cybersecurity
	Smart cities
	Smart Agriculture
	Business and Finance
	Virtual Assistant
	Visual Recognition
Data mining, knowledge discovery and advanced analytics	Education
	Business
	Cybersecurity
	Diagnostic analytics
	Prescriptive analytics
Rule-based modeling and decision-making	Intelligent systems
	Healthcare
	Recommendation system
	Smart systems
Fuzzy logic-based approach	Healthcare
	Agriculture
	Cybersecurity
	Business
Knowledge representation, Uncertainty reasoning and Expert system modeling	Smart systems
	cloud computing
	cybersecurity
	Mobile expert system
Case-based reasoning	Healthcare
	Smart cities
	Smart Industry
	Recommendation Systems
Text mining and natural language processing	Sentiment analysis
	Business
	Cybersecurity
	Healthcare
Visual analytics, computer vision and pattern recognition	Healthcare
	Computer vision
	Visual Analytics
Hybrid approach, searching and optimization	Mobile application
	Recommendation systems
	Sentiment analysis
	Business
	Cybersecurity

In the presented Table there are ten (10) different AI technologies and twenty-four (24) examples of where these technologies could be utilized. The following chapters will apply additional insight to these AI techniques. **Machine learning** utilizes algorithms for advanced problem solving through large quantities of data and its processing, and it can be used for example in healthcare to preliminary diagnostics of patients (Ngiam & Khor, 2019, pp. 262-266). **Neural networks** base their operating model to human brain as they attempt to model our humans ability not only to learn, but also to apply perceived data, something which could be useful for scenario work in business through predictive business models. (Zohuri & Moghaddam, 2020, pp. 5-6).

Data mining, knowledge discovery and advanced analytics related AI techniques provide for even large organizations the possibility to oversee their computer activities within their networks and thus they are providing an invaluable tool for enabling organizational cybersecurity (Afzaliseresht et al., 2020). **Rule-based modeling and decision-making** respectively utilize the available data to preliminary risk related action detection and thus aim for precautionary actions in order to enhance safe operating environments (Xu & Luo, 2021, p. 1).

Fuzzy logic-based approach offers more layers into decision making process by challenging the conventional binary logic of true and false, which paves way for smarter resource allocation habits for example in agriculture (Krishnan et al., 2020). **Knowledge representation, uncertainty reasoning and expert system modeling** translates real-life information for computers to understand, something which can be utilized for example by performing faster personalized medical analysis in a more secure manner (Kiran & Nalini, 2020) and more personalized services are provided for example by mobile applications in a more cost-effective manner (Sarker et al., 2021).

Case-based reasoning can create significant value to especially the manufacturing industry as it teaches the manufacturing process continuously to improve its efficiency without repeating the past miscalculations and actions (Khosravani et al., 2019). **Text mining and natural language processing (NLP)** are useful for basically any organization, as they

can assist product sellers and service provider to gather valuable insight by interpreting the sentiment behind written feedback given by their customers (Onan, 2021).

Visual analytics, computer vision and pattern recognition form another cluster of AI related technologies which can assist societies in the future on a global scale through medical innovations such as precautionary cancer diagnosis (Elakkiya et al., 2022). **Hybrid approach, searching and optimization** most probably are quite familiar to those who are using smartphones or other technical devices in order to find an accommodation or travel destination alternatives that suit one's preferences (Ramzan et al., 2019).

This leads to an understanding that AI has the potential to create value in multiple fields and industries. Wamba-Taguimdje et al. (2020, p. 1910) suggest that AI has the potential to create value throughout the value chain by increasing cost-efficiency through resource optimization and improved customer relationships, with all of the previous elements leading inevitable towards better profitability. Regardless of the potential that the field of AI holds through its variety of technologies, it is useful to remember that successful businesses, or other organizations that are driven by goal-oriented mindset, might often be tempted to stay loyal to their processes which have led them to sustainable operating models. Therefore, it is most likely that it takes some extra effort to adopt AI as a complementary tool.

Åström et al. (2022) suggest that this can be done by recognizing in which internal processes lies the potential to utilize AI, adapting the operating models and capabilities to enable more efficient mechanisms for value creation and finally, adjusting one's business models to supply the added value created by updated processes. This position towards internal willingness regarding proactivity is also shared by Perifanis and Kitsios (2023, p. 2). They also bring forward AI's ability to assist organizations to adopt within unpresented circumstances, which might cause disruptions to companies supply chains (2023, p. 1). Regardless of their size, organizations are processing millions of data related computational commands and tasks on a daily basis (Afzaliseresht et al., 2020, p. 19089).

This leads to the conclusion that every day there is a large amount of data being processed in various parts of buyer-supplier relationships as well, a view that shared by Allal-Chérif et al. (2021, p. 69). Therefore, AI´s potential in processing and providing the required data swiftly and safely can be seen as a value creating factor for buyer-supplier relationships.

2.2.2   Managing and capitalizing AI

While AI seems to hold a fascinating potential in paving the way for societies stepping towards operational efficiency and thereby more reasonable and sustainable way of resource consumption, it does not come without any challenges. One of these challenges is the governance of AI. Unwelcomed hazards such as data leakages or unexpected operating system malfunctions may pose safety risks related to people's personal data or even accidents that might put someone's physical health in danger (Taeihagh, 2021, p. 138).

Like for any other playing ground, a set of commonly agreed rules need to be in place so that chaos does not ensue. While the development of AI has entered the stage where the machines are able to learn themselves and not only operate based on predetermined commands, at the same time concerns have risen also especially regarding the ethics of AI's operating domain as there remains a question to be answered how the machines are able to factor the so-called human aspect into their decision-making process (Taeihagh, 2021, pp. 141-142).

Governing organizations such as the United Nations and the European Commission have also recognized the potential impact which AI has to enrichen our societies. The UN present a polarizing approach to AI: on the other hand, the organization embraces AI's potential to assist in the organizations Sustainable Development Goals (SDGs), but they also remain suspicious about how these technological advancements will impact the social aspects of our societies such as employment issues (International Telecommunication

Union, 2023). The European Commission (2020) addresses the need for trustful, safe operating environment when it comes to the development of AI related technologies and applications and suggests that regulative actions should be supported in order to mitigate the risks. An advisable stance can be concluded based on the approach the beforementioned organizations have towards AI: it should be respected, yet not feared. Kaplan and Haenlein (2019, p. 22) call for regulative actions considering AI to reach multiple layers all the way from individual privacy issues to wider global societal issues such as democracy.

There is a reason why trust issues seem to occupy and maintain their role in the discussion related to AI. Individual issues such as banking and healthcare information are not the only risky datasets which are opposed to the threat of possible data breaches. Companies that are sustainably profitable hold immeasurably valuable data concerning their products, process and operations. As according to Enholm et al. (2022, p. 1715 & 1721) the core potential that AI offers lies in the quality and quantity of data, as well as the organization's ability to utilize it, it is a conundrum how to safely refine one's own (continually growing) datasets in cooperation with different external stakeholders without compromising one's market position and competitive advantage.

An alternative view for the capitalization of digitalization has also been presented: Seppälä et al. (2023, p. 163) claim that while data itself has its value, the most fruitful way it can be utilized towards value creation is through interactions with other parties, which would then many relationships, such as buyer-supplier relationships, the most fruitful element of technological advancements. Likewise, Perifanis and Kitsios (2023, p. 10) suggest that organizations should invest in interactions which will lay the foundation for AI to operate as a tool which helps them to translate the increasing amount of data which they have at their disposal. Nevertheless, digital technologies such as AI seem to have benefitting impacts on buyer-supplier relationships that are heavily efficiency related (Kauffman & Pointer, 2022, p. 1524). According to Veile et al. (2020, p. 1246), this

potential presents itself through inter-organizational collaboration through the increasing role of external procurement as the companies are leaning towards concentrating to their core businesses.

Research indicates that while there seems to be a demand for digitalize the current status of buyer-supplier relationships even further (Veile et al., 2020, p. 1254; Patrucco et al., 2022, p. 54), there are still some gaps in the infrastructure. Communication methods have already witnessed a clear transformation towards technologically advanced devices (Veile et al., 2020, p. 1246), yet the novelty of the AI applications together with the developmental state of regulation poses a challenge as the trust factor is one the key elements within the buyer-supplier relationships (Veile et al., 2020, p. 1252). While Kauffman and Pointer (2022, pp. 1524-1525) acknowledge the digitally enhanced operating environment within the buyer-supplier relationships may assist organizations in growths in revenue and value capturing, it also demands the flow of information should increase by both parties within the relationship.

Allal-Chérif et al. (2021) suggest that AI has the potential to assist procurement organizations in a variety of ways from supplier management lifecycle to automated processes and decision making. While Guida et al. (2023, p. 6) illustrate with the following Figure the multiple benefitting factors that can be utilized through AI related technologies within the procurement process, they also remind that the capitalization of AI requires updates into internal processes and capabilities (Guida et al., 2023, p. 3).
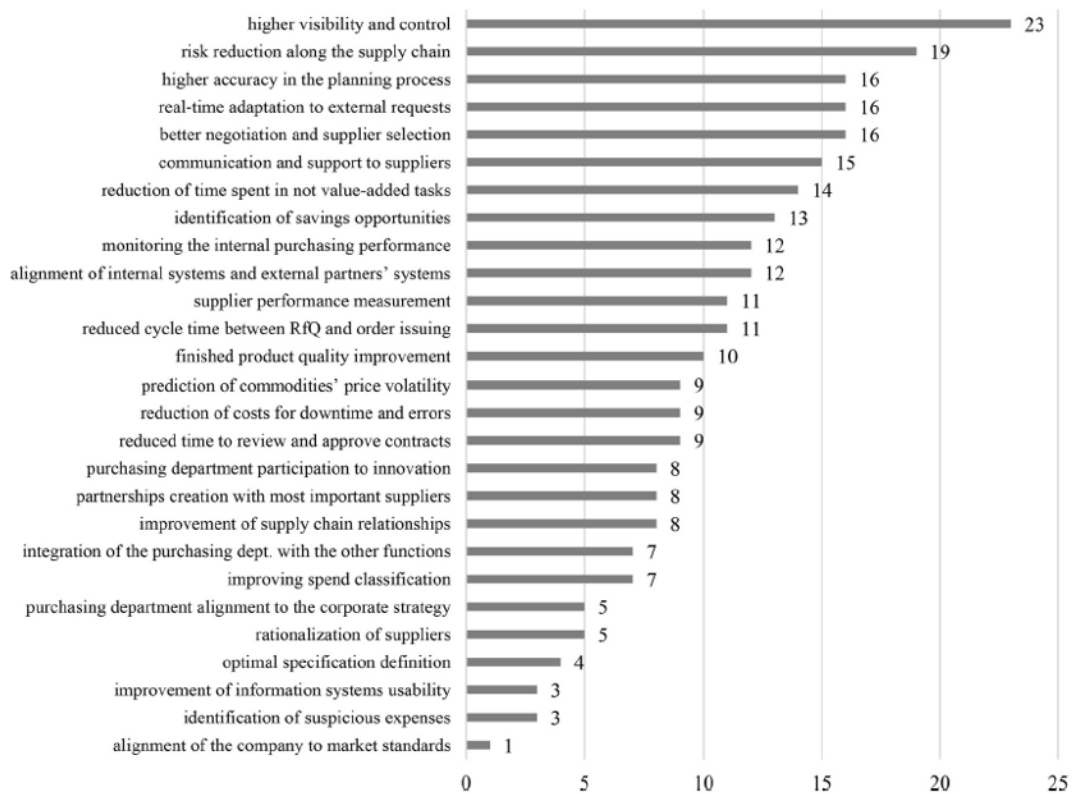
Figure 7. The benefits stemming from the adoption of AI throughout the procurement process (Guida et al., 2023).

The most popular theme that rises from the research done by Guida et al. is that the seems to be that AI offers organizations multiple ways in which they can improve the predictability in their operations. Increase of operational excellence through improved information flow would seem to also bring benefits through improved results in quality and spend management capabilities and with more cost-efficiency through decreased downtime due to disruptions in supply chains. Like within any other adaptation, there are challenges linked to the adoption of AI in the procurement process. A review of the challenges is illustrated also by Guida et al. (2023, p. 7) with the following Figure.
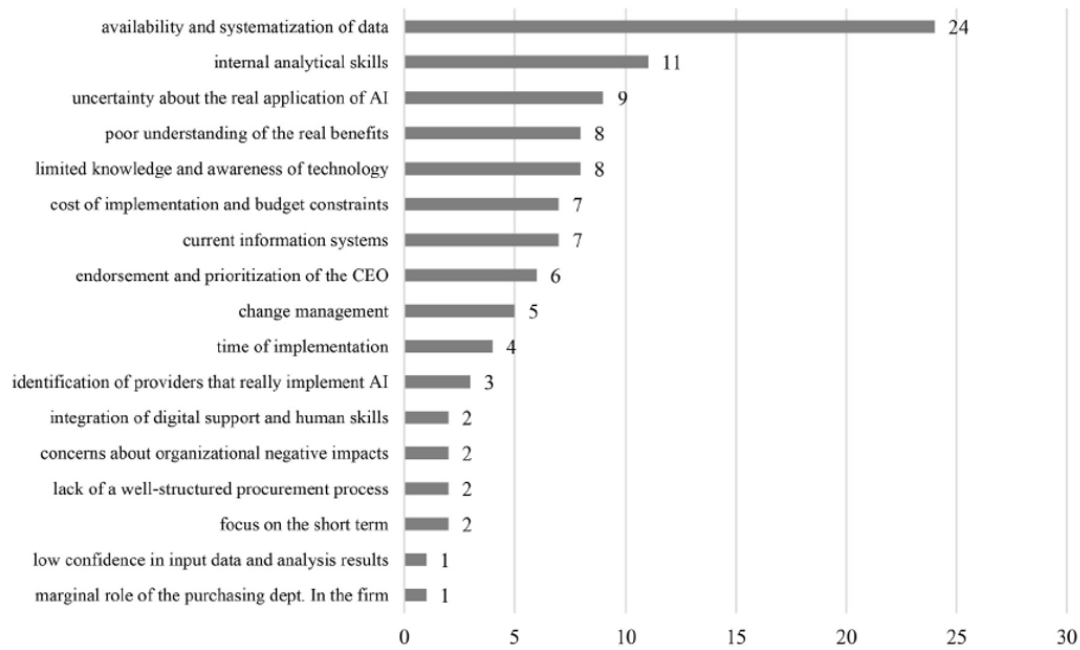
Figure 8. The challenges to the adoption of AI in the procurement process (Guida et al., 2023).

This compiled list of challenges highlights the role that solid foundations constitute in practically every adaptation of an update to operational models: if and when the AI's potential lies in the increased speed and quantity of processed data, then the data must be sufficiently available. The next challenge is related to the timing of the subject: as the implementation of AI into organizations' operating models is in quite early stages, the required internal capability and infrastructure, cultural as well as technological, to utilize these technologies is still somewhat missing (Tariq et al., 2021, p. 8).

Regardless of how tempting the potential related to AI technologies could be seen, it should not be addressed as some kind of a rogue mission which will suddenly boost the company's profitability. Companies often rely on their strategies when they are seeking for sustainable competitive advantage over their competition (Porter, 2008, p. 25). Kitsios and Kamariotou (2021, p. 7) though suggest that as a strategic tool, AI presents its own challenges due to its cognitive nature. Nevertheless, when addressed as a complementary tool towards competitive advantage, AI, along with other potential other technological tools, should be incorporated into the company's strategy. Once included

in the company's strategy, the necessity to fill this void regarding the implementational infrastructure can become more naturally. As the AI related activities should then become driven by strategic management, it is still worthwhile to recognize that the implementation does not happen automatically overnight (Schuler et al., 2023, p. 10). While aiming to implement AI into its operating models, organizations should address multiple functions. This perspective is highlighted by Weber et al. (2023) with the following Table of organizational elements factoring the implementation of AI.

Table 5. Organizational resources as organizational factors for AI implementation (Weber et al., 2023).

Category	Resource
Human resources	Technical AI skills
	Domain AI skills
	Workforce AI skills
IT resources	Data
	AI-specific infrastructure
	IT infrastructure
Intangible resources	AI-Business relationship
	Sourcing relationship
	Culture

The Table divides the required organizational factors to three different categories. The human resources category includes capabilities related heavily to technical aspect of AI, such as abilities to evaluating and maintaining the AI systems chosen for the organization. The IT sources are responsible for the quantity and quality of the data along with the AI infrastructure within the organization. The third category, intangible resources, is allocated towards being responsible for the interorganizational collaborations in the field of AI as well managing the supplier relationships that support the AI infrastructure.

AI does not differ from any other tool that is introduced to organizations with the prospect of having an impact in efficiency and profitability: it also calls for its own adjustments from the managerial point of view (Kaplan & Haenlein, 2019, p. 23.) Dithering approach between operational excellence and AI adoption can pose a substantial challenge to any organization (Perifanis & Kitsios, 2023, p. 25). Huang et al. (2019, pp. 58-59) deservedly highlight managers' role in the adaptation of AI, as they are the ones who should bear the responsibility of choosing the right AI related techniques and infrastructure for their organization, along with most importantly being able to inspire the company's personnel along for the journey towards updated operations.

Berente et al. (2021, p. 1435) describe AI as a frontier, which boundaries can be expected to expand along the way. They suggest that management should explore this frontier by aiming to harness the autonomous learning to conquer such complex equation which might prove too complex for humans even to construct (2021, p. 1437). Weber et al. (2023) have refined this approach presented by Berente et al. into the framework which is presented in the Figure 9.
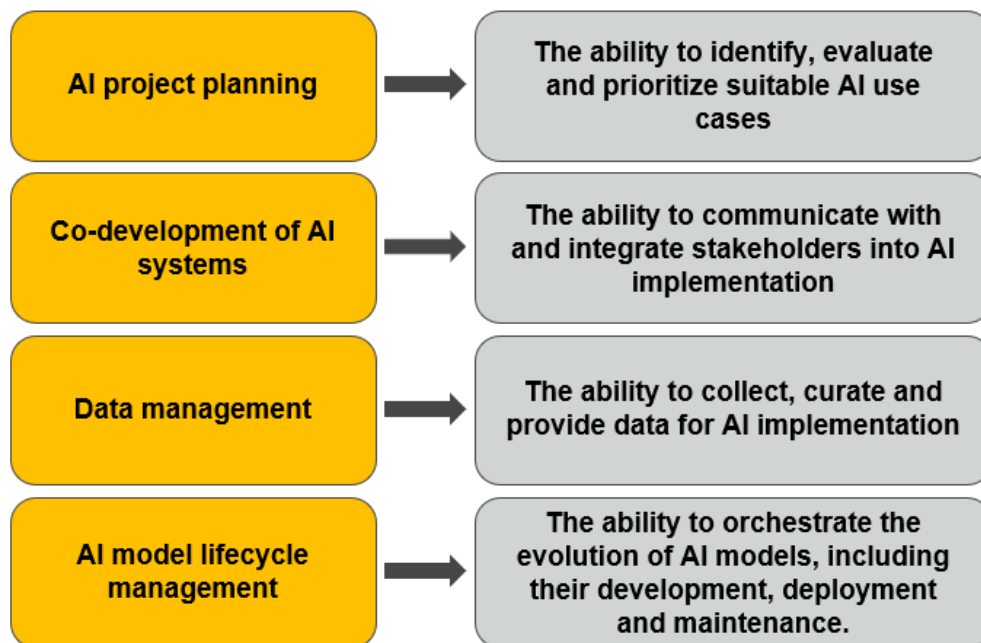
Figure 9. Organizational capabilities for AI implementation (adapted from Weber et al., 2023).

The Figure brings forward four organizational capabilities which can be exploited in order to manage the two key elements of AI utilization: inscrutability and data dependency. These elements are 1) AI project planning, 2) co-development of AI systems, 3) data management and 4) AI model lifecycle management. Logically, everything starts with planning what are the desired goals, which can be then achieved in collaboration with internal and external stakeholders. The quality and quantity of exploited data needs to be managed as it lays the foundation for creating added value, and finally the AI capitalization models need to be maintained so they have the ability to become an integral part of the company's operating culture.

2.3 Theoretical framework: Utilizing AI in buyer-supplier relationship as a procurement organization

Previous chapters include the theoretical literature review or procurements role in buyer-supplier relationships (BSR) and artificial intelligence (AI). Based on that review, a conceptual framework is constructed in order to express the intercommunication of these elements and to serve as a guide towards the following research steps which aim to understand which capabilities can help a procurement organization utilize artificial intelligence in their buyer-supplier relationships. Company's supplier portfolio is managed through the company's procurement processes. The content of the supplier portfolio, the supplier network, will be most likely in the near future exposed to further developments on the field of technological advancements, such as AI. The supplier network also acts as a counterpart to the procurement organization in their buyer-supplier relationships. The conceptual framework is presented in the following Figure 10.
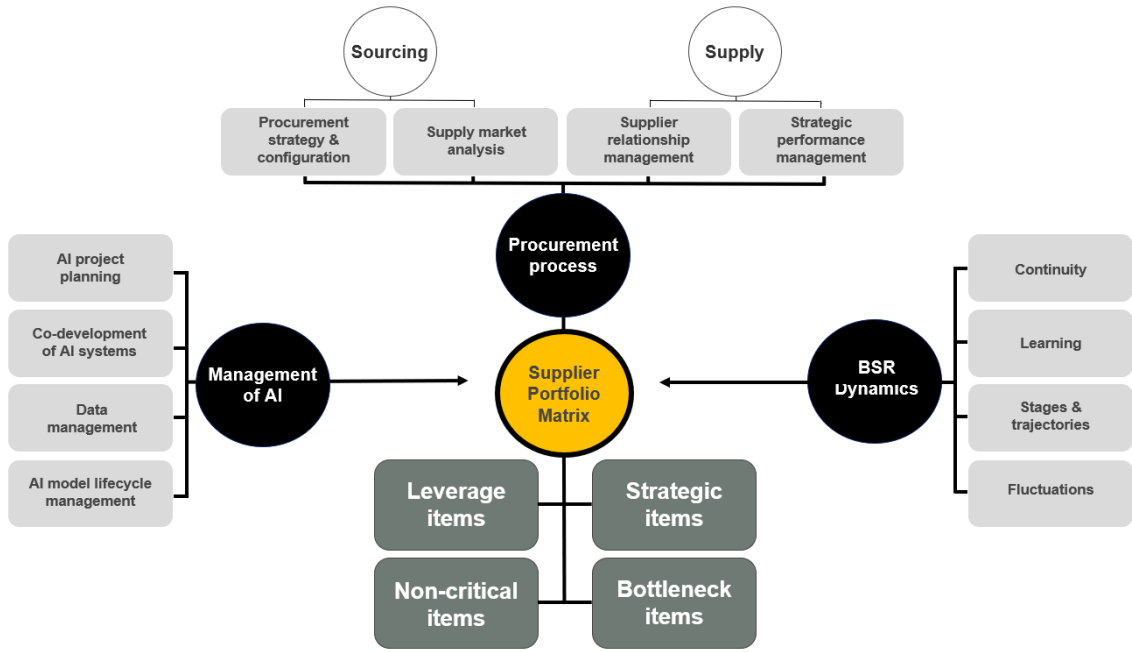
Figure 10. Theoretical framework.

3 Methodology

Following the theoretical background to the thesis, this chapter will focus to the methodologic approach of the conducted research. The opening subchapters will demonstrate the general attributes of academic research, the methodology chosen for the research as well as aiming to understand the justification of the timing and research approach on the subject: AI and its utilization in buyer-supplier relationships. The chapter also includes a section where the case company, UPM-Kymmene Oyj, will be presented. This methodology chapter will then be concluded with a closer investigation towards the research related data: how it was collected and analyzed, while also offering an assessment regarding the quality of the data. Along with the theoretical background, the methodology chapter will serve as a foundation for the actual findings of the research which will be presented later in the following chapter.

3.1 Research approach

Saunders et al. (2023, pp. 4-6) define research as a purposeful quest to interpret information systematically collected from variable sources. Therefore, research often aims to understand and further explain different phenomenon concerning our everyday lives. The research approach itself originates from the study's research question (Gioia et al., 2013, p. 19). Brannick and Coghlan (2007, p. 60) suggest that instead of focusing on practicalities, academic research should mainly concentrate on developing theories which help to understand the topics to which the research itself is focusing on. Quantitative and qualitative research methods are arguably two of the most common research methods used in academic endeavors. This study exploits the approach of qualitative research from these two alternatives, as qualitative research method aims to understand the causal theories through the question "how" (Pratt, 2009, p. 856). A qualified theory provides a foundation to understanding the interconnections of focus subjects as well predicting their behavior in a changing environment (Saunders et al., 2023, p. 48; Gehman

et al., 2018, p. 284), a perspective that for some while now has been seen as something which can also be utilized in various business contexts (Mansfield, 1995, p. 55).

Though arguably geographically centralized, technological development through novel innovations has multifaceted impacts on our societies (Petralia, 2017, p. 956). Seppälä et al. (2023, p. 7) see that companies' ability to renew their operating and business models will have a significant impact on societies. Therefore, researching how technological innovations and their impacts on businesses and working environments arguably has an economical as well a social justification. The original idea to studying AI's impact in buyer-supplier relationships was conceptually agreed with the representative of the case company, as value creation through the company's supplier relationships can be seen as an essential task for the company's procurement function. Therefore, to study the potential impact that artificial intelligence poses to the operating landscape of procurement organizations agrees with the argument made by Gioia et al. (2013, p. 16) that to compliment the process one needs to understand its surroundings.

There are alternative ways in which research can be conducted. Therefore, selecting a suitable method which most highlights the potential to conclude the research should be selected based on the research subject. Grover (2015, pp. 1-2) sees the function of research design as something which specifies the justified methods for the research to encounter with the key elements included in the research and therefore providing the structure in which the research will be conducted. To execute the method selection and validation, Saunders et al. (2023, p. 102) present a multilayered tool which they have appropriately named the resource onion, which is presented in the next Figure. A functional structure for the research establishes itself once the themes provided with each layer of the onion are followed.
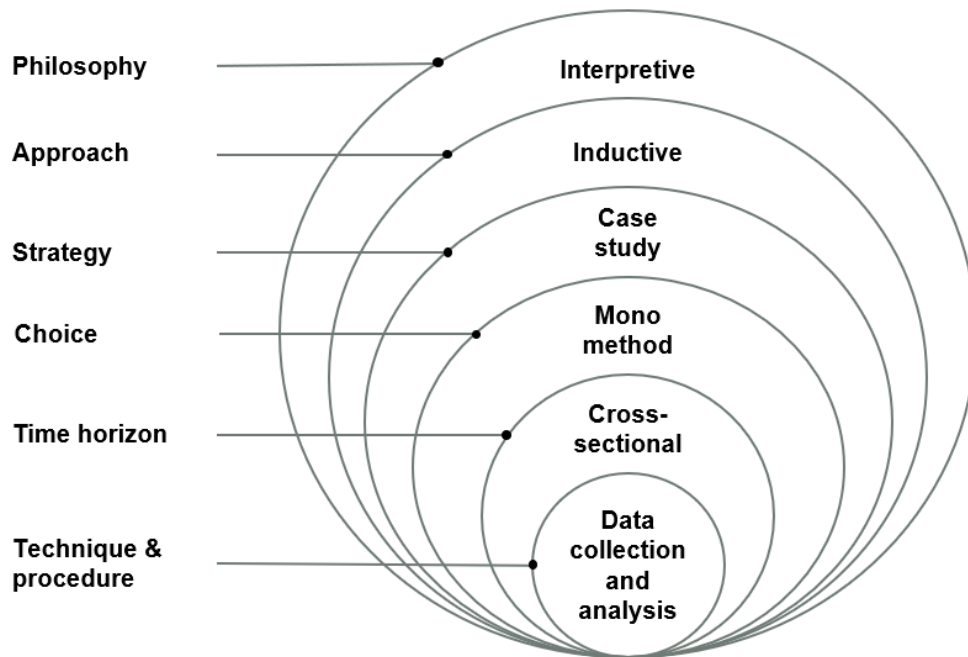
Figure 11. Research onion (adapted from Saunders et al., 2023).

The first layer of the research onion maps out the philosophy of the research. This study can be seen to consist of an interpretive paradigm, as it aims to clarify the organizational formation related to future competencies (Saunders et al., 2023, p. 113). In its approach, this study is inductive, which according to Saunders et al. (2023, p. 118) aims to build a theory based on the gathered information and sets the research data collection platform firmly towards the concrete observations of the research variables and therefore it becomes a driver for the theory (Azungah, 2018, p. 391; Eisenhardt & Graebner (2007, p. 25). Following the methodology of research onion, its authors (2023, pp. 139-140) describe the chosen strategy for this study, a single case study, as a fitting method when the aim is to establish the eventual theory based on a variety of sources. For this study the approach of case study provides a solid platform, as case studies generally offer multilayered tool for managerial aspirations through addressing the interplay between multiple variables (Gibbert et al., 2008, p. 1465) and the theories built based on research can offer increasing levels of predictability for operating environments (Jebb et al., 2017, p. 265). The choice to collect information is an interview, which makes this the study a

mono method study (Saunders et al., 2023, p. 145). Cross-sectional time horizon approach reserves the potential for timely actions based on the theory (Saunders et al., 2023, p. 148) and is well suited for studies with developed theoretical foundation (Rindfleisch et al., 2008, p. 274), something which can be well suited for this study based on the potential which the case company representatives see concerning the research subject. The study aims to minimize the risk of unreliable and biased data by collecting the data through a series of interviews from a multilayered group of interviewees which represent a variety of stakeholders related to the research subject.

3.2   Case company

The case firm for this study is UPM-Kymmene Oyj, and its procurement function, UPM Sourcing, in particular. UPM-Kymmene operates on the forest industry and at the stock market the company's stocks are listed in NASDAQ Helsinki (UPM-Kymmene Oyj, 2023e). While the company's origins can be dated back to the 19th century, UPM-Kymmene was officially founded in 1995 (UPM-Kymmene Oyj, 2023d). The company holds its headquarters in Helsinki, Finland, and during the fiscal year 2022 it created a turnover of 11,72 billion euros with profits after taxes reaching the level of 13,72 % (UPM-Kymmene Oyj, 2023b).

While offering its products in business-to-business markets, UPM-Kymmene's product portfolio can be seen having an impact to millions of households on a global scale. The following Figure depicts how the company has positioned itself and its offering towards the markets.
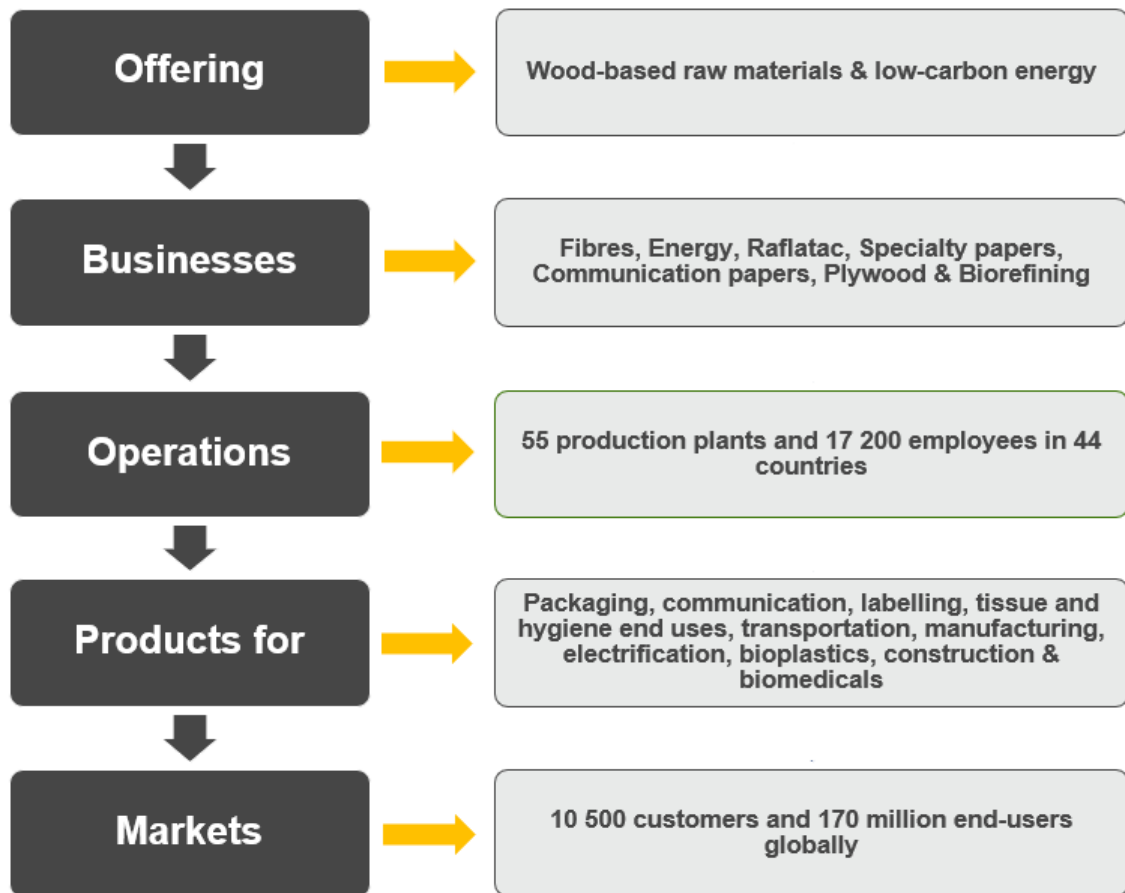
Figure 12. UPM-Kymmene's business areas and operations (UPM-Kymmene Oyj, 2023b).

In addition to wood-based raw materials, UPM-Kymmene is also an energy producer through its shareholdings in nuclear, thermal and hydropower (UPM-Kymmene Oyj, 2023c). Company aims for build stability towards market fluctuations through its operations with diverse product portfolio as its revenue is generated through seven different business areas. The company operates on global markets and its operations spread out throughout the continents excluding Africa and Oceania and UPM-Kymmene's operations presence covers 44 countries (UPM-Kymmene Oyj, 2023b). They have over 10 000 customers through whom their products reach approximately 170 million end-users on a global scale.

At the core of UPM-Kymmene's procurement operation is its business integrated global function, UPM Sourcing. This function is responsible for the sourcing and procurement processes which aim to foresee that actions in sourcing and procurement will be done in an efficient and compliant manner. Through its process based operating model, UPM Sourcing thrives to create and protect value based on the following principle quoted from the company's internal material (UPM-Kymmene Oyj, 2022): "Our aim is to secure the supply of cost competitive, innovative and responsibly produced material and service solutions for UPM businesses - in all market conditions." This principle presents appropriately the landscape against which the sourcing and procurement function of UPM has positioned itself. Highlighted by the volatile markets conditions (Covid-19 pandemic, war in Ukraine) during the recent years, UPM Sourcing can be seen as an integral influencer in the company's ability for profitability, especially as the company holds a spectrum of business areas with alterative levels of maturity. UPM Sourcing has a proactive approach towards digitalization and it seeks to utilize the potential made available through the modern technologies.

3.3 Data collection

Interviews are a commonly used strategy for data collection purposes (DiCicco-Bloom & Crabtree, 2006, p. 314). Eisenhardt and Graebner (2007, p. 28) encourage for diversity amongst the interviewees when it comes to mitigating bias. Primary data for the study was collected through interviews. The length of the interviews varied from a less than an hour to almost two hours. These interviews were held in a semi-structural manner, which aimed for more diverse data collection as it leaves room for interview participants to further elaborate should an issue arise during the interview which could be seen as relevant concerning the aim of the study (Gioia et al., 2013, p. 26). The possibility for further discussions regarding aspects that were not predetermined could be seen as essential due to the precondition that most organizations arguably haven't reached a high level of maturity in their assumed aspirations concerning the implementation of artificial

intelligence into their processes. The final list of interviewees was conducted in collaboration with case company's representative from the global sourcing function along with sourcing directors from different business areas. For interviewee recruiting purposes, an introduction letter (Appendix 1) was conducted and delivered upon request.

Diverse perspective towards the buyer-supplier relationships was a key driver when the list for suitable candidates to be interviewed was summoned. Utilizing a diverse group of professionals possessing a sufficient level of know-how towards the subject supports the study's aspirations to avoid biases (Eisenhardt & Graebner, 2007, p. 28; Gioia et al., 2013, p. 26). As the case company operates through a diverse product portfolio with different maturity levels, it became quite self-evident that in order to gain a diverse view regarding the subject of the study, representatives from both the buyer's as well as the supplier's side was required. In order to enrichen the perspective further, it was decided that a versatile group of managerial representation should also be included to the list of interviewees. The final list of interviewees included five representatives with different position in the case company's procurement organization and an equal amount of five representatives from the case company's supplier network. To complement the views offered by the different operators in the field of buyer-supplier relationships, six interviews were conducted with persons who view the research subject from a managerial perspective. The detailed statement of the interviewees categorized based on their current professional role as well as their altogether experience from issues related to buyer-supplier relationships can be found in the Appendix segment of this study as Appendix 2. To ensure a comprehensive view on the buyer-supplier relationships, the supplier portfolio matrix provided by Krajlic served as a foundation for the pre-qualifying process of the interviewees. The recruitment process succeeded as each quadrant from the portfolio matrix was represented in the interviews both from the suppliers' side as well as from the procurement perspective.

The framework for the interview questionnaire, Appendix 3, was constructed from four different categories. The first category included basic background information such as

the professional role of the interviewee and their experience on buyer-supplier relationships along with a general interest towards interviewees' perspective regarding artificial intelligence. After that the framework aims to discover interviewees' views and learnings about buyer-supplier relationships. This is followed by more detailed request to explore on how artificial intelligence might impact buyer-supplier relationships through different technologies that are related to artificial intelligence and what is required to utilize artificial intelligence in these relationships. Different questions from the questionnaire were emphasized based on which of the three categories (buyer, supplier, management) the interviewee was representing.

The meetings for the interviews were held online as Microsoft Teams -meetings. This singular interview method supported study's data reliability through replication (Gibbert et al., 2008, p. 1468). The meetings were summoned and hosted by the author of this study, and they were scheduled so that the first of the interviews was held on October 11th and the last interview took place on November 6th, 2023. The probability that the study subject might hold some level of novelty among the interviewees was addressed in the beginning of each interview, and the participants were encouraged towards open-minded, even somewhat predictive, approach to the ensuing discussions. The majority of the interviews took place as one-on-one meetings. However, on two occasions the interview was conducted as a joint session with two interviewees present at the meeting. The option for double participation (when requested) was based on the ambition to ensure that the interviewees could offer insights both on buyer-supplier relationships as well as artificial intelligence. Interviews were held on two different languages, both in Finnish as well as in English. A total of eleven (11) interviewees answered the questions in Finnish and five (5) offered their insight in English.

3.4   Data analysis

Data analysis' most prominent role in the research is to lead the process towards theory building (Grodal et al., 2021, p. 604). As previously stated, the empirical for this study data was collected through a round of recorded semi-structure interviews. The first three interviews were transcribed the author of the study and for the remaining 11 interviews the transcription tool of the Microsoft Teams software was enabled with the consent of the interviewee. The transcribed documents from the interviews were then revisited along with the audio recordings to correct the potential obscurity and spelling issues between the spoken word and the transcriptions. The conducting of transcriptions and the clarifying process related to the started at the same time as the round of interviews as the aim was to ensure that the potential confusions between the materials would be rectified immediately by contacting the interviewee. Fortunately, no follow up actions were required.

The next phase of the data analysis process utilized data coding. Data coding is a process which aims to separate the collected data to different categories based on the similarities (Saunders et al., 2023, p. 665.) According to Gioia et al. (2013, p. 26) combining the various themes of the findings has a pivotal role in theory building. Different theme categories based on the study's theoretical framework (Figure 10) were established and various occurring themes were compiled while still maintaining the separation between interviewees. The separation process of the themes most relevant and related to the research topic also served as a step to eliminate the portion of transcription material from the interviews that was irrelevant to the findings section. Following the categorization of the data, 53 pages were left to be further analyzed in a more precise manner.

The concluding part of the data analysis was to arrange the previously determined themes to refining them into findings in a manner which would complement the original research question. Therefore, this study exploits the theory of merging categories as it aims to conclude the study findings which spring from a foundation built upon multiple

theoretical aspects (Grodal et al., 2021, p. 600). The analysis of the data and the empirical findings refined from it were reasserted through direct quotes from the interviewees. This also helps the study to validate its theory building (Pratt, 2009, 860). As most of the interviews were held in Finnish, a translation of the original quote was presented. While the data was collected through a set of interviews which were arguably held in positive context, it must be reminded that the perspectives of 16 people from a selective field of industry still represents a rather limited intake on the subject. Due to the subject of the study it is also worthwhile to bring forward that the only artificial intelligence related tool or method that was used in this thesis was the transcription tool of the Microsoft Teams which provided the spoken word into a written format.

3.5   The assessment of the quality of the data

Regardless of the circumstances in which the research takes place, its outcome relies on the quality of the data upon which the research is constructed upon. Leung (2015, p. 325) presents the tools, processes and data as the cornerstones of validity when it comes to qualitative research. While conceding that there are multiple ways to assess the data quality of the research, Gibbert et al. (2008, p. 1467) suggest that the issue can be viewed through four elements which are internal validity, construct validity, external validity and reliability. Internal validity of the research refers to the study's ability to build and present the relationships that occur between the elements which are included in the research (Gibbert et al., 2008, p. 1466; Findley et al., 2021, p. 366). The study's approach regarding this challenge stems from its theoretical framework, as the semi-structured interview guide, which is used as the primary method for data collection, utilizes the various elements presented in the theoretical background section of the study. In addition, an introduction letter was made available to further ensure that the interviewees would possess at least a general understanding regarding the theoretical variables of the study. This approach of focusing into complementary elements considering the data collection is supported by Kaya (2015, p. 112).

Gibbert et al. (2008, p. 1466) define the construct validity of the research as a consolidation that the research truly studies the issue it claims to. Gioia (Gehman et al., 2018, p. 286) highlights the role of research construct has in building the theoretical outcome of the study. The validity of construct the research be logically built, starting from a broader view of covered issues and advancing seamlessly to even more detailed viewpoint for the issues relevant for the study. This study's theoretical background begins with the presentation of fundamentals and dynamics of the buyer-supplier relationships, while shifting then its focus to observe these relationships from the procurement organizations perspective. This foundation of theoretical perspective is followed with the presentation of the fundamentals concerning artificial intelligence and how organizations should address this technological frontier to be able to utilize it in their operating environments. All of this leads to the main target of this study, which is to understand how procurement organizations can utilize artificial intelligence in their buyer-supplier relationships.

The external validity aspect of the data quality assessment constructs itself from the belief that the findings provided by the study will correspond with the potential outcome should the study be carried out by an alternative operator or with a different sample (Gibbert et al., 2008, p. 1466; Findley et al., 2021, p. 368). This challenge is addressed by the study primarily with the embedded diversity policy regarding the interviewees. Starting from the preselection phase, the recruitment process was met with the intention to summon a versatile cohort of representatives to participate in the interviews. As the case company operates in multiple markets that hold diverse maturity levels, the interviewees were recruited from different business areas representing all the quadrants included in the supplier portfolio matrix so that a holistic perspective from the company's buyer-supplier relationships would be covered by the study. Additionally, this versatility was further strengthened with the inclusion of managerial aspect concerning the subject.

The three beforementioned aspects of validity constitute as the foundation for the data reliability regarding the research. This is essential especially while conducting qualitative

research where according to Leung (2015, p. 326) the landscape presents its challenges due to the richness of perspectives. Above all, transparency and replication should be provided to ensure data reliability (Gibbert et al., 2008, p. 1468). The study thrived for these conditions as anonymity was guaranteed for the interviewees and the questions guided by the semi-structured interview guide were not made available for the inter-viewees beforehand. Additionally, all of the interviews were carried out in similar fashion as they were conducted as recorded Microsoft Teams -meetings.

4   Findings

The findings section of this study will approach the subject from two perspectives. This is motivated by the binomial nature of the study's research question. The first part of this section aims to represent the landscape of the current buyer-supplier relationships as well as aiming to reveal whether and how the professionals operating within that landscape see artificial intelligence becoming an element in these relationships. AI's potential impact to these relationships will be covered along with views regarding the factors to be considered for the implementation of AI to buyer-supplier relationships. The second part of the findings section focuses on the subject from the perspective of a procurement organization: how AI could enfold in relation to different supplier categories and how procurement processes along with the professionals conducting them could enrichen their operating field through artificial intelligence. Opinions concerning how this phenomenon could become more of a reality in the current landscape of buyer-supplier relationships proved out to be rich and multifaceted. The group of interviewees present multiple different business areas and mostly possess decades of experience from buyer-supplier relationships, which should provide a solid foundation for this study's findings. The findings section is concluded with the revised theoretical framework originally presented as Figure 10 in the theoretical background section of this study.

4.1   Artificial intelligence in buyer-supplier relationships

The first section of the findings examines the current landscape of buyer-supplier relationships and whether the professionals operating and managing these relationships see that AI's holds potential to become a valuable element on these relationships. This section is concluded by offering various perspectives on AI's potential to impact the relationship dynamics as well as covering the aspect of AI's implementation to these relationships.

4.1.1 Current value drivers in buyer-supplier relationships

The interviewees strongly advocated the element of trust in their answers when considering the building blocks of a successful buyer-supplier relationship. This can be seen as a quite logical outcome, as companies mainly prefer partners and stakeholders around them which through their own supportive actions lay a foundation for the company to thrive in their own core business. The ability to rely on one's counterpart could be seen as the backbone of these interorganizational relationships especially when considering how to further develop them over the lifecycle of the relationship in question. It is also worthwhile to mention, that at this current time trust is first and foremost seen as something built and held among the human representatives within the relationship.

> *"It all starts with trust and if you lose it, then it becomes really hard to repair. And then there is of course the element of human relationships… so that we understand to whom we are talking to and with what kind of a company and what are their goals." (Interviewee 8, buyer)*

> *"Also the difficult things are said in the relationships, and things are said correctly." (Interviewee 4, management)*

Following the trust factor openness, and its logical offspring communication, were also embedded into multiple answers. All of these can be seen as linked together, as it is arguably quite challenging to trust one's counterpart in a relationship should one feel that they are holding relevant information from you. In addition to being a prerequisite for trust, communication was also seen to hold a potential to elevate these relationships even further through innovation.

> *"To move from good or successful relationship to very good or excellent I mean then, then it's about communication." (Interviewee 1, buyer)*

Both parties also need to gain something from the relationship in question. This aspect was also presented by several interviewees and it was also quite clearly acknowledged that the counterpart's benefits must become a reality to be able to tend the relationship forward. Generally, building these win-win situations between organizations was seen as

a foundation for collaboration to pursue continually improving outcomes through the value chain. In the heart of these collaborative aspirations lies information and how it is shared, and thereby refined amongst the parties involved in the relationship.

> *"Openness… in so that we really see the numbers in the same way. And based on that a common vision will be shared on how the market is behaving so that everyone can make their own conclusions in relation to their own business based on the same set of numbers." (Interviewee 10, management)*

Easy-going and straightforward manner to conduct business presented itself also from the answers when discussed about the most valued element of buyer-supplier relationships. This can be seen as quite self-evident, as it would hard to rationalize why any relationship needs to improve its degree of friction and that more challenges should rise from the interorganizational operating models. While it is easy to require smooth operational models, at the present it can be seen as a real challenge among the current volatile markets springing from Covid-19 pandemic and war in Ukraine, to name a few.

> *"What is missing is the predictability and continuity… so that this going back-and-forth would go away." (Interviewee 7, supplier)*

Therefore, both buyers and suppliers value continual and innovative relationships that are founded on trust. Information can be seen as the key element for these aspirations, and to be more precise: the ability to provide, communicate and furthermore refine it together with one's counterparts. As artificial intelligence has gained its latest momentum based on the increased capacity of computing power, it arguably holds a clear potential to enhance buyer-supplier relationships.

4.1.2 Future aspirations for buyer-supplier relationships

Looking at these interorganizational relationships from the buyers' perspective, AI could offer a series of developmental aspects. Some business areas, with historical back-grounds spanning over decades, see themselves as parts of a very human relationship centric relationships, which have left them questioning whether business decisions are based on actual data or more so because relationship history with the counterpart. As a potential tool for efficient data management, AI could support this transaction towards more profit-oriented decision making.

> *"We would need to move this direction that it's more and more fact based at not like something that it's a bit like here and there and you don't exactly know why certain decisions are made." (Interviewee 1, buyer)*

Buyers' also highlighted the potential of relationship development as something which should benefit from better information sharing capabilities and more efficient ways of working. The desire for development can be seen as two-folded: on the other hand, buy-ing organizations should be able to concentrate to more developmental issues should the more basic functions of their operative models become automated. Then again, buy-ers would also like to be in the receiving end of this relationships when it comes to inno-vation as there seems to be a demand for suppliers to take the driver's role in the rela-tionships and making sure that the focus will be on reaching new levels of efficiency and profitability through innovative actions.

> *"We are good at purchasing and procurement and so on… but where we lack is the developmental role which we should embrace after we have closed the deal." (Interviewee 3, buyer.)*

> *"Myself I would even yearn for this kind of a forward-looking approach… and in a positive way some kind of a challenging from the suppliers' side about the ways how we can improve our operations or products or services, so that there would be a more of a proactive way." (Interviewee 14, management)*

The buyers are not alone with their views about the development potential in buyer-supplier relationships. Suppliers also seem to be keen to take these relationships to the next level, albeit their views on how to develop the relationships differ from the buying organizations' representatives. The request to develop relationships which was indicated through the buyers' answers seems to resonate quite well among the aspirations brought forward from the suppliers' side. For example, suppliers would like to elevate their relationships to mutually increasing level should through a deeper understanding of how their products/services help their customers in their respective value promises.

> *"Knowing more about the end use applications at customer level… so we are too far away to understand the market needs and we need more input from time to time from our customers in order to help. And in order to grow and in order to look together for new opportunities, that's something missing." (Interviewee 5, supplier)*

> *"So there are some buyer-supplier relationships which are already working at a fairly mature level where you're doing joint product development, you're doing joint designing, you're you're [sic] kind of pretty much working towards the end state. Whereas if you look at the market in totality, that's not where all buyers suppliers are." (Interviewee 15, supplier)*

> *"More intelligent contracts, or how should I put it… that there would kind of be this kind of an element of incentivizing more on how the risks are mitigated or how we are approaching these risks together." (Interviewee 13, management)*

The advancements occurring in the technological front can also see buyer-supplier relationships inheriting some unpresented challenges. Innovative ways of working without regulation has the potential to lead towards undesired circumstances, and corporate world along with its interorganizational relationships serves as a relevant example. Should organizations aim to increase their data sharing, it might lead to more complex contractual situations. When more efficient ways of working are discovered, the temptation to scale these innovative approaches is quite self-evident. Should they become a reality through an innovation process which utilizes multiple sets of data, sharing it among other customers or suppliers is not so straightforward.

> *"These new digital technologies call for companies to go through basically all of their contracts and take more into consideration what sort of revisions must be done based on the updated regulation". (Interviewee 10, management)*

Multiple variations were highlighted during the interviews regarding how the buyer-supplier relationships could evolve in the near future. All of the following aspects are naturally purely speculative as there are no guarantees how the landscape will eventually form into. Yet, they are arguably valuable speculations, as they present views from professionals who are continually aiming to add value to their companies through different functions related to buyer-supplier relationship.

One key theme rising from the buyers' side was the expectation towards deeper and more innovative relationships, which would lead the nature of the buyer-supplier relationships towards more of a strategic partnership from merely transactional relationships. A deeper level for existing relationships and the potential transparency that could come along would also ease the pressures which are posed by the increasing amount of regulation, which was also presented as a growing element on buyer-supplier relationships.

> *"This kind of an innovative model and innovations will rise to the surface even more and we are kind of looking forward on how we can develop and add value… to ensure through AI that we will be as efficient as possible going forward as well." (Interviewee 8, buyer)*

> *"Regulation has increased tremendously… these kinds of compliance requirement are increasing a lot, which will lead to situation where transparency will have a role in the supply chains. It cannot be just talk anymore, it must genuinely be transparent." (Interviewee 4, management)*

Suppliers anticipate an increased level of automation in buyer-supplier relationships interactions in the future. As the technological landscape continues to develop even further, the base camp level for data analyzing and information sharing reaches new levels in the future. Additionally, a deeper level in partnerships was also addressed in suppliers'

visions of the near future buyer-supplier relationships. These relationships could lead towards more efficient value creation as both parties become more aware what to expect from each other and therefore would presumably hold the ability to adjust their actions more smoothly towards market requirements.

> *"As it is with these latest tools of digitalization, we already have kind of a ready-made information as in that someone has already refined that data… which gives us a whole new starting point. This makes it more of a possibility to focus on what we are doing next." (Interviewee 10, management)*

> *"Big partnership deals, as in that the collaborations will become more comprehensive." (Interviewee 12, supplier)*

4.1.3   Enhancing buyer-supplier relationships through artificial intelligence

In general, the participants for the study's interview held a sufficient level of eagerness towards the potential of artificial intelligence. This potential was first and foremost perceived through business related issues, but comments on artificial intelligence's ability to impact our societies on a broader scale were presented as well. While it was also recognized that the subject itself is not a novel phenomenon per se and that there is a substantial level of hype regarding the issue, artificial intelligence was seen as somewhat disruptive force which could have a substantial impact on how our working lives will continue to develop in the future.

> *"Overall is very exciting as an area… so I do feel positively about the potential it holds for." (Interviewee 16, supplier)*

> *"It's a great opportunity for human mankind… it can help to to [sic] sort of complex problems that can help to bring people together." (Interviewee 9, management)*

While the excitement for artificial intelligence potential was clear, also concerns were expressed by some of the interviewees. This was backed by arguments on whether systems and tools related to artificial intelligence would hold the potential to reach the

mainstream within the buyer-supplier relationships' landscape and therefore could bring any concrete value to them. Given that the phenomenon's history spans over decades and the scarcity of concrete operational tools available (based on majority of the interviewees), a level of skepticism can be seen justified. On the other hand, the somewhat skeptical stance was also occasionally reasoned by the lack of knowledge concerning the subject.

> *"There is a great amount of opportunities, there is a great amount of potential but how it is utilized at the moment, that is still somewhat missing." (Interviewee 3, buyer)*

> *"I'm a bit skeptic about it because I do not know much about it." (Interviewee 5, supplier)*

Additionally, the atmosphere amongst the interviewees was artificial intelligence seems like a subject that requires attention regardless of one's role in the buyer-supplier relationship. Along with the shared vision of its potential, numerous interviewees pondered on how it might become costly to bypass this issue without further acknowledgement. One key driver highlighted in the discussions was the fear of being left behind in the development, something that should be considered as a real threat, both individuals and organizations alike, especially in the current climate of digitalization.

> *"You have to jump on the train, otherwise you are sooner or later surely missing out." (Interviewee 2, buyer)*

There seems to be an inequal level of maturity when it comes to companies approach to the utilization of artificial intelligence. Some of the interviewees came from an organization that had multiple years of experience regarding the implementation of artificial intelligence into their operational environments, whether it was in production or customer/supplier related issues. There were also some interviewees who were confident that this issue is discussed at their organizations in some level, while conceding that the concrete measures and actions were still missing from their operating environment.

Multiple interviewees also brought forward that they had started to educate themselves on this issue in their personal lives while no clear advancements were to be seen in their professional lives. Some organizations had also been active in trying to come up with innovative approaches while aiming to bring forward artificial intelligence in peoples working lives.

> *"It is visible, … there was this hackathon type of event where small groups were contemplating the possibilities related to AI." (Interviewee 11, buyer)*

The round of interviews also brought forward the scattered maturity levels of AI implementation in the current operating roles of the interviewees. Some individuals had a long-standing knowledge and experience base on the subject, while the other end of the spectrum was just beginning to take their first steps on the journey. Each of the interviewees had familiarized themselves with the subject, though the group in general held a much more matured level of experience in matters related to buyer-supplier relationships.

> *"I am not using it (AI) on daily basis, it is more like I am trying it for fun to educate myself". (Interviewee 11, buyer)*

> *"As a company we have invested quite a large sum of money into it." (Interviewee 16, supplier)*

This provides a solid foundation to analyze how novel innovative tools and operating models related to AI could be implemented to the buyer-supplier relationships, regardless of the role in which one operates. It serves as a valuable reminder on how individuals operate in general: everyone has their own unique way to internalize different aspects of working lives, and it could be argued that each approach is motivated through one's personal needs and requirements posed by one's role. Based on the interviews, the adaptation of AI related tools can be supported through internal and external stakeholders. No turn-key solution to this supporting act was acknowledged during the interviews. It would appear that companies hold diversified policies to this matter, arguably based on

the fact that the interviewees presented a variety of different size companies and thus diversified option of resources.

> *"Yes, to some extent, not to a large extent, we kind of we are part of the pilot program with Microsoft for this copilot… so external stakeholders, yes, the part kind of platform providers because we don't have our own kind of AI lab or kind of a platform that we are kind of ourselves developing." (Interviewee 15, supplier)*

While it might be challenging to specify a certain timeline for AI to gain a stronger foothold in our professional lives, the interviewees were unanimous in their opinions that AI will to some extent impact their own professional roles in the future. When it comes to buyer-supplier relationship, AI was welcomed as a supportive element to these relationships. While digitalization is already a reality, there still seems to be a high-level of motivation towards automating certain work stages. Regardless of the role which AI might possess in the relationships of the future, it could be argued that the dynamics within the relationships need to be adjusted and therefore the requirements for human input can also be seen as something which will need to evolve.

> *"In its entirety, it will not replace the roles of the buyer and the seller, but it will surely be a part of the equation in the future." (Interviewee 6, supplier)*

> *"So I would say that the cross-functional team, maybe we look different. Even AI is implemented [sic] and you do not need human being at a certain level anymore." (Interviewee 5, supplier)*

This driver for development was presented and welcomed through the round of interviews as well. Many of the respondents saw AI as a tool which could increase both organizational as well as individual efficiency. From the organizational perspective, various parts of operational processes could be streamlined towards more efficient models through AI related tools and techniques. From the personal perspective, interviewees proposed that AI could take away some of the mundane tasks which cannot be overlooked while aiming to hold the operational standards high, but which can be seen as more time consuming than value adding. Thus AI's implementation to the buyer-supplier

relationships could pave way to allocate more resources towards the more vital issues in the relationships, such as development and innovation.

> *"Developing personal work, as in productivity and ways of working, … and the process in general can be developed through AI related solutions." (Interviewee 14, management)*

In general, both parties of the buyer-supplier relationship seem to have an optimistic approach towards the possible implementation of AI into the relationships landscape. While this provides a solid foundation, it is hard to argue that it alone would guarantee a smooth transition towards more technologically savvy business relations. The round of interviews clearly indicated that while business activities carry on despite the recent turmoil in the market, there still seems to be room for improvement in various buyer-supplier relationship. Organizations and individuals alike will arguably find themselves prone towards evolved relationships, for example through the implementation of AI related tools and techniques, when they feel the need to improve their daily operative models.

The interviewees saw artificial intelligence as something which most probably will have an impact on the four core elements of buyer-supplier relationships. **Continuity** as a theme which divided opinions amongst the interviewees. Some argued it to have an impact for example in issues when people managing the relationships change over time there could be some kind AI assisted tools which would ensure the level of operations has the ability to continue without decreasing back to fundamental levels. On the other hand, investments in AI related interorganizational functionalities could also be seen as something which makes more difficult to abandon the relationship and therefore supporting the continuity factor.

> *"AI has a lot to offer in this side, actually there is a lot of room to improve, as it feels like when the person changes it means that it all starts from the beginning even though it would not have to." (Interviewee 11, buyer)*

"It requires quite a lot of efforts, if we are going to share the information and open up those lines. Then it just makes the relationship deeper which makes it more difficult to leave after all that trouble." (Interviewee 7, supplier)

The **learning** theme in buyer-supplier dynamics was clearly seen as something which could benefit from artificial intelligence. AI was for example seen as a something with the ability to support additional transparency as a gateway towards more streamlined and efficient decision making. This velocity could then be seen as a way to differentiate from competition through more efficient supply chains. Overall, willingness to learn was seen as a cornerstone of long-lasting relationships as it best it could be described as both parties striving actions towards the defined and desired benefits of the relationship.

"Through AI to clearly bring better things or when we find things that need to be addressed, it will be better, as well as transparency, so that we can reach clear conclusions faster from basic data like this." (Interviewee 4, management)

"Well, I'm sure that if we can speed things up, things will go through. And we will be able to solve some things faster. It should bring us competitiveness compared to other competitors like ours, and that's what we're trying to do when we build strategic supplier relationships." (Interviewee 8, buyer)

"We are at a certain point now in these customer relationships and. And in the amount of business, that (learning) has come as a whole along the way and also now that these newer services are being brought there in a way, we learn from both sides how to do it and what and how we would like to do things and what we want so and so to focus and invest so in a way, yes, it will come out quite well, because through this kind of artificial intelligence and this cooperation, then that learning is quite good to describe it." (Interviewee 12, supplier)

Comments for and against were present during the interviews whether artificial intelligence could have an impact on the **stages and trajectories** theme in the buyer-supplier relationships. Those who saw the potential in AI's impact suggested that it would more likely impact the early stages of the relationships as it could speed up the phase where the potential partners are learning to know about the qualities their counterparts possess and whether the relationship holds a real potential to become under consideration. As discussed, AI's potential lies in the efficiency of information processing. Should this

development of faster initiation phase be supported through AI related innovations, both parties would quite probably be eager to implement it to their practices. Each resource, whether it is human related efforts or some other resources from the organizational infrastructure, that is allocated towards new and unsecure relationships means that the same resource is away from some other already existing relationships which bears concrete benefits for the organization.

> *"Well, I was just thinking that probably in the initial phase, the more and better data there is, the faster the development phase can go. On the other hand, when in the normal phase it would start to stop, maybe then when there are these ways of working and then something new would be found all the time." (Interviewee 6, supplier)*

> *"It can affect the steepness of the u curve at the beginning, that you can find many more opportunities there than you could find without artificial intelligence, that the initial phase can be much faster and stronger with the help of artificial intelligence. Also then, the middle part, I would think that it can be made longer at best if the real artificial intelligence can help with that, that there will be a reason... to continue that relationship longer." (Interviewee 11, buyer)*

> *"Well, somewhere in the early stages of a relationship, maybe artificial intelligence will bring us opportunities to understand more quickly what kind of partner we are talking about. How will our relationship develop? It might speed up the initial phase of the u curve, so that we can get to those benefits faster." (Interviewee 13, supplier)*

The **fluctuations** theme was also received with a mixed opinions by the interviewees. Others offered enthusiasm towards AI's ability to bring innovative aspects towards scenario work and therefore to the field of forecasting, which is arguably quite high on the list of organizational challenges especially during the volatile market situations presented which have been unfortunately well present during the recent years. While the improved lines of information sharing could assist organizations in their decision making and in the coping process of local or global fluctuations, some interviewees remained sceptic regarding the concrete ability to actually predict what kind of fluctuations will take place, let alone where and when they would take place.

"When we are injected with artificial intelligence to monitor certain suppliers in real time from the internet or based on their historical information and internet information, we will certainly be able to anticipate these various fluctuations, not only in terms of supplier relations, but also in terms of what is happening in the market." (Interviewee 10, management)

"Maybe for these specific volatility fluctuations. Artificial intelligence can probably have something more to give, also how to predict certain things in it so that in a mutual relationship it was practically nothing. Forecasting demand and supply and such deviations that there will probably be effects on a very practical level." (Interviewee 14, management)

"Historically, predicting such black swan-like time series in general has been terribly bad." (Interviewee 16, supplier)

When it comes to the potential related to value creation, expectations for AI's ability to enhance buyer-supplier relationships where quite evident throughout the interviewees. Process efficiency was presented as a concrete example and expectations were also presented whether AI related innovations could at some point offer solutions resembling the supportive work conducted by a personal assistant in managing the mundane actions of one's professional role. Interviewees also revealed a strong desire towards AI's potential ability towards more precise and efficient decision making. After all, profitable operations require numerous decisions on a daily basis and through the increasing amount of data these decisions can arguably become even more multifaceted.

"Smoothing processes within suppliers and buyers, making everyone's life easier." (Interviewee 2, buyer)

"From the point of view of the work of purchasing, basically, it's just basic things like this, that you have to arrange a meeting or something else. I would think that there would be something like that who would find a solution that would help with that... a digital assistant." (Interviewee 3, buyer)

"The structuring and management of information that enables better business decisions to be made both ways." (Interviewee 4, management)

"In my opinion, the most value comes precisely when we are allowed into the customer's process to influence those things, which then affect the final result of how efficiently the production is." (Interviewee 12, supplier)

The ability to process different information and, above all, to be able to draw conclusions from that information. Then there will probably be just this kind of automation of processes to increase efficiency... and this kind of different monitoring of these business processes." (Interviewee 14, management)

The four core organizational capabilities for AI implementation were seen as one practical example how AI could also be implemented to buyer-supplier relationships. Naturally, there is no one exact way to approach the implementation and the nature of the relationship as well as the dynamics of its counterparts should come into consideration in the implementation phase. Interviewees were also relatively moderate to voice their opinions on how AI should be implemented to buyer-supplier relationships. This could be interpreted to reflect the current status: artificial intelligence at the moment is not a common element in buyer-supplier relationships.

However, the interviewees offered some concrete challenges which may complicate the initiation of AI in interorganizational functionalities. Firstly, as the quality of AI related tools relies heavily on the quality of data, it was presented that organizations hold diverse levels of maturity when it comes to the quality aspect of their data. Secondly, it is worth to remember that within landscape of both buyers and suppliers there are companies with very different amounts of resources and investments on artificial intelligence are by no means self-evident especially for smaller companies. Thirdly, governance issues especially related to data sharing were highlighted as a potential source of friction on the road towards AI enhanced buyer-supplier relationships.

"Every day in our work we see that our data is not in order." (Interviewee 3, buyer)

"Well, this can be a more difficult task. I also have a lot of suppliers who are quite small. It depends entirely on the supplier, but there are also suppliers who live quite small and have very few resources for this kind of thing." (Interviewee 11, buyer)

"I try to remember our own projects and planning, so we have quite big challenges already with ourselves and to get it for ourselves organizationally. Then if we add someone else to play on that side, will we get even a meter forward." *(Interviewee 6, supplier)*

When it comes to individual adaptation of artificial intelligence related tools and techniques, the requests for the supporting organizations vary quite understandably. Still, scattered views regarding supportive actions should not be overlooked as hopefully this study and its various perspectives accompanied with diverse set of interviewees succeeds to serve as a reminder on how in the end artificial intelligence is also a tool which will be approached from countless perspectives. Like many other tools, the end-users operating in the field of buyer-supplier relationships hope for assistance for the implementation first and foremost through clear guidance and hopefully adaptable set of use-cases.

"I think the key will just be guidance… Maybe also doing the work on preselection, so which tools could be useful." *(Interviewee 2, buyer)*

"Maybe it's just a small group that systematically focuses on this do-it-yourself and then on the possibilities and possible challenges and then we think about a certain kind of guidance for the development of this development path and then, of course, for the implementation." *(Interviewee 14, management)*

4.2 Utilizing artificial intelligence as a procurement organization

As presented in the first part of the findings section of this study, based on the round interviews the general stance on artificial intelligence and its implementation to buyer-supplier relationships seems positive. In this latter part of the findings section the study focuses more on the issue through the lens of a procurement organization. Firstly, this section approaches the subject utilizing the supplier portfolio matrix according to Krajlic and presented as the Figure 5 (Montgomery et al., 2018) in the theoretical background section of this study. The latter part of this section aims to bring forward which AI related

technologies could help in the different elements of the procurement process and how procurement professionals could approach while aiming to further improve their roles talentwise regarding the utilization of AI.

4.2.1 Supplier categorial perspective on artificial intelligence

The requirements for company supplier categorization often stem from the company's own value promise. Therefore, the supplier categorization should be addressed with curiosity and comprehension which elements possess the potential to add value for the organization which the procurement function through its processes is supporting. As the representatives for the buyers' side in the interviews was presented by a group of individuals operating in different business areas of a company which holds a variety of maturity levels within its business areas, also the categorization approaches varied between interviewees. Krajlic's portfolio matrix could be seen as a framework for various approaches, as it is being used in its entirety as well as through adapted versions of it concentrating more to either one of its two variables: importance of purchase or supply risk.

> *"We pretty much use Krajlic's matrix." (Interviewee 11, buyer)*

> *"But nowadays I would say you are either partnership supplier or then you are just like a challenging supplier or this kind of development supplier." (Interviewee 1, buyer)*

> *"We have strategic suppliers and critical ones and then tactical ones... And then when you look at and categorize or segment suppliers from many different angles." (Interviewee 3, buyer)*

Interviews also shed light for various efficiency aspects concerning the managerial perspective of the supplier network. In the current climate the procurement professionals responsible of preparing and finally agreeing the terms for the final contracts between the buying and supplying organization are not themselves making the actual purchases regarding the materials and/or services included in the contract scope. This may lead to a situation where the spend is not fully optimized between suppliers and as the invoicing

processes are becoming increasingly automated the procurement strategy formed to support the business areas profitability objectives become harder to capture. Procurement professionals might also benefit from extending the previously mentioned AI empowered personal assistance to include an ability to make suggestions in relation to the buyer's personal preferences and capabilities for various sets of action which might be useful in the given supplier management landscape.

> *"Then, even if something unusual is delivered, just like in this kind of spending matters. Now we look at it manually and then try to wake up to the fact that, for a moment, why, for example, this supplier's spend has risen so much. You don't necessarily see it because we make framework agreements and purchases are then made against them, and practically anyone can make that purchase."* *(Interviewee 3, buyer)*

> *"Well, if we think of examples like this, that I would have an artificial intelligence like this at my side, which is capable of knowing everything that I know and knows in which situation we go with the journalists, and with it we could even spar with it to see what the different options would be to do in such a situation. So I can see that it could bring a lot of similar thoughts that you can't necessarily think of at that moment and what could be the best solution in the end, like different scenarios and such. regarding... Then also to such results where both win and that artificial intelligence is able to support maybe such and such ideation. Which, in the end, is quite often what makes the relationship continue, of course, so that both find solutions that benefit."* *(Interviewee 11, buyer)*

The aspect of more efficiently managed relationships was also present from the suppliers side. Should both parties be able to implement lighter operational models in when it comes to relationship management, more time would there probably to be allocated towards actions which could help elevate the relationships towards even more fruitful levels. As one interviewee (15, supplier) replied when asked could AI assist in customer relationship management.

> *"In terms of your being able to understand your customer landscape better."*

As the impact of various supplier categories alternates due to their differences in nature and value adding qualities, according to the interviews the manners in which AI could be

utilized in collaboration with different supplier seemed to alternate as well. The **non-critical items** were seen as a category where AI related technologies and tools quite comprehensively impact the working methods. As there is a low availability risk for these somewhat complimentary items, the interviewees suggested that the automation levels of this category should maximized and the information sharing required to lay the foundation to the highly transactional relationship nature could also be left to AI related tools.

> *"I think non-critical items could be taken over (by AI)." (Interviewee 2, buyer)*

> *"AI could help to think about more effective and functional cooperation models, operational models and so on... and automate the manual work to a great extent." (Interviewee 3, buyer)*

> *"You can even put artificial intelligence to negotiate those prices." (Interviewee 10, management)*

In the category of **leverage items** the potential role of AI was also present in the interviews. For the procurement organization this category presents an enjoyable market situation as there are plenty of potential suppliers and the risk of material availability is therefore low, yet the categories business impact is on higher level compared to those non-critical items and thus it helps to ensure that the organizations will allocate sufficient amount of resources to confirm that the category also reclaims the deliverables assigned to it. AI could assist to expand the supplier network scouting even further and innovate new ways to approach negotiation situations as well as procurement processes.

> *"So, of course, this gives us opportunities to search as widely as possible globally, even for those suppliers, operators, and to create better competitiveness for us there." (Interviewee 8, buyer)*

> *"Maybe if we think about AI-supported processes such as negotiations with suppliers, creation of tactics, and implementation of procurement processes like this, then there is clearly value potential there." (Interviewee 14, management)*

As the impact of the purchase increases along with the risk of the supply chain and material availability, also the actions should become more diverse to ensure efficient and

reliable supply chains. The **strategic items** category presents a challenge for organizations and based on the procurement professionals from the group of interviewees this category should be met with an innovative approach. Here especially there was a clear requisition for the ability to collect and analyze large data sets as the decision-making process could be seen as something which needs to fully utilize all of the available information and resources.

> *"What to take into account organizing like big data sets or some market related stuff and providing some kind of like outlook with said that he put the to watch the future." (Interviewee 1, buyer)*

> *"At the beginning, it was talked about that maybe more like this, like how to bring that innovation, and maybe like these in terms of strategic suppliers, so that we can also develop these kinds of digital AI capabilities in a more long-term way, and in that also a little bit like digital business models." (Interviewee 14, management)*

And to conclude the supplier portfolio matrix, there are the **bottleneck items**. In general, AI was seen as a disruptive element to this category as in that it might offer some tools which could assist organizations to move these suppliers either towards the situation where alternative suppliers would become available to selection and thus the supply risk would increase, or alternatively they would be replaced by some alternative products which hopefully would contain a wider network of suppliers.

> *Maybe then in the job of getting those suppliers out of that box and moving towards the upper left corner, that's for sure.... when I have a lot of suppliers there, trying to get them to be more important to the business and constantly trying to minimize that risk, so probably artificial intelligence can then help you move them out of that box." (Interviewee 11, buyer)*

> *When the risk usually increases in situations like that… so in terms of technology, there should be a good opportunity to ensure it, and in a way, when you read and understand the supplier's equipment… when should I start this kind of thing in time and other similar things, I would see, I'm sure it can be found on that side. (Interviewee 8, buyer)*

4.2.2 Artificial intelligence related technologies and capabilities for a procurement organization

Regardless of the tool in use, it is a prerequisite that the individuals using it have the capability to understand what the key features of the tool are as well as how to use the tool in order to benefit from those features in their own operating environment. Generally speaking, this can be seen as the foundation upon which the utilization of artificial intelligence in organizations should be built upon. As the prospect of the artificial intelligence was welcomed in their working roles, interviewees were also willing to further upgrade their knowledge base regarding AI related tools and technologies.

Firstly, the people representing the procurement organizations in the round of interviews highlighted the importance of understanding better the fundamentals of artificial intelligence and what exactly are the concrete benefits from different set of tools that could be applicable.

> *"Yes, to have an overview what's out there already on tools and which of those tools could be done useful in real life." (Interviewee 2, buyer)*

Secondly, the next logical step to real life applications could be done through various sets of use-cases that would implicate in a concrete manner which are results could be expected from various business scenarios and category actions.

> *"Yes, I would probably say that they follow in a way like steps that we increase understanding of just such a use case, we increase understanding of which of these use cases has such a clear added value element and a little bit on which timeline." (Interviewee 14, management)*

And to conclude the preliminary steps towards more AI capitalizing business operations, the members of procurement organizations would welcome a perspective for scalability right from the beginning. This was mentioned not as something which would aim to try to overstep the previous smaller scaler steps mentioned above, merely as state of mind

which could set the tone for the discussions right away as a reminder of AI's potentially significant impact regarding the operating models and processes.

> *"We should study it right away and not just from a very small point of view, but really extensively to see what everything it could do for us, how we have such an opportunity here. A great competitive advantage compared to the competitors, if you were on the move with it now." (Interviewee 11, buyer)*

Approaching the potential for the utilization of artificial intelligence in the procurement process, there was a common understanding that AI holds the potential to support organizations throughout the process. The **supply** side of the process which includes the functionalities between order issuing and operative evaluation was seen as something which could be fully automatized in the future, if not already done so by some organizations. This part of the process is quite strongly related to actions where existing information needs to be transferred towards desired destinations, which arguably necessary does not mean that the information itself requires to be analyzed or refined through AI related tools and techniques.

> *"So when the question is rather that if you think completely about this operational purchasing process to invoicing, then the logic is that it is very largely untouched. AI probably plays a role in that." (Interviewee 4, management)*

The other side of the procurement process, the **sourcing** function, was mainly seen as the part of the process where AI could quite probably become a valuable asset for individuals and organizations. Specification definitions could receive a boost should for example language models work as a sort of an interpreters between organizations which each their own unique coding for similar products. This could be especially helpful when searching for alternative products in the challenging category of bottleneck items. The same category could benefit from AI supported supplier scouting: when scouting for new suppliers AI enhanced tools could be sent to do the prequalification on their own based on the predetermined requirements.

"That if it now refers to the fact that the two-by-four plank has so many names and it already starts to roll in the wrong direction from the beginning." (Interviewee 6, supplier)

"AI can look for similar suppliers there who have the same type of goals." (Interviewee 12, supplier)

Procurement organizations could also streamline their decision-making processes through the rule-based modelling, especially considering the materials and/or services with lesser impact on the profitability levels commonly met in the category of non-critical items. Organizations from both side of the buyer-supplier relationships could benefit from well written and more detailed requests for quotations that could be manufactured while exploiting the potential which lies in large generative language models A high-quality correspondence starting from the beginning could save a lot of resources along the process. This same approach could then quite logically be carried forward into the contractual phase of the process and could support procurement organizations in all four supplier categories alike.

"In the latest stage, it's how you replace human beings by a computer because you need to have some sort of rule-based decision making. If you then want to automate an entire go to market for example." (Interviewee 9, management)

"As I said, I get such bad and poorly written requests for quotations... That is clearly the case when it comes to structuring the text and content." (Interviewee 16, supplier)

"I have made this kind of contract of intent and I want someone to tell me how to turn this into an actual contract." (Interviewee 16, supplier)

There are multiple different technologies that could help to further automate and streamline the procurement process related task in the non-critical items category. As far the internal procurement process goes, through machine learning organizations can build decision models which will then support the decision-making process all the way to awarding the business based on the rules and requirements based on the demand.

Suppliers evaluation can be then revisited through the analysis of the transactions quality and language models accompanied with other techniques providing various communication methods could be harnessed to provide business centric development plans and potential claims if necessary. Stock levels could be surveilled through computer vision and based on that purchase orders will be automatically sent supported once again by communication models which modify the model for the information to follow the pre-determined rules set up by both parties of the transactions.

> *"Orders you want to automate and you only have a written purchase requisition and so on. So very applicable already today." (Interviewee 9, management)*

> *"Actually, when we receive an inquiry, it recognizes that this is the product we have with this title... But the information, such as translating data such as from our title, such as visual learning, that it can read e-mails and attachments in e-mails and recognize what is being talked about now." (Interviewee 7, supplier)*

While a procurement organization holds the potential to automate much of the procurement process in the leverage items category due to the competitive market situation, the implementation landscape also slightly alters in this category. While machine learning could support both of the relationships' parties here as well, majority of the applicable approaches towards AI related technologies support the internal procurement process. Large data sets are used and analyzed to ensure valuable market positioning and efficient collaborative optimization of various algorithms help organizations in their forecasting.

> *"Advanced analytics tool is already used today." (Interviewee 8, buyer)*

> *"We are using it (machine learning) today for forecasting." (Interviewee 5, supplier)*

In the strategic items category the list of AI related applications for AI appear at this point somewhat more limited. As both parties aim for innovative actions that would help jointly grow the market shares, greater emphasis accumulates towards human centric

organizations to further sophisticate the gathered information, both internal and external. Language models would continue to support the more strategic work orientation through effortless high-quality documentation. For the bottleneck items the AI offers potentially new horizons especially considering supplier markets and available solutions for the items holding a high supply risk. This could significantly improve the innovative approach to novel supply chains and possibly even alternative products which could substitute certain critical products especially when the markets continue their current volatile nature.

> *"And then this I would do a search based on like the Internet data to get all the suppliers, list of suppliers and everything and then it would also search where these like supply locations would be and then it would plan kind of a like supply chain already with this information based on certain data and then it would also probably could bring up some risks that might be that I want for this specific supply chain it just created." (Interviewee 1, buyer)*

4.3   Summary of the findings and revised theoretical framework

Communication and openness hold a great value within the buyer-supplier relationships. In general, artificial intelligence operates based on the increased data analyzing capabilities presuming the high-quality data and therefore AI holds the potential to becoming a supportive actor within these relationships. Interviews indicated that there still is potential for further development in buyer-supplier relationship on a general level. This also could be enhanced through AI related tools and technologies. In general, AI holds the potential to increase the levels of proactivity throughout the value chain. At this point, concrete use-cases seem to be scarce, which would indicate that a somewhat experimental approach could be required from organizations as well as individuals when aiming to capitalize the current supportive climate regarding this issue.

It would be hard to suggest a certain way to approach AI implementation for a procurement organization. Experimental attitude towards taming this frontier should be advisable, as the ability to utilize the potential it offers most likely differs based on the industry within one operates. One perspective to approach this issue is through supplier categorization. Krajlic's supplier portfolio matrix helps to understand how business requirements differ with various suppliers, and therefore it could be used as a foundation when searching for appropriate use-cases in one's own procurement related role. Regardless of the role within the procurement organization, the ability to foster and utilize increasing amounts of data lies in the core of AI related competencies.

The following Figure 13 presents a revised theoretical framework for the study. The framework is a combination of the study's theoretical framework presented as the Figure 10 and the key observations from the study findings. The framework approaches the potential introduction of different AI related technologies through the supplier portfolio matrix and introduces a two-folded approach for a procurement organization regarding the utilization of AI. The representation includes a shared view for each of the four quadrants of the matrix: depending on the placement of the gray boxes, the represented AI related technologies can be utilized solely on the internal processes or both, the internal processes as well as the in co-operation with the suppliers in buyer-supplier relationships.
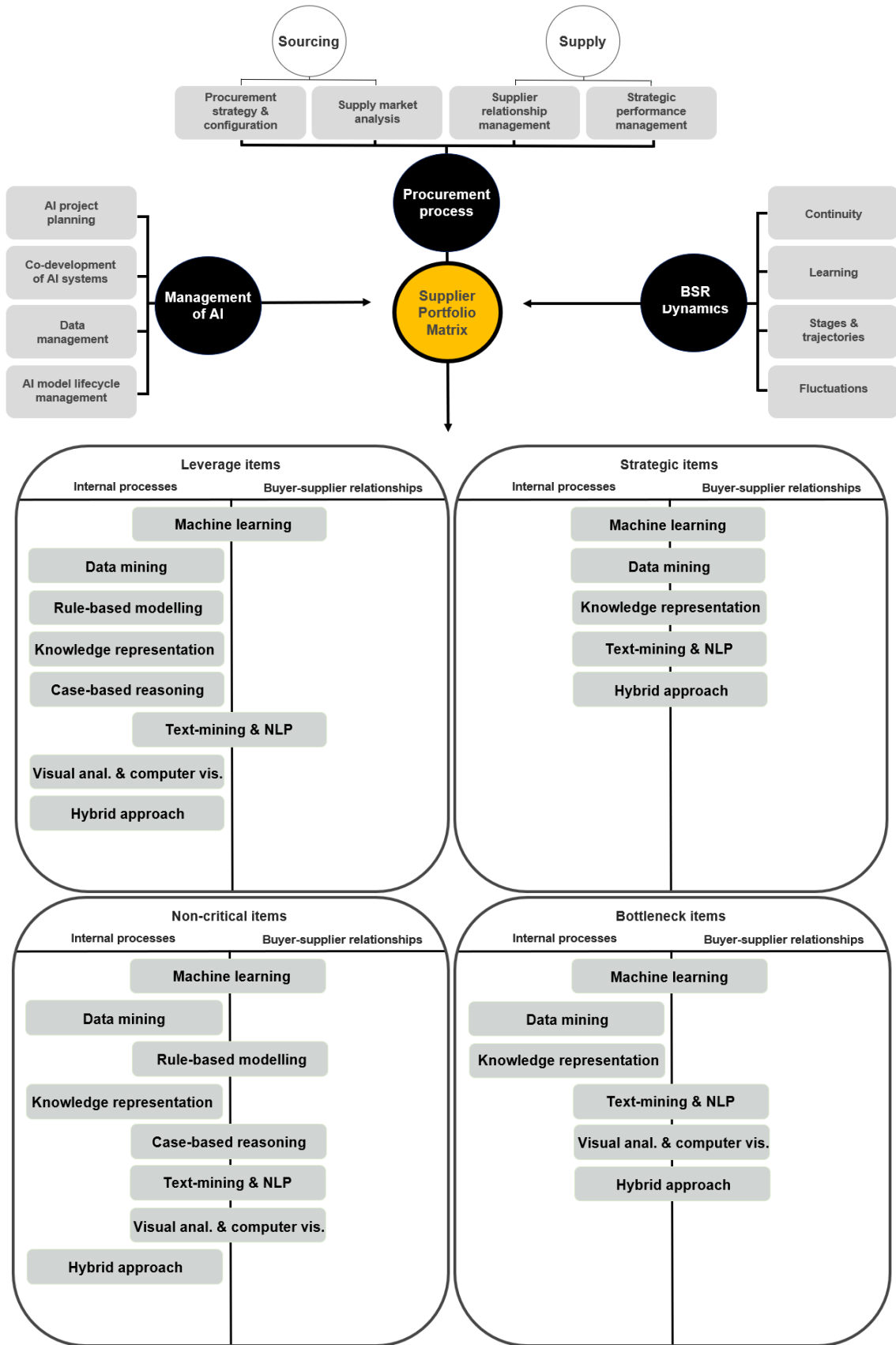
Figure 13. The synthesis of theory and empirical findings.

5 Discussion

The study will be concluded by this chapter consisting of the discussion related to the study. In the first part of this chapter the theoretical contribution of the study will be presented focusing on the key themes of the study: buyer-supplier relationships, procurement and artificial intelligence. This will be followed by a review of managerial implications which aims to serve as an input for organizations contemplating with the subject which has been in the core of this study: the realization of AI in buyer-supplier relationships especially through a procurement organization. Limitations of the study will also be covered in this chapter before closing of the research paper through suggestions for future research.

5.1 Theoretical contribution

Gioia (Gehman et al., 2018, p. 290) suggests that "theoretical contributions arise from the generation of new concepts and/or the relationships among the concepts that help us understand phenomena". This study adds to prior research regarding buyer-supplier relationships and procurement on multiple levels. Concerning the buyer-supplier relationships, the findings support Flint et al.'s (2002) view on how the buyer-supplier relationships are continuously developing. Regarding the implementation of AI, the study shows that people approach this somewhat novel technology from a variety of starting points, which embodies with Weber et al.'s (2023) argument that all newcoming tools require their own unique implementation processes. Additionally, the study extends to prior research by presenting various aspects on how procurement organizations can benefit from the somewhat inevitable implementation of AI and utilize it to succeed in their role (Christopher and Holweg (2014, p.64). To conclude, the study's theoretical implications offer novel perspective's when it comes to the potential benefits when it comes to utilizing AI in buyer-supplier relationships through procurement.

First, the study offers various theoretical contributions regarding the buyer-supplier relationships. It fills the research gap presented by Veile et al. (2020, p. 1258) by combining the suppliers with buyers as a unified subject of research. The study also supports the current trend of digitalization (Veile et al., 2020, p. 1254; Patrucco et al., 2022, p. 54) impacting buyer-supplier relationships, as the findings suggest that there still is room for increased level of automation for both parties involved in the buyer-supplier relationships. When it comes to the key elements of buyer-supplier relationships (Gullet et al., 2009, p. 331), this study amplifies the need to resolve how these relationships can benefit from AI without jeopardizing the trust factor within these interorganizational relationships. Additionally related to these key elements presented by Gullet et al., this study further confirms that both jointly defined goals and information sharing can benefit from the implementation of AI to these relationships as AI's potential lies in the increasing ability for information sharing and data analyzing as the result of the advancements made in the field of computing power but it also leaves room for problem-solving methods and innovation models unimaginative in relation to average human individuals. When it comes to the dynamics of buyer-supplier relationships (Shamsollahi et al., 201), the findings reveal that AI will not impact on equal force regarding the four core elements. The study shows that the learning element is most likely to be empowered in buyer-supplier relationships as AI first and foremost is seen as something which will further increase the levels of information sharing therefore supporting the organizational ability to find suitable affiliates.

Second, the study brings forward novel approaches on how procurement organizations can benefit from artificial intelligence. In general, this study extends the suggestion made by Sjödin et al. (2021) that procurement organizations can benefit from artificial intelligence. As stated, companies' expenditure is largely overseen by its procurement organization (Kaufmann & Carter, 2006, p. 653; Hallikas et al., 2011, p. 9; Guida et al., 2022, p. 1) and therefore AI's potential ability to further improve procurement operations should not be overlooked. For procurement organizations to generally succeed in their role, Christopher and Holweg (2014, p.64) argue that organizations need to ensure

their supply chains are developing along the way whichever the organization is pursuing in its own markets. To succeed in this role, this study shows that organizations will benefit from highly functioning supply chains provided by their network of suppliers, something in which AI holds a clear potential to assist procurement organizations. As AI can be seen as a relentless in its power and has an increasing capability to analyze large data sets, the theory of supplier management will most likely be heavily impacted once procurement professionals and organizations become experienced on the matter. The findings also suggest that procurement professionals see AI as something which can further assist to allocate their time towards more productive and valuable procurement related activities, such as supplier relationship development and innovations, which support Bals et al.'s (2019) argument that competencies related to innovation are becoming a requirement for procurement professionals. Regarding the actual procurement process, there are multiple ways in which the procurement organization can further improve their internal processes. The study suggests that in general the supply side of the procurement process (Guida et al., 2023) can become fully automatized and AI presents a variety of useful tools to compliment the human capacity when it comes to multiple functions of the sourcing element in the procurement process (Guida et al., 2023), for example in issues related to the contract management as well as the previously mentioned supplier scouting.

Third, this study further elaborates the framework provided by Krajlic's (Montgomery et al., 2018, p. 192) supplier portfolio matrix as it utilizes its application to explore different avenues with which procurement organizations can implement the usage of artificial intelligence. In addition to exploring how different AI related technologies can be utilized in procurement organization's internal processes, the study also presents various perspectives how these technologies can be utilized in buyer-supplier relationships in the four different supplier categories presented in the supplier portfolio matrix, therefore additionally strengthening the argument made by Patrucco et al. (2019, p. 360) that proactive approach to fostering these relationships can bring value to procurement organizations and therefore their parent companies. This combining of internal processes and

buyer-supplier relationships presented in the revised theoretical framework of the study can be seen as an entry point for ambidextrous approach when it comes to AI implementation. Ambidexterity can be seen as the approach model where companies execute their current strategy in their daily operations while at the same time proactively examining how they approach their strategic decisions towards the future (Birkinshaw & Gibson, 2004, p. 47). Accompanied with the requirements offered by the supplier network, the challenges to the adoption of AI in the procurement process presented by Guida et al. (2023) are largely verified by this study as the quality of data and the ability to find suitable use cases are highlighted as equations in search for concrete solutions by the procurement professionals. Finally, the study suggests that implementing artificial intelligence through the procurement organization can have multiple positive impacts on the company's value chain. As the frontier that is AI offers valuable tools for increased data handling and refining, the potentially following increasingly transparent value chains ensure future advancements when it comes to more sustainable operating models (Mol, 2015) and more innovative supplier practices and even potential new market entries (Kraft & Zheng, 2021). This also challenges Jahani et al.'s (2021, p. 10) argument that AI utilized through procurement would not be add value when it comes to sustainability development.

5.2   Managerial contribution

Based on the findings, the framework of managerial discussions should be addressed to how instead of if the AI will have an impact on buyer-supplier relationships. Companies' ability to operate their businesses in a profitable manner is ultimately very heavily determined by their decision-making abilities. As organizations start their journey towards more AI-empowered operating models, managers alike could benefit from addressing communication as the central theme of their journeys. While AI arguably holds a significant potential to alter our ways to share and refine information based on increasingly growing data sets that can be analyzed in a decreasing amount of time, it is worthwhile to remember that all this information has always been there to be capitalized. While our

computing powers may support the transition to data efficiency, the equation still at least on some level holds the element of human capacity within it. After all, it is those individuals who will start the process of data handling and give the fundamental instructions to the systems on how to operate. Large data sets do not automatically equal better decision-making capabilities nor better communication habits and it is the organizations which emphasize the ability to being curious towards new ways to gather and refine information that will benefit from artificial intelligence the most. From this perspective, human individuals and artificial intelligence are much alike.

Artificial intelligence will not in itself guarantee success for organizations, but it offers them a way to become more efficient in their operations. Ways to refine information will become even more relevant in the buyer-supplier relationships of the future. This ultimately could lead towards improved product and material offerings. Nevertheless, it will also put even more highlight on trust within the parties of buyer-supplier relationships as they contemplate entering the territory of increased data exchange. General governing models need to be agreed upon, most likely heavily supported by institutions such as the European Union. While the implementation of AI requires a certain level of adventurous mind, organizations and managers should promote the rules and regulations aspect from the very beginning to avoid potentially damaging misuse of data. Intentional or not. Therefore, in modern workplaces the handling of data and any kind of information should be presented as one key element of work safety. This work safety approach would also provide a seamless transition for the issue to be discussed among new employees as a part of their orientation plan.

For the actual operating field of buyer-supplier relationships, AI has arguably plenty to offer. Efficiency of information sharing and more innovative productions methods enable more efficient usage of raw materials which ultimately leads towards more sustainable product and service offerings, which will in the help companies in their sustainability aspirations. It also provides valuable assets for companies scenario work, as the holistic view of supply chains will become more transparent and therefore the organizations will

have better possibilities to equip themselves against potential disruptions. Still, it is crucial to remember that artificial intelligence will not remove the uncertainty element of supply chains, it merely holds the potential to smoothen them.

The role of procurement and sales professionals will continue to develop as more efficient decision-making supportive tools become accustomed to their operating environments. Technologically savvy working environments will also see a shift in the challenges which they face, especially in international organizations. Language models that are part of the AI related technologies will reduce the language barriers between organizations and their members to bare minimum. On the other hand, the inequality between individuals' technological capabilities amongst different generations operating in the work life can raise its head when aiming to implement modern tools into surroundings which might still heavily rely on people-oriented business relations. When addressed as something which can unity various strengths in the procurement organization, artificial intelligence can deepen the organization's supplier relationships, automate the organizations processes and release time for more future oriented procurement culture.

5.3 Limitations

While aiming to understand the impact which the modern technology frontier of AI might offer to buyer-supplier relationships, the study also has some limitations. Firstly, the study is conducted by an individual who has gained some work experience from working in various procurement organizations which therefore can be seen as a challenge of unbiased research approach, even as it might be unintentional. The study is nevertheless approached from the perspective where ultimately everything is possible yet nothing is certain.

Secondly, the interviewees represent a somewhat limited cohort. While there is representation from multiple companies and cultures, the limiting factor for the interviewees is that they present a rather limited perspective in different industries. The case company

itself operates in the material and process industry and all the interviewees were either internal or external stakeholders of this company. Therefore, the buyer-supplier relationships were discussed solely from the business-to-business point of view discarding the business-to-consumer perspective entirely. The case company can also be considered to be a large company based on its number of personnel. Therefore it has a certain level of capacity to allocate various resources for AI implementation, something which is not self-evident when it comes to smaller companies.

While artificial intelligence and its potential impact is in the core of this study, the subject is only covered in general terms. What is considered as artificial intelligence in the study, includes a spectrum of different technologies, some of which are overlapping and some of which are very much different from each other. The study also covers a singular organizational function, the procurement, and therefore does not represent a holistic view on how AI might impact business operations on a general level. However, the limitation to a single business function presented the possibility study the subject from multiple perspectives and on a concrete level within that function, something that might have proven out to be a challenge if the study would addressed the issue from holistic organizational view. The decision to discuss artificial intelligence on a general level was driven by the novelty of the subject and its limited implementation levels to operations at the time of the study.

5.4 Suggestions for future research

As the limitations section suggests, there are multiple venues for future researcher to venture. The first somewhat logical alternative route would be to focus more on how artificial intelligence could impact other corporate functions such as the marketing or human resources department. Likewise, due to the diverse set of technologies that can currently be placed under the umbrella that is AI, a more focused approach on machine learning or natural language models could become a useful approach especially should

we witness an increase in the adaptation of AI related practices in our workplaces in the near future.

Researchers could also concentrate their studies to examining the concrete use-cases from different industries related to AI and search for different ways to verify the actual impacts on companies profitability levels. As a subsection for this approach could be the examination of the return on investment which would highlight the organizations' ability to turn investments allocated to artificial intelligence into increased profitability levels. Should the buyer-supplier relationships become increasingly digitalized, one future research avenue could be to study how the socio-technical environment of buyer-supplier relationships has been altered through the implementation of AI.

Another diverging research path would be to concentrate to the procurement organizations and cultures that operate within the public sector. The case company in this study is a stock listed company operating within the forest industry with a diversified product portfolio, which presents at least in some parts a contradicting decision-making platform compared to public funded purchasing. The realities of AI implementation for smaller companies could also serve as a venue for future research. As we are advancing on the ladder of digitalization, it would be intriguing to understand are we on the verge of the reformation where smaller companies are tempted to outsource their procurement activities as a whole much like has been done when organizing one's accounting and finance administrative functions.

Lastly, while technological advancements are made around the world, it is not self-evident that there is a common global narrative around the issue. Therefore, there is a clear gap to be fulfilled on how the approach, investment, attitudes among others are being viewed in different parts of the world. One could imagine that the attitudes towards AI and the potential it holds might quite easily differ whether the discussions are taking place in Zimbabwe, the United States or in China. Starting from economic discussions, let alone other assumably even more important fields of life.

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Appendices

Appendix 1. Introduction letter

Matti Mehtälä
Master of Science (Econ.) Student
University of Vaasa
School of Management

Introduction Letter   1 (1)

October 3rd, 2023

Dear Recipient

I am currently working on my master's thesis in the University of Vaasa's Strategic Business Development -programme. My thesis studies the impact artificial intelligence (AI) brings to the dynamics of the buyer-supplier relationships and it aims to gather information how procurement organizations could on their part assist in utilizing AI in these relationships.

I am looking for interviewees to gather information for the study regarding AI related competencies. To take part as an interviewee one does not have to be able to cover every corner about AI. Desired features for the interviewee are a general understanding of buyer-supplier relationships and a level of interest and understanding regarding the ways AI could impact our work life in the future.

The interviews will preferably be conducted during October 2023. Naturally there is always room for discussions regarding this timeframe. Approximate length of the interview is 1,5 hours, the identity of the interviewee will not be revealed in the thesis.

Kindly send your questions and concerns to the following e-mail address:
matti.mehtala@upm.com

With Best Regards,

Matti Mehtälä

Appendix 2. List of interviewees

Interviewee	Role	Experience from buyer-supplier relationships in years	Interview length
1	Sourcing manager	9	1 h 44 min 6 s
2	Senior specialist[1]	2	1 h 44 min 6 s
3	Director	25 +	1 h 21 min 55 s
4	Senior vice president	30	1 h 25 min 1 s
5	Sales manager	6	1 h 19 min 50 s
6	Vice president	28	1 h 54 min 21 s
7	Development manager[2]	10	1 h 54 min 21 s
8	Category director	30	58 min 41 s
9	Partner and associate director	15	57 min 20 s
10	University lecturer	22	1 h 28 min 49 s
11	Category manager	11	1 h 32 min 46 s
12	Head of service business line	20	1 h 25 min 47 s
13	Vice president	10 +	1 h 20 min 6 s
14	Vice president	20	59 min 14 s
15	Head of strategy & business operations	20 +	1 h 8 min 7 s
16	Director	17	47 min 31 s

[1] Joint interview with interviewee 1
[2] Joint interview with interviewee 6

Appendix 3. Semi-structured interview guide

Background information:

1. What is your role in your company and how long have you worked in this role?
2. How long has your work involved issues related to buyer-supplier relationships?
3. How do you personally see AI?
4. Do you think it will have an impact in your own professional role?
5. Has AI been made visible in your company? If yes, how?

Buyer-supplier relationships:

1. Based on your experience, what are the key elements of a successful buyer-supplier relationship?
2. As a buyer / supplier, what do you most value in buyer-supplier relationships?
3. As a buyer / supplier, how do you categorize your suppliers / customers?
4. As a buyer / supplier, how do you see the buyer-supplier relationships evolving in the near future?
5. As a buyer / supplier, is there currently something clearly missing from your buyer-supplier relationships?

Artificial intelligence:

1. Is AI currently present in your role? If yes, are you using internal or external stakeholders to assist you?
2. How do you see AI impacting the four core elements of buyer-supplier relationship dynamics (Figure 1)?
3. Where do you see AI bringing most value in buyer-supplier relationships?
4. How do you see AI assisting in customer / supplier relationship management specifically in your business are?
5. How do you see AI impacting the four supplier categories (Figure 5)?

AI related technologies & capabilities:

1. As a buyer / supplier, do you feel that in your role you will need to update your know-how regarding AI? If yes, how?

2. How can your own organization assist you utilizing AI in your role?

3. As a buyer / supplier, how could the four elements of organizational capabilities for AI implementation (Figure 9) assist you in utilizing AI in buyer-supplier relationships?

4. What AI techniques (Table 4) can be utilized in AI to enhance buyer-supplier relationships?

5. Are there AI related technologies (Table 4) that excite you and could help you in your role?

6. What AI related competencies are required to enhance buyer-supplier relationships considered from the following perspectives:

    a. Specifications definition?

    b. Supplier scouting?

    c. Request for quotation?

    d. Negotiation and selection?

    e. Contract?

    f. Order issuing?

    g. Expediting?

    h. Receipt and control?

    i. Payment?

    j. Operative evaluation?