Artificial Intelligence (AI) for supply chain collaboration: Implications on information sharing and trust

Abstract

Purpose: Managers and scholars alike claim that artificial intelligence (AI) represents a tool to enhance supply chain collaborations, however, existing research is limited in providing frameworks that categorise to what extent companies can apply AI capabilities and support existing collaborations. In response, this paper clarifies the various implications of AI applications on supply chain collaborations, focusing on the core elements of information sharing and trust. A five stages AI collaboration framework for supply chains is presented, supporting managers to classify the supply chain collaboration stages in a company's AI journey.

Design/methodology/approach: Using existing literature on AI technology and collaboration and its effects of information sharing and trust, we present two frameworks to clarify a) the interrelationships between information sharing, trust and AI capabilities and b) develop a model illustrating five AI application stages how AI can be used for supply chain collaborations.

Findings: We identify various levels of interdependency between trust and AI capabilities and subsequently divide AI collaboration into five stages, namely *complementary AI applications, augmentative AI applications, collaborative AI applications, autonomous AI applications* and *AI applications replacing existing systems.*

Originality/value: Similar to the five stages of autonomous driving, the categorisation of AI collaboration along the supply chain into five consecutive stages provides insight into collaborations practices and represents a practical management tool to better understand the utilisation of AI capabilities in a supply chain environment.

1. Introduction

In recent years, the topic of supply chain collaborations has become an emerging area of importance for both supply chain academics and managers (Geske *et al.*, 2024b; Rejeb *et al.*, 2021; Soosay and Hyland, 2015; Um and Kim, 2019). Supply chain collaboration is a crucial component in supply chain management where supply chain members work together to reach mutually agreed, aligned and even synchronised goals to create a competitive advantage (Badraoui *et al.*, 2020; Herold and Marzantowicz, 2023; Lankford, 2004; Magliocca *et al.*, 2023; Paula *et al.*, 2020). Scholars found, however, that the collaboration along the supply chain are characterised by the extent of information sharing and trust among supply chain partners (Kwon and Suh, 2005; Piderit *et al.*, 2011; Raweewan and Ferrell Jr, 2018).

A documented striking example of the benefits of information sharing and trust was the supply chain collaboration between Walmart and Procter & Gamble (Attaran and Attaran, 2007; Grean and Shaw, 2002). In 1989, which can be considered as a revolutionary step at that time, Walmart agreed to place Procter & Gamble employees in their customer headquarters and shared information with each other, allowing them to use the consumer information at point of sale in order to reduce demand variability (Dobre-Baron and Niţescu, 2019; Mason-Jones and Towill, 1997). This resulted in a win-win situation, as Walmart could reduce inventory levels and

improve the service levels with their supplier, while Procter & Gamble had more control over factory output and is able to analyse the marketplace (Albers *et al.*, 2016; Chen *et al.*, 2021; Kumar, 1996).

Complementary to information sharing, both companies were also able to build up and establish trust between key members in their respective organisation (Daugherty *et al.*, 2006; Fawcett *et al.*, 2012). For example, through the data insights, Procter & Gamble advised Walmart also how to manage other suppliers, which was sometimes not beneficial to them, but "created a massive basis of trust" (Valuecreator, 2022, p. 1). In return, Walmart advised Procter & Gamble on package design, as they found that the product packaging made them prime targets for theft in their stores (Huang and Wang, 2020). These actions increased trust levels, information sharing and collaboration between the firms and be regarded as key factors leading to a revenue uptick from US$350 million in 1989 to US$13 billion in 2013 (Nash, 2022).

Today, however, this formerly strong collaboration does not exist to that extent anymore, as each company focused more on independent decisions than joint ones, leading to a decrease in revenues (Valuecreator, 2022). In other words, the case of Walmart and Procter & Gamble sows that beside the right intentions, the complexities of changing business environments and the impact of the associated decision-making of individuals show collaborations are often characterised by a lack of trust and little information sharing (Collier and Sarkis, 2021; Fawcett *et al.*, 2012; Herold *et al.*, 2024b; Hoyt and Huq, 2000; Skjoett-Larsen *et al.*, 2003).

To address the lack of information sharing and trust, academics and managers claim that the emergence of artificial intelligence (AI) can be used to transform the traditional forms of information exchange and trust-building between partners along the supply chain (Belhadi *et al.*, 2021; Geske *et al.*, 2024a; Rodríguez-Espíndola *et al.*, 2020; Weisz *et al.*, 2023). For the purpose of this study, we adopt the widely accepted definition provided by Marvin Minsky, the founder of MIT Artificial Intelligence Lab (Minsky, 1968), which defines AI as "the science of making machines do things that would require intelligence if done by men". In fact, numerous studies have found that AI has the potential to transform supply chain collaborations and the associated relationships to information sharing and trust (Mithas *et al.*, 2022; Riahi *et al.*, 2021). With applications ranging from real-time data transfers, automated decision-making, synchronised information exchange and predictive analytics, scholars claim that the use of AI plays is increasingly important role and represents an indispensable tool for designing and managing supply chain collaborations (Min, 2010; Pournader *et al.*, 2021).

Despite the claim that AI capabilities can support supply collaborations (Baryannis *et al.*, 2019; Mikl *et al.*, 2021; Pournader *et al.*, 2021), most firms so far do not engage in AI applications in and for their supply chains, indicating a lack of trust in AI technology (Ashraf *et al.*, 2020; Glikson and Woolley, 2020; Pan *et al.*, 2020). A recent study from McKinsey found that the majority of supply chain firms still use manual or outdated methods, with almost 75 per cent of firms using mainly spreadsheets for supply chain planning and optimisation. In contrast, only 20 per cent of firms use AI capabilities in some form in sales & operations planning (Destino *et al.*, 2021).

So far, there seems to be little understanding of how AI capabilities can impact information sharing and trust in supply chain collaborations. In particular, there seems to neither be a framework illustrating how AI capabilities can be used for supply chain collaboration, nor how the interdependence between information sharing, trust and AI capabilities impact supply chain

collaborations. In response, this paper aims to fill that gap by asking the following research questions:

RQ1. How can AI support collaboration along the supply chain?

RQ1a. How can AI enhance information sharing and trust along the supply chain?

RQ1b. To what extent can firms apply AI capabilities for supply chain collaboration?

To answer these research questions, we will first examine the roles of information sharing and trust in supply chain collaborations, thereby providing a theoretical foundation to further integrate the role of AI capabilities support. In particular, we will present our first framework outlining the interrelationships between AI capabilities, information sharing and trust as well as their implications for AI-driven collaborations. Finally, based on the various degrees of AI capabilities, information sharing and trust, we will provide an AI-driven collaboration model illustrating five AI stages of how supply chain partners can use AI for supply chain collaborations.

The contribution of this paper is threefold: First, we contribute to the supply chain and AI literature by expanding the role of AI for supply chain collaborations, thereby clarifying the interrelationships of the underlying concepts between information sharing, trust and AI capabilities. Second, by integrating AI in supply chain collaboration, this research also elevates the role of trust, as trust is now not only restricted to interpersonal and interorganisational relationships, but it adds another dimension of trust in AI technology. Third, we develop a five stages AI collaboration model for practice based on the interrelationships between AI capabilities, information sharing and trust.

2. Theoretical Background

2.1 Information sharing and trust for and in supply chain collaboration

The concept of collaboration in the supply chain is based on the principle that working together leads to more benefits and exceeds the associated risks by far (Raweewan and Ferrell Jr, 2018). In academic literature, the topic of supply chain collaboration has received significant attention and as collaborations are seen as a technique to further strengthen a firm's competitive advantage. From a supply chain perspective, both academia and industry found various benefits from collaborations including better coordination, quicker response time, better flexibility and agility leading to a reduced bullwhip effect and lower warehouse, transportation and manufacturing costs (Alzoubi and Yanamandra, 2020; Herold *et al.*, 2024a; Jeong and Hong, 2019).

While several factors influence the supply chain collaboration, Prajogo and Olhager (2012) suggested that information sharing and trust are two crucial aspects of supply chain collaboration. In fact, scholars agree that information sharing can be seen a prerequisite for effective collaboration (Baah *et al.*, 2022; Mohammad Arif and Du, 2019; Zhou and Benton Jr, 2007), with some calling it even a "competitive weapon" (Olorunniwo and Li, 2010, p. 456) to improve a company's performance. Along the supply chain, information sharing is mainly used to increase visibility in order to improve operational efficiency, in particular by providing information about inventory levels, promotion performance, pricing, sales data, production planning or delivery updates (Kaipia *et al.*, 2017; Srinivasan and Swink, 2018). As such,

information sharing can be regarded as strategic response to supply chain related activities (Altay and Ramirez, 2010; Duong and Chong, 2020).

Quality information sharing, however, is often subject to internal and external challenges which can be attributed to the inherent complex nature of collaboration schemes (Marty and Ruel, 2024). Panahifar *et al.* (2018) found that successful information sharing is based around the four enablers a) secure sharing of information, b) information accuracy, c) information readiness, and d) the level of trust. Trust in the context of supply chain collaborations, which can be defined as the "willingness to rely on an exchange partner in whom has confidence" (Moorman *et al.*, 1993, p. 82), is thus considered a crucial element in information (Ghosh and Fedorowicz, 2008; Kwon and Suh, 2004). From a collaboration viewpoint, some scholars argue that information sharing and trust can be considered interdependent, thus trust can not only be seen as a necessary component for information sharing, while others claim that information sharing also increases the level of trust, leading to cyclical relationship (Kwon and Suh, 2005; Piderit *et al.*, 2011; Raweewan and Ferrell Jr, 2018).

Interestingly, although information sharing among supply chain partners has evolved and has been optimised with new technologies, "true collaboration problems still persist" (Panahifar *et al.*, 2018, p. 360). For example, in supply chain practice, it can be observed that the majority of firms keep avoiding strategic collaborations with other supply chain members and that the information exchange is often purely kept on an operational or transactional level (Lohmer *et al.*, 2020; Olorunniwo and Li, 2010; Ramjaun *et al.*, 2022; Sandberg, 2007; Zheng *et al.*, 2022). One significant factor contributing to lack of information sharing is that trust and trust-building in and for supply chain collaborations consist of a – often long-term - process. Studies show that building up trust relationships between supply chain partners gradually increase the willingness between firms to exchange more crucial information in order to further enhance collaborative strategies along the supply chain (Herold and Marzantowicz, 2024; McFadzean *et al.*, 2007; Olorunniwo and Li, 2010; Salo and Karjaluoto, 2007; Sandberg, 2007; Sebastianelli and Tamimi, 2018).

A main link between information sharing and trust can be attributed to the role of stakeholders in the supply chain ecosystem and their intricate interplay among them (Herold *et al.*, 2023; Mikl *et al.*, 2020; Riquelme-Medina *et al.*, 2023). Boddy *et al.* (2000) used the term 'supply chain partnering' to illustrate that collaboration is dependent on the interaction of people. Examining the role of stakeholders in the supply chain, some authors emphasise the role of individual change agents, while others highlight institutional influences that can enhance collaboration (Ghazal *et al.*, 2020; Soosay and Hyland, 2015). As such, the relationship between information sharing and trust is characterised by a mix of formal, role interactions and informal, personal interactions that "emerge, evolve, grow, and dissolve […] as a consequence of individual activities' and that 'individual views (on the issues to be resolved) will be a function of their organisational roles" (Ring and Van de Ven, 1994, p. 95).

As such, supply chain partnering is dependent on the level of trust between stakeholders and members. Sako (1992) categorised the different levels of trust relationships and identified three forms of trust between partners: contractual, competence and goodwill. Contractual trust happens on the transactional or operational level and refers to whether that the partner is able to perform its contractual agreements. Competence trust refers to the capabilities of the partner, that is, whether the partner is capable of doing the job the company itself is not able to do. Goodwill trust refers to an commitment beyond the contractual obligations for a mutual benefit

(Davenport *et al.*, 1998; Lui and Ngo, 2004). Developing goodwill trust, which represents the ultimate form of trust in a study of Sako (1992), is generally an outcome of long relationship, indicating that supply collaboration need to evolve of a longer period of time. The main argument in supply chain literature is that information sharing and trust(-building) evolve and occur in multiple stages, thereby gradually developing into stronger relationship between supply chain partners for enhanced collaboration (Colicchia *et al.*, 2019; Hoyt and Huq, 2000; Olorunniwo and Li, 2010; Pomponi *et al.*, 2015).

Currently, however, collaborations to optimise supply chains are increasingly characterised by new technologies, in particular, the use of AI (Gartner, 2022). Surprisingly, with AI becoming an integral part in the information exchange between supply chain partners, not only little attention has been paid to AI and its implications on information sharing and trust, but existing literature is also limited to provide frameworks to classify the role of AI in and for supply chain collaboration. In the following section, we will examine the role of AI and its capabilities on information and trust with the goal to present a framework clarifying the interrelationships between AI, information sharing and trust for a better supply chain collaboration.

2.2 AI capabilities for information sharing and trust

While scholars claim that AI capabilities have the potential to drastically improve supply chain collaboration, firms cannot simply change their practices, behaviour and structures to integrate AI in all organisational levels. The implementation of AI in and for supply chain collaboration requires not only a build-up of AI capabilities, but it also involves the trust and the willingness of supply chain members to share data. In other words, firms generally adopt a gradual step-by-step approach when implementing AI into their supply chains (Yang *et al.*, 2021), depending on the firm's AI capabilities and the extent of information sharing and trust with supply chain partners.

The literature distinguishes different levels of AI capabilities for firms, ranging from AI applications "complementing" existing information sharing systems to AI applications "replacing" existing information sharing systems (Belhadi *et al.*, 2021; Dubey *et al.*, 2021; Haefner *et al.*, 2021; Herold *et al.*, 2021c). AI applications that can complement existing systems information sharing systems comprise of e.g. chatbots, but may also be used to collect and interpret data from RFID tags or sensors (Herold *et al.*, 2021a; Herold *et al.*, 2024b; Zdravković *et al.*, 2022), i.e. there is a limited information exchange involved. In contrast, when AI technology has the capability to replace existing systems, extensive datasets are usually automatically exchanged to not only provide real-time information to other supply chain partners, but also to run predictive analytics for a range of supply chain activities (Akter *et al.*, 2022; Dobrovnik *et al.*, 2018; Herold *et al.*, 2021b).

AI technology has also an impact on the trust relationship in supply chain collaborations. Traditionally, the literature distinguishes trust activities in and for supply chain collaboration into interpersonal and interorganisational trust (Qian *et al.*, 2021; Zaheer *et al.*, 1998). While interpersonal trust refers to the dependencies with and the behaviour of individuals, interorganisational trust refers to the expectations beyond the business agreements and commitments (Ekanayake *et al.*, 2017; Manfredi and Capik, 2022; Zheng *et al.*, 2016). Both interpersonal and interorganisational trust are found to be key factors to a stronger relationship between supply chain partners and a stronger commitment to information sharing. By using AI technology into the collaboration discourse, however, the two dimensions of interpersonal and

interorganisational trust will need to be extended to include another trust dimension: the trust in AI technology. Specifically, whereas in a traditional collaboration supply chain members build up trust to each other to provide the right information, the inclusion of AI results in shift to more extended trust approach, that is, trust does not only involve interpersonal and interorganisational information partners, but it also required trust in the (AI) technology to provide the right data and interpret the data in a meaningful way (Chen *et al.*, 2023; Shin, 2021).

From a trust viewpoint, we argue that an increase of AI capabilities leads to a gradual reduction of interpersonal trust, i.e. trust in AI gradually replaces the trust in interpersonal relationships (Hengstler *et al.*, 2016). In this context, the interorganisational trust factor plays a more significant role, as trust in the AI technology itself depends on the transparency and explainability of AI systems on a firm level (Makarius *et al.*, 2020). Transparency refers to the extent to which the operations and processes of AI technology are open and accessible to users, while explainability refers to the ability of AI technology to provide clear and concise explanations for their predictions and recommendations. The main argument is that AI-driven supply chain collaborations in the complementary stages are characterised by low trust in AI technology due to low AI transparency and AI explainability, while AI-driven supply chain collaborations in a replacement stage are characterised by high trust in AI technology due to high AI transparency and AI explainability. As such, if AI technology and it associated processes on a firm level is both transparent and explainable, the need for interpersonal trust declines.

Fig. 1 shows the interrelationship between AI support, information sharing, trust and its implications on how to use AI capabilities in different stages.

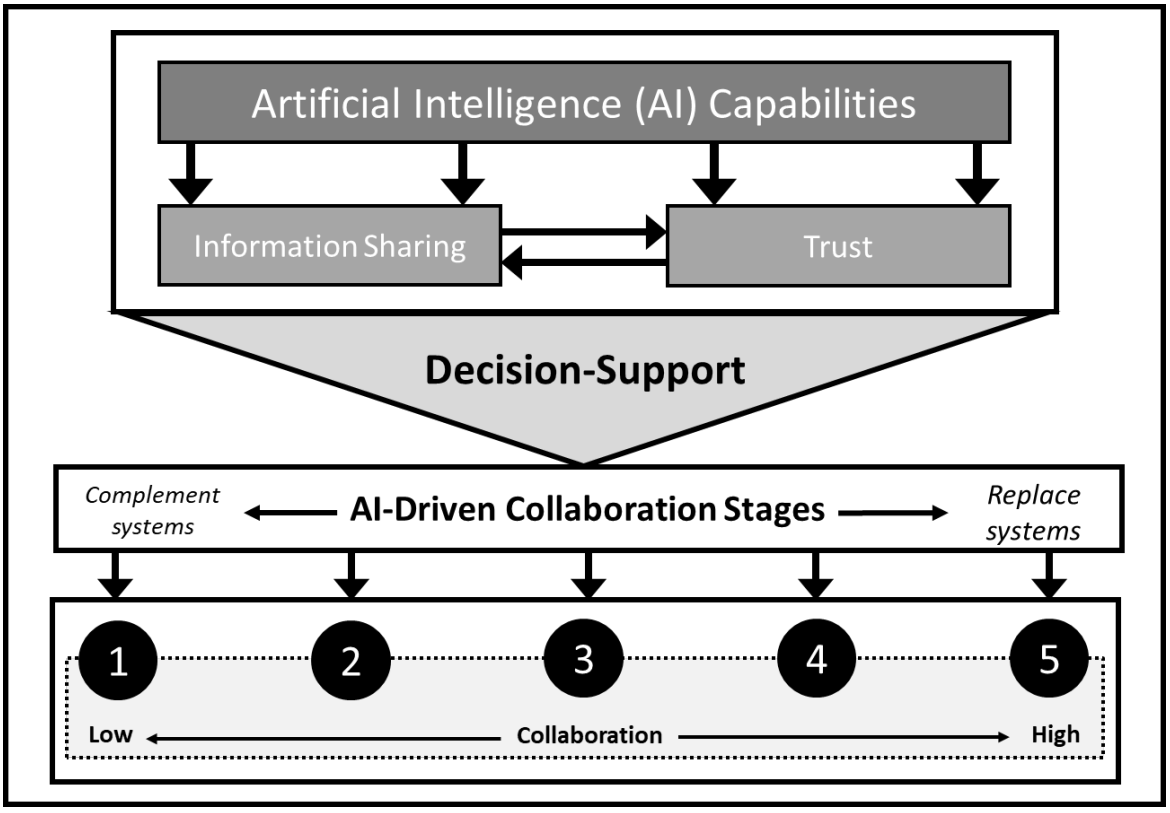

Figure 1: AI support for collaborations and collaboration stages

3. An AI support framework for supply chain collaborations

The interrelationships between information sharing, trust and AI capabilities allow us to build a framework to categorise the different stages of how AI applications can enhance collaboration along the supply chain. We divide the AI collaboration into five stages (see Fig. 2), namely "complementary AI applications", "augmentative AI applications", "collaborative AI applications", "autonomous AI applications" and "AI applications replacing existing systems". In stage 1, AI applications are used to complement existing information sharing systems by analysing data from various sources to provide insights and recommendations that can help partners make better decisions (Grover *et al.*, 2022; Oliveira-Dias *et al.*, 2022). As trust is limited between supply chain partners, AI applications at this stage are designed to complement existing systems by providing reactive assistance (Ivanov and Dolgui, 2021). In other words, AI systems can detect and respond to certain events or inputs from e.g. chatbots or virtual assistants, thus is able to answer basic questions about inventory or shipping (Khan *et al.*, 2022; Oosthuizen *et al.*, 2021), but is not able to actively manage the supply chain. Stage 1 may also include reading data from sensors, RFID tags, and other tracking devices to provide real-time visibility into supply chain activities (Angeles, 2005; Delen *et al.*, 2007). This sharing of basic information with supply chain members such as orders, inventory levels, and shipment tracking is communicated via basic tools such as email or phone.

In stage 2, AI applications are used to augment existing information sharing systems, i.e. they are designed to provide limited assistance by actively contributing to the decision-making process (Rodríguez-Espíndola *et al.*, 2020; Trunk *et al.*, 2020). Trust between partners is increasing, and AI is used to assist in information sharing, such as automated data entry and analysis, data cleaning and consolidation, thereby reducing the need for manual intervention and increasing efficiency (Giannakis *et al.*, 2019). In stage 2, supply chain members share information such as demand forecasts and production schedules, using more advanced communication tools like cloud-based platforms or shared databases (Kochan *et al.*, 2018). This may result in a supply chain collaboration that includes demand forecasting tools that can predict future demand for products, or inventory optimisation tools that can suggest optimal inventory levels based on past data (Dwivedi *et al.*, 2021). In other words, AI is used to analyse data and make predictions about future supply chain activities including predicting demand, identifying potential disruptions, and recommending optimal inventory levels.

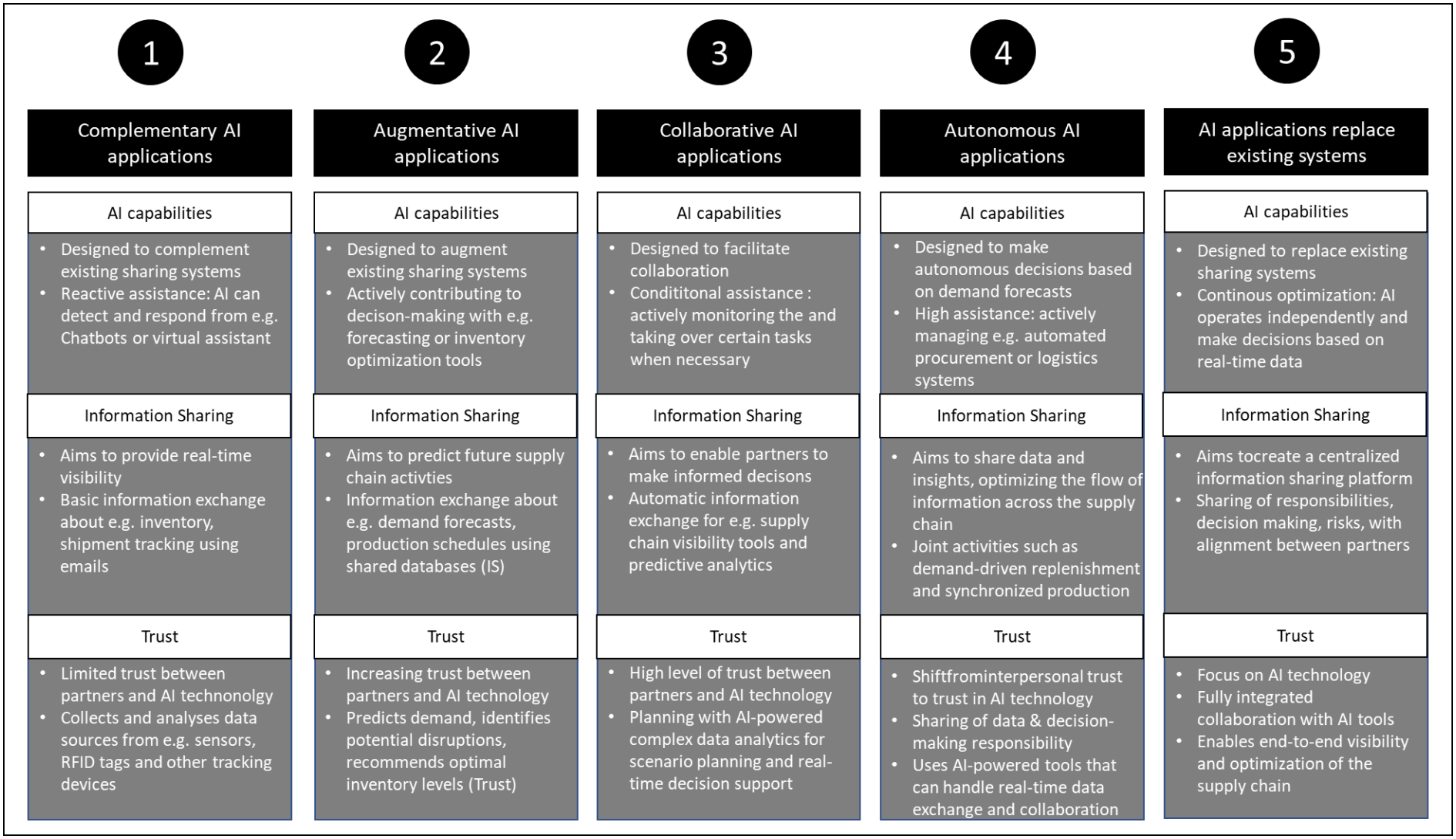

Figure 2: AI collaboration framework for supply chains

Stage 3 AI applications are used to facilitate collaboration between partners in information sharing, i.e. they are designed to provide conditional assistance by actively monitoring the supply chain and taking over certain tasks when necessary (Xue *et al.*, 2021). In this stage, high level of trust between partners exists and AI is used to facilitate collaborative decision-making between supply chain partners by providing predictive analytics and real-time decision support (Barratt and Oliveira, 2001). More specifically, AI can be used to automatically share information and insights in real-time, enabling partners to make informed decisions together (Zhang and Li, 2006). These decisions may comprise inventory optimisation and transportation planning, using AI-powered tools that can handle complex data analysis and scenario planning, but also include predictive maintenance systems that can identify when equipment needs repairs, or supply chain visibility tools that can monitor the status of shipments in real-time (Jarrahi *et al.*, 2023).

In stage 4, AI applications are used to make autonomous decisions about information sharing, i.e. they are designed to provide high assistance by actively managing the supply chain (Calatayud *et al.*, 2019). In other words, AI is used to automatically share data and insights, optimizing the flow of information across the supply chain by making decisions for e.g. automatically routing shipments, optimizing warehouse layouts, and adjusting production schedules based on demand forecasts (Chan and Chan, 2009; Helo and Hao, 2021). Trust is high and supply chain partners work together to execute joint activities based on shared data and decision-making responsibility (Barratt, 2004). AI applications in stage 4 are also capable to make autonomous decisions for demand-driven replenishment and synchronised production using AI-powered tools that can handle real-time data exchange and collaboration, thus relying on automated procurement systems that can make purchasing decisions based on real-time data, or automated logistics systems that can optimise the routing of shipments (Datta and Christopher, 2011).

In stage 5, AI applications replace existing information sharing systems, i.e. they are designed to replace existing systems by providing full automation to continuously optimise the supply chain by operating independently and decision-making based on real-time data (Min, 2010; Wu *et al.*, 2016). Trust is high and supply chain partners not only share data, decision-making responsibility and risks, but have a fully integrated collaboration system powered by AI that enables end-to-end visibility of the supply chain (Bechtsis *et al.*, 2022). From an IT infrastructure viewpoint, stage 5 also comprises the creation of a centralised information sharing platform that replaces the need for multiple systems, streamlining information sharing and reducing costs (Rezaei *et al.*, 2017). Examples of stage 5 AI applications for supply chain collaboration may include fully autonomous inventory management systems that can continuously monitor inventory levels and make purchasing decisions, or self-organizing logistics networks that can dynamically adapt to changing conditions (Nitsche *et al.*, 2023). In other words, AI is used to continuously improve collaboration by providing predictive analytics, real time optimisation, and autonomous decision-making capabilities including automatically identifying areas for improvement, testing new strategies, and monitoring performance (Allal-Chérif *et al.*, 2021).

4. Managerial and theoretical implications

Our findings and framework have several managerial and theoretical implications. We argue that our AI collaboration framework for supply chains can help supply chain managers to better understand the stages in a company's AI journey and the requirements for each stage. Similar to the five stages of autonomous driving, the categorisation of AI collaboration along the supply chain into five consecutive stages provides both insight into collaborations practices as well as

presents a practical management tool to better understand the utilisation of AI capabilities in a supply chain environment.

Supply chain managers may also use the framework to get a better understating of their involvement, as our research implicitly discusses the role of oversight in context of AI and trust, in particular how much oversight should management have over AI applications and AI collaboration systems. Generally, the level of oversight should be based level of AI collaboration and the associated potential risks, that is, more oversight is needed when AI systems are autonomous, and less oversight is needed when AI complements existing systems. In other words, more oversight is needed when AI systems take actions and make decisions along the supply chain that are unexpected due to potentially biased datasets or algorithm errors (Hall and Ellis, 2023; Kinney *et al.*, 2024; Rice, 2007). The lack of human oversight can exacerbate issues, especially in critical areas such as inventory management, demand forecasting, and logistics optimisation, where errors can result in significant financial losses or operational disruptions (Kleindorfer and Saad, 2005).

In the context of AI, humans may also have a direct impact on the adoption of AI technology within organisations. Studies show that a lack of trust or fear of loss of control can have humans reject AI technology (Al-Adwan, 2024; Fast and Horvitz, 2017). Scholars link the lack of trust to the "black box" decision-making processes of AI systems, i.e. the difficulty to understand or reconcile AI decisions (Brintrup *et al.*, 2024; Sadeghi *et al.*, 2024). With unfair, unexpected or unreliable decisions, trust in AI capabilities may further decline (Gligor *et al.*, 2021). In such cases, oversight may not only mitigate these potential errors, but scholars also found the combination of humans and AI may even outperform stand-alone systems, both for human and AI systems (Fügener *et al.*, 2022).

However, it needs to be emphasised that the adoption of AI and the implementation of AI capabilities in practice for a better supply chain collaboration are subject to various influences that can affect the acceptance and utilisation of AI. Venkatesh *et al.* (2012) identified for main constructs that influence how users adopt and use new information systems: a) performance expectancy, b) effort expectancy, c) social influence, and d) enabling conditions. This points to influences in these constructs that go beyond our research and may be often also out of control of supply chain members. For example, AI system designers may not be able to influence the enabling conditions or social environment and the AI collaboration system is equally unable to address potential shortcomings (Kinney *et al.*, 2024). Moreover,

From a theoretical perspective, we not only expand and extend the literature on trust and information sharing but provide a differentiated view on the implications of the use of AI. Normative views on how to use AI in organisations predominantly suggest augmentation over automation, however, scholars found that the use of AI is rather subject to a automation-augmentation paradox (Lockey *et al.*, 2021; Raisch and Krakowski, 2021). For example, while AI designer may work in the beginning to complement existing systems by augmentation, their work will eventually reach a state when the system is automated and can replace existing systems, making their jobs obsolete. However, with changing conditions over time, further augmentation may be necessary, thereby highlighting the role of AI designers and the tensions between augmentation and automation. Thus, it can be argued that the balance between automation and augmentation must be carefully managed to ensure that AI systems complement rather than completely replace human roles, maintaining a synergistic relationship that leverages the strengths of both human expertise and capabilities as well as AI efficiency. By integrating different levels of trust and information sharing into the supply chain collaboration field, this research thus contributes to better understanding and help to categorise the different AI collaboration stages between augmentation and automation.

5. Conclusion

In this paper, we set out to illustrate how AI capabilities can enhance supply chain collaborations with a focus on the implications on information sharing and trust. To do so, we highlighted the interdependencies between AI capabilities, information sharing and trust not only to demonstrate how AI changes trust in organisations and potentially improves information sharing, but also to provide insights into the different AI application stages of a firm.

In particular, we examined not only the information sharing and trust implications for AI-driven supply chain collaborations, but provided insight into how firms can apply for collaborations along the supply chain. For information sharing, we identified that AI capabilities have the potential to complement and even replace existing information sharing systems for more efficient collaborations characterised by real time data transfers, automated decision-making, synchronised information exchange and predictive analytics. From a trust perspective, we not only expanded the trust dimension of interpersonal and interorganisational by a third one: trust in AI technology, but we also argued that higher trust in AI technology is linked to a corresponding decline of interpersonal trust, i.e. interpersonal trust on an individual level is gradually replaced with AI trust on a firm level.

To illustrate the question how firms can apply AI capabilities collaborations along the supply chain, we developed a 5-Stages AI application supply chain collaboration model that consists of the different demands and requirements for AI capabilities, information sharing and trust. The AI application stages ranging from AI applications that complement existing information sharing systems to AI applications that replace existing information sharing systems, thereby providing a practical management tool that can be used to classify the supply chain collaboration stages in a company's AI journey.

Our results and our model, however, have to be viewed in the light of its limitations. This is an attempt to classify AI-driven supply chain collaboration based on AI capabilities, information sharing and trust. And although we are confident to have identified a model that illustrate the five stages of AI-driven supply chain collaborations, other factors and a more fine-grained view may be required. Hence, we invite researchers to expand on our approach, in particular to advance the different stages of the proposed model. Moreover, although we found that AI trust gradually replaces interpersonal trust during the AI journey, the role of trust and augmentation seems under-researched, in particular from a supply chain collaboration perspective. So far, the discourse is often dominated by 'augmentation over automation' or 'human-in-the-loop' approaches, which seem to be obvious avenues for future research. Here, the social dimensions how to build trust and how it affects decision-making provide another chance for future research. Our research also points to a lack of understanding how AI influences information sharing in practice. It is also not clear so far how the shift to automation occurs and how it impacts the meaning-system of firm, thereby providing opportunities for further examination. While our model provides a conceptual foundation to better understand the information sharing requirements, real world cases studies would help to paint a more detailed picture of the opportunities and challenges in this field. As a first step, we hope that this paper provides insights into this rather open canvas of AI-driven collaborations and a foundation for academics and managers for further discussion and ideas.

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