“Beyond Transactions: How B2B Platforms in Construction Progressively Create and Monetise Value through Data-Driven Value Propositions”

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Abstract

Data has become a critical driver of innovation and competitive advantage for B2B platform companies, especially in traditional industries such as construction. However, many platforms struggle to translate data into value for external stakeholders and effectively monetise it. To address these challenges, this study investigates how B2B platforms in the construction industry can develop data-driven value propositions (DDVPs). In doing so, this study introduces the Data Strategy and Maturity (DSM) framework, developed through extensive literature review. This general framework for B2B platforms aligns data-driven strategies with partners’ digital maturity and serves as a guide for creating value through DDVPs. Building on this foundation, an in-depth case study of a Dutch B2B platform identifies a DDVP continuum comprising Data-driven Services, Data-enhanced Products, and Data-enabled Performance Outcomes. These propositions address varying partner needs and require distinct capabilities. The findings highlight the importance of actionable insights, predictive analytics, and operational efficiency as core drivers of value creation. Indirect monetisation strategies, such as embedding insights within partnerships, are preferred for fostering trust and collaboration while minimising friction. Key challenges include different levels of digital maturity, data quality issues, and resistance to change. This study contributes to the literature on digital servitisation and platform ecosystem by presenting a phased roadmap for integrating data-driven strategies in industrial contexts. For practitioners, it offers guidance on aligning data iniatives with partners readiness, enhancing collaboration, and achieving sustainable platform growth.

Keywords: B2B platforms, data-driven value creation, external data monetisation strategy, data-driven value propositions, platform business model evolution

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1. Introduction

1.1 Background and Research Gap

In the last century, possession of tangible, valuable resources such as oil was considered the most important asset to gain competitive advantage. This is known as the Resource-Based View Theory (Barney, 1991). However, the advent of digitalisation has radically changed business models. One of the most striking examples of this transformation is the emergence of digital platform business models, where businesses use digital technologies to create and capture value (Gawer & Cusumano, 2014; Kenney & Zysman, 2016; Taeuscher & Laudien, 2017). These digital platforms acts as intermediaries, facilitating interactions between distinct user groups, often referred to as 'producers' and 'consumers' (Rochet & Tirole, 2006). By utilising digital infrastructure, these platforms businesses significantly altered conventional market dynamics, and have gaining popularity among academics and practitioners across disciplines, including marketing (Muzellec et al., 2015), strategy development (Cennamo, 2019), and supply chain management (Loonam & Regan, 2022).

Platform businesses create value by simplifying matchmaking (Rochet & Tirole, 2006), reducing transactions costs and resolving market frictions (Parker et al., 2016; Trabucchi et al., 2021). However, capturing this value and turning it into sustainable revenue streams remains challenging for companies, as research by Bock and George (2018) noted. This is particularly true for companies applying sharing economy principles, such as digital platforms, as the value of the platform rises when the use of idle capacity by users increases. Moreover, the value of the platform is mainly created by the users of the platform themselves, making it difficult for platform businesses to capture value (Grieco & Iasevoli, 2022). Furthermore, the network effect – where an in users on one side of the platform enhances the value or utility for users on the other side – can lead to rapid, non-linear growth (Evans, 2003; Li et al., 2010; Rochet & Tirole, 2006). While this growth provides opportunities for economies of scale, it also challenges platforms to continuously innovate their business models to maintain sustainable value creation and capture. As their ability to transform value creation into value capture is affected by the maturity level of firms (Muzellec et al., 2015; Woroch & Strobel, 2022).

Despite the growing interest in platform business models, most research has focused on managing the 'transaction' between the distinct groups by testing different pricing strategies (Dou et al., 2016; Kung & Zhong, 2017) , leaving a gap in understanding new ways to create and capture value. Recent studies have begun to highlight the role of data in creating value. Trabucchi et al. (2022), identified 'data-driven extensions' as key driver of value creation for two-sided platforms (Trabucchi et al., 2022). The advent of smart, interconnected devices and systems, also known as the Internet of Things (IoT), has enabled organisations to capture vast amounts of data (Rose et al., 2015). This is no exception for platform businesses, since the platform runs on smart information and communication technologies, thereby

amassing many valuable customer data. As data is seen by many as the most valuable resource in this digital age, combined with the vast amount of analytical tools, it has the potential to contribute to business value (Chen et al., 2012). This is supported by a substantial body of literature on the benefits of integrating data-driven applications at organisational level. As posited by Brynjolfsson et al. (2021), the utilisation of real-time and predictive analytics through data analytics markedly enhances organisational operational efficiency (Brynjolfsson et al., 2021). Furthermore, incorporating Big Data Analytics significantly improves decision-making process (Elgendy & Elragal, 2016; Li et al., 2022) and a data-driven culture fosters both product and process innovation, thereby enhancing the competitive advantage of businesses (Chatterjee et al., 2024).

The construction industry, the focus of this study, presents unique challenges in terms of adopting digital innovation. This sector is known for its slow adoption of innovations. For example R&D spending is less than 1% of turnover, significantly lower than the 3.5% to 4.5% in the automotive and aerospace industries, indicating a cautious approach to new technologies (Agarwal, 2016). Additionally, the presence of small profit margins and high project costs serves to reinforce risk aversion, thereby resulting in a limited embrace of unproven data-driven solutions (Sawhney, 2023). Furthermore, the issue of low data literacy, with 42% of companies reporting a lack of digital skills, hinders further innovation (Delloite, 2024). Regardless of these challenges, this industry is gradually transitioning towards integrated software platforms through increased investments in technology, as noted by the organisational consulting firm McKinsey & Company. According to them, platform development is progressing rapidly, exemplified by construction materials marketplaces, which are set to play an increasingly significant role in construction projects (Bartlett et al., 2020).

Despite this progress, there is limited understanding how platforms in the construction industry can create and monetise such value. It is notable that the majority of existing studies is focused on intra-organisational perspectives. The limited number of studies that explicitly address value creation for external actors are primarily concerned to the end user (e.g., consumers) (Azionya, 2023; Gui et al., 2023; Heikkilä et al., 2023). Furthermore, given the novel nature of the topic, most existing literature is based on findings form large, well-established platforms such as Uber, Spotify, and Just Eat Takeaway (Skog et al., 2018; Taeuscher & Laudien, 2017).

This leaves a research gap regarding research on data-driven value creation at inter-organisational level for sector-specific platform companies operating in the B2B environment. This specific group of digital platforms benefits from data-driven value creation for their business partners, thereby enabling them to gain a competitive advantage and achieve sustainable growth of the platform. However, the current literature does not address how industry-specific B2B platforms, like the construction industry, can transform their business models with data-driven extensions, a challenge reinforced by the lack of fundamental knowledge and skills in this area (Woroch & Strobel, 2022).

1.2 Purpose of the study

To address these critical gaps in the literature, this research explores how B2B platform businesses can use their accumulated data to create and deliver additional value for their business partners (e.g., manufacturers), by the use of data-driven value propositions. Moreover, it tries to identify the best ways of monetising the created data-driven value, by examining multiple data monetisation strategies. In doing so, this study pays particular attention to the business model of B2B platforms operating in the construction industry, and how these platforms can evolve their primarily transactional focused business model into a data-driven business model, by monetising the created data-driven incentives.

To investigate the opportunities of data-driven value creation B2B platform businesses intended for their business partners, it is essential to determine what information is deemed valuable by business partners and whether this information can be extracted from the data sources of the platform business. Furthermore, it is crucial to ascertain how this valuable information is distributed to the users and the optimal means of monetising it. Consequently, the following research question is identified:

"*How can a B2B platform in the construction industry utilise their data to create and deliver value to their business partners through data-driven value propositions, and effectively monetise this value?*"

To explore this research question, a single case study was conducted at a platform company in the Netherlands. The platform can be characterised as a two-sided B2B platform that connects sellers of wooden, PVC and/or aluminium windows and doors (manufacturers) with people looking for new frames for their own homes or on behalf of homeowners such as craftsmen (consumers). The research was motivated by the platform company's struggle to grow the platform in a sustainable way. The stability of the organisation's revenue and order quantity over the past two years is indicative of this fact, as opposed to the previous years where it had doubled annually (Figure 1). According to the company several factors contribute to this negative trend. Firstly, insights based on search volume for windows and doors indicates a decrease in the Netherlands. Secondly, increased online competition with faster delivery times have diminished the platform's unique selling point of delivering custom-made window frames within five working days.

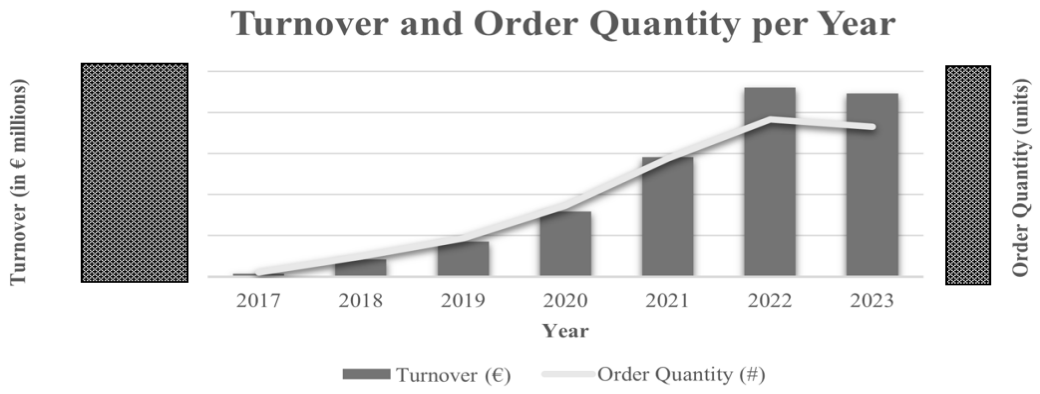


Figure 1 Turnover and Order Quantity per Year of case company

This negative trend is concerning for the platform company, as platform businesses rely on cross-side network externalities (Li et al., 2010). A decline in either group can quickly reduce the value of the platform. Therefore, the company has formulated five strategies to revitalise the platform and resume sustainable growth. One such strategy is to develop a digitised chain where value is delivered for both manufacturers and consumers, thereby strengthening the bond with the platform. The circumstances facing the platform company provide an ideal opportunity for research into data-driven value creation and data monetisation. The company would like to know what information is considered valuable by platform users, and the optimal way to distribute this information. In the interests of revenue, the company also wants to know the best way to monetise the data-driven value created. More background information of the case company can be found in Appendix A of this thesis.

The research explicitly focuses on data-driven value creation for the platform's manufacturers, as this group is currently underrepresented. Consequently, the platform becomes more reliant on these manufacturers if one or more decide to end their collaboration. In addition, due to the cross-side network externalities, the data-driven value creation investments made for one side would enhance the value or utility for the other group of users (Dou et al., 2016; Rochet & Tirole, 2006).

To the author's knowledge, this study is the first to explore the potential of using data to create value for manufacturers affiliated to (two-sided) B2B platforms within the construction industry and monetise it as well. Therefore, this study makes important contributions to several academic fields. Previous studies have indicated that 'data-driven extensions' is one of four additional drivers of value creation for platform businesses (Trabucchi et al., 2022). This study extends the scope by exploring the application of the driver of value creation in practice through a case study. The study goes even one step further by also studying the closely related concept of strategies to monetise the data-driven value created. By bridging these concepts, the study extends the existing literature on business model innovation by highlighting the central role of data as a strategic tool in shaping modern digital platform business models. Finally, it presents ways how B2B platform businesses in the construction industry can monetise data-driven created value, enriching the literature of external data monetisation.

This research has practical relevance for organisations seeking to create more data-driven value downstream their supply chain, especially for manufacturers or other business partners (e.g., suppliers) within the construction industry. The findings can be used as stepping stone for developing data-driven strategies that align with partners' operational goals, such as enhancing efficiency through (predictive) analytics and the use of real-time dashboards. By embedding these actionable insights into existing services and adopting indirect monetisation strategies, platform businesses – as well as organisation in general – can foster trust and improve the collaboration with affiliated 'producers' of the platform. In addition, this research provides managers of platform organisations in various sectors, including e-commerce, the sharing economy and digital marketplaces, with tools in the development process to

transform existing business models into data-driven business models, using the DDVP continuum roadmap developed. By using the DDVP continuum as a guide and adapting it to fit their own business environment, companies can incrementally create and monetise data-driven value, potentially strengthening their market position.

1.3 Structure of thesis

The paper is structured as follows: In Chapter 1, the introduction outlines the current situation and focus of the research, as well as identifying the research gap. Chapter 2 presents the chosen literature method, followed by a comprehensive literature review and analysis in Chapter 3. For brevity reasons, the detailed discussion about the relevant concepts is placed in Appendix C. Basen on the insights gained from the literature review and analysis, a theoretical framework is developed and presented in Chapter 4. Chapter 5 compiles the chosen research methodology. The findings, obtained from in-depth interviews with stakeholders, are presented in Chapter 6. The study ends with a discussion section in which both theoretical and practical implications are discussed, limitations and further research recommendations are outlined, and eventually the research question is answered in a conclusive way (Chapter 7).

2. Literature Method

Prior to completing the literature review, it is essential to systematically examine and differentiate relevant sources and academic articles. To accomplish this, the five-stage Grounded Theory model proposed by Wolfswinkel et al. (2013), was utilised as a foundation. By going through the stages step-by-step, this study aims to provide an in-depth analysis of the literature surrounding the application of data in creating value, along with the potential monetisation strategies than can be employed in this process. This all in the context of two-sided platform businesses seeking to provide (additional) value to their users.

This section outlines the first of five-stages, which involves the Define stage consisting of four separate tasks, namely defining the criteria for inclusion/exclusion, identifying the fields of research, determining the appropriate sources, and lastly the decision of specific search terms (Wolfswinkel et al., 2013). The complete model, including a step-by-step segregation of sources, is presented in Appendix B.

The first task is to determine the scope of the research and thereby marking inclusion and exclusion criteria. As the scope of the research is limited to two-sided platform businesses and how their business model can innovate through the application of data-driven value creation, this research was interested in publications that focus on *data-driven business model innovation,* and/or *data-driven value creation* and/or *data monetisation.* This all within the context of preferably two-sided platforms or if of high-value digital platforms in general. Given the current relevance of the research scope, which encompasses topics such as utilisation of data for value creation, a field in which new developments are occurring rapidly, this study has chosen to exclude publications predating 2017 from the search criteria. Incidentally, this does not apply to publications that serve as foundational references for more recent works. On top of that, publications unable to substantiate their hypotheses are excluded to ensure the reliability of the literature analysis.

The second task involves identifying the relevant fields of research that align with the topic under review, ensuring the inclusion of the most pertinent literature. Taking into account the associated topics and the purpose of the study, the research area of Business, Management, and Accounting was selected. Given that this study addresses external data-driven value creation in two-sided platform businesses, there is high possibility that the findings will have effects at both intra- and inter-organisational level. In addition, Decision Science is also a field of research that is applicable to this study. This research aims to expand the horizon of data-driven value creation by exchanging it to effectively within the network of (two-sided) platform businesses, enabling them (manufacturers) to make informed decisions based on data too. Finally, the research area Information Systems was selected, as this study explores the potential use of data to create value. Without the presence of advanced information technology, data cannot be captured in databases The absence of advanced information technology precludes the capture of data in databases, thereby preventing the extraction of valuable information.

In third task of the Define stage is determining the most appropriate databases. This was done by considering the established criteria from the previous tasks. The databased used to find relevant publications on the chosen topics were: Scopus, ScienceDirect and Google Scholar. The main reason for this was that these databases allow the researcher to search both broadly, but also to search specifically, using operators such as 'AND' and 'OR'. Using several databases reduced the chances of missing important publications, as some were only included in one database.

The fourth and final task in the Define stage is the formulation a precise set of possible search terms. According to Wolfswinkel et al. (2013) the selected search terms reflect the full spectrum of the chosen research area (Wolfswinkel et al., 2013). Based on the choices made in the previous steps, the following search terms were included: *two-sided platform, data-driven value creation, value capture, data monetization, data-driven business models, business model innovation.* The search terms were used in various combinations using operators. Synonyms of terms were also included to avoid missing relevant articles, e.g., digital platforms, or two-sided markets instead of two-sided platforms. The search strings that returned the most relevant articles are listed in Table 5 in appendix B.

3. Literature Review

This literature review provides a comprehensive overview of previous research and key theories relevant to data-driven value creation, data monetisation and how this can be integrated into the business model of B2B (two-sided) platforms. Furthermore, this review has concentrated on the capabilities that platform companies must posses in order to execute this effectively. The final product of the literature review, as a result of following the guidelines of the Grounded Theory Model, is presented in Table 1. Based on the identified concepts using open coding, axial coding and selective coding, aggregated concepts are formulated and presented at the top of the table. These aggregated concepts serve as overarching themes and are closely related to the formulated research question. These aggregated concepts are further elaborated, with additional emphasis on data-driven value creation including associated value propositions and data monetisation as these proved to be the key topics related to this study.

For brevity purposes, only the literature analysis is included in the core and more detailed exposition of each aggregated concept is placed in the appendix C 'Extended Literature Review'.

Table 1: Literature coding of relevant concepts

Aggregated concepts										
	Two-sided platform dynamics		Platform business model evolution		Data-driven value creation		External data monetisation strategies		Identify capabilities and challenges for data-driven business models	
Open coding										
Article #	*Network Effects*	*Pricing Strate-gies*	*Platform 's value proposi-tions*	*Business Model Innova-tion*	*Data Driven Value Creation*	*Data-Driven Value Proposi-tions*	*Data Moneti-sation*	*Data Driven Business Models (DDBM)*	*Capabili -ties for DDBM*	*Challen-ges for DDBM*
7 *Madanaguli et al., 2023*	X	X	X	X	X	X	X		X	X
4 *Woroch & Strobel, 2022*	X			X	X	X	X	X	X	X
6 *Ritala et al., 2024*				X	X	X	X	X	X	X
3 *Diane et al., 2020*	X			X	X			X	X	X
10 *Hartmann et al., 2016*				X	X	X	X	X		X
11 *Parvinen et al., 2020*		X				X	X	X	X	X
1 *Trabucchi et al., 2022*	X	X	X	X	X				X	
2 *Trabucchi & Buganza, 2022*	X	X	X	X	X		X			
8 *Kakuschke, 2024*					X	X	X	X	X	X
5 *Ofulue & Benyoucef, 2024*					X		X	X	X	X
9 *Muzellec et al., 2015*	X	X	X	X			X			

3.1 Literature analysis

The dynamics and evolution of two-sided platforms have been extensively studied since Rochet and Tirole (2003) introduced the concept of two-sided markets, emphasizing the facilitation of interactions between distinct user groups through a common platform. This foundational theory underscores the

significance of network externalities, where the value of the platform increases as more users participate. Eisenmann et al. (2006) expanded on this by dissecting network effects into same-side and cross-side effects, providing a nuanced understanding of user interactions and value creation mechanisms.

However, these early studies primarily focus on the initial stages of platform development and the inherent "chicken-and-egg" problem (Caillaud & Jullien, 2003; Li et al., 2010), which involves simultaneously attracting users on both sides of the platform. While valuable for understanding the initial role of platform businesses, they offer limited insights into how platform businesses evolve and create sustained value for their user groups nowadays.

Consequently, more recent studies have explored these concepts in greater depth and concur that as platforms mature, there is a paradigm shift in their business models. Muzellec et al. (2015) and Madanaguli et al. (2023) highlights this evolution, noting that platforms transition from mere matchmaking entities to sophisticated ecosystems that leverage data integration for advanced value propositions. The classification of industrial platforms by Madanaguli et al. (2023), presented in Appendix D, and the hybrid model proposed by Trabucchi and Buganza (2022) converge on the idea that higher levels of data integration enable platforms to serve both user groups effectively, often resulting in differentiated data-driven services. In essence, recent literature agrees that data is a key asset for digital services, innovation and providing solutions for both user groups.

Despite these advancements, the literature mainly focuses on value creation for end users (e.g., consumers), with less attention given to business partners (e.g., producers). This finding is not entirely inexplicable as Muzellec et al. (2015) emphasises that the focus of platform businesses is shifting from end users to business partners as they mature. This represents a significant gap, especially for platforms operating within B2B environments, where creating data-driven value for business partners is crucial for sustainability and growth.

In exploring data-driven value creation, Kakuschke (2024) presents the Data Value Creation Matrix, identifying twelve distinct options for leveraging data. This framework, presented in Appendix E, is instrumental in understanding how platforms can create value through data, particularly in external contexts. Furthermore, it visualises the crucial role of data analytics in deriving valuable information from data, as most DVC-options fall into the ‘information’ category. However, the matrix, while thorough, may not be fully applicable to sector-specific nuances, such as for platforms operating in traditional markets (e.g., construction industry) where their customer groups have little or no data integration into their business processes. Diane et al. (2020) contributes by identifying key factors for data-driven business models (Appendix F), all of which are inextricably linked to data analytics. Yet their focus on the platform businesses operating in the food industry (e.g., Hello Fresh and Deliveroo) suggest that these factors might not be directly transferable to more traditional industries. This indicates a gap in the literature where sector-specific studies are needed to tailor data-driven strategies effectively.

Research by Ritala et al (2024) make an important contribution to this discussion on data-driven strategies for companies in B2B-markets by identifying four archetypal data-driven value propositions (DDVPs). These DDVPs, respectively: Data-as-a-Product, Data-Enhanced Products, Data-Driven Services and Data-Enabled Performance Outcomes, are propositions that can be developed for external data monetisation purposes. These DDVPs represent a progression in complexity and the value offered to customers. Upon closer examination, there is a clear similarity between Kakuschke's (2024) DVC-options and Ritala et al.'s (2024) DDVPs. Less complex options such as providing raw or prepared data correlate with simpler value propositions such as Data-as-a-Product. As the data offering becomes more sophisticated and includes analytics and actionable insights, it aligns with more complex DDVPs such as Data-driven Services and Data-enabled Performance Outcomes.

Although the literature outlines the potential for such progress, its application remains at an abstract level. Existing studies focus on B2B organisations in general rather than specifically on platform businesses. Therefore, there is a need to identify which DDVPs are suitable for B2B platform companies operating in specific industries as they endeavour to monetise data externally.

Moreover, while the literature recognises that developing data-driven propositions is conceptually straightforward, effectively monetising them is considerably more complex. Factors such as data ownership, legal risks, data quality and customer's willingness to use advanced data solutions complicate monetisation efforts (Ritala et al., 2024). These challenges are particularly evident in B2B context, where business partners may be hesitant to share data and require clear evidence of value before committing to data-driven services. Furthermore, most studies generalise data monetisation strategies and associated revenue models without tailoring them to specific sectors or in the collaboration between platform and business partners. This is an important gap, as business partners' willingness to pay for data-driven offerings depends on perceived value, trust, and alignment with their business objectives.

In conclusion, although the theoretical frameworks for data-driven value creation and monetisation for platform companies are robust (Appendix G), little is known about data-driven value creation for business partners by B2B platform companies. Moreover, most models for data-driven value creation and data monetisation are general in nature and lack depth to sector-specific platform organisations. Hence, this study focuses on how B2B platform organisations in the construction industry can leverage their data to create and deliver value for their business partners, using DDVPs. Moreover, it tries to identify the best ways to monetise this delivered value considering the unique challenges and opportunities within this sector. By addressing these gaps, platforms can better use data to create and capture value for their business partners, ensuring sustainable growth and competitive advantage in their respective markets.

For these reasons, a proprietary integrated framework has been designed and will be outlined in the next chapter.

4. Theoretical Framework

This study is guided by the Data Strategy and Maturity (DSM) framework, an integrated theoretical framework that synthesises key concepts from Parvinen et al. (2020), Kakuschke (2024), Ritala et al. (2020), and Madanaguli et al. (2023). The framework offers a structured approach to understanding how B2B platform organisations can evolve their business models from transactional to more sophisticated business model types, such as product-service and platform ecosystem, through DDVPs. Specifically, it serves as comprehensive lens to explore what DDVPs create value for business partners and develop effective data monetisation strategies tailored to the construction industry.

This chapter elaborates on the DSM-framework in detail (section 4.1), followed by addressing the key gaps and limitations in the literature, and outlines how this study will address them.

4.1 The DSM-framework

The DSM-framework, presented in Figure 2, illustrates a roadmap for external data-driven value creation and monetisation for B2B industrial platforms. Derived from the literature review and analysis, it synthesises various theoretical constructs across multiple domains such as digital strategy, organisational maturity and platform business model evolution. This integration aligns with Kakuschke's (2024) call for multidimensional frameworks to address the complexities of data monetisation.

Since the DSM framework is based on general insights, a key deliverable of this study is to adapt and tailor it to the construction industry. By leveraging the framework as a guideline, this study will identify industry-specific data-driven value creation and monetisation strategies and their associated challenges, and capabilities required for successful implementation of each DDVP.

The framework bridges strategic and maturity components for each DDVP, ensuring both theoretical robustness and practical applicability. This dual focus allows the framework to address the unique challenges of sector-specific industries like construction while maintaining relevance for broader B2B platform contexts.

The framework comprises of two interconnected dimensions:

1. ***Organisational Maturity Dimension:***
   This dimension identifies the necessary capabilities required by both the provider and recipient to successfully realise each DDVP. This emphasis on maturity is supported by Parvinen et al. (2020), who argued that organisational maturity is prerequisite for leveraging data-driven initiatives and contributes significantly to achieving competitive advantage. The inclusion of interconnected capabilities in the DSM-framework ensures a holistic perspective, as advocated

by Heikkillä et al. (2023) in their study on collaborative data ecosystems. Furthermore, potential challenges highlighted in the literature are aligned with each DDVP.

2. ***Strategic Dimension:***

   This part concerns a strategic dimension, which links DDVPs with specific external data value creation options and monetisation strategies. By connecting the external DVC-options from Kakuschke's (2024) matrix with external data monetisation strategies identified by Parvinen et al. (2020), the DSM-framework bridges the gap between value creation and value capture. This enables platforms to effectively navigate complex value chains.

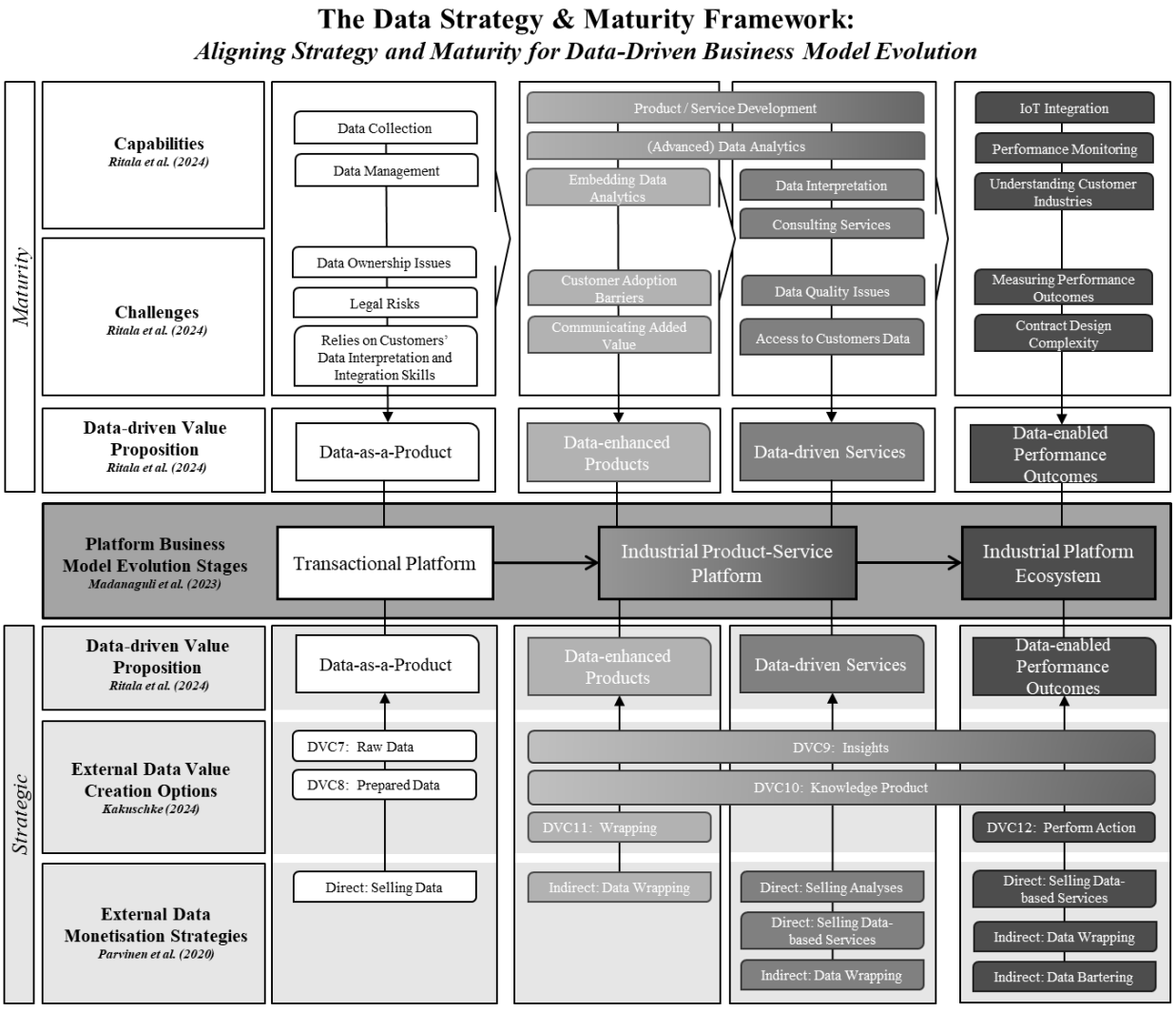


Figure 2: "The Data Strategy and Maturity Framework: Aligning Strategy and Maturity for Data-Driven Business Model Evolution" (Schuurman, 2024).

Together, these dimensions provide a comprehensive guide for B2B industrial platforms, illustrating how DDVPs can create value for external stakeholders. Additionally, it underscores the importance of necessary organisational capabilities and overcoming challenges to successfully develop and sustain higher-level value propositions. The inclusion of external DVC-options and monetisation strategies addresses the gap as well identified by Trabucchi et al. (2022), who emphasises the unique needs of

upstream stakeholders like manufacturers, ensuring the DSM-framework's theoretical grounding and practical relevance.

This framework guides readers through each phase of platform business model evolution, as described by Madanaguli et al. (2023), integrating both strategic and organisational maturity components to achieve data-driven value creation. The initial identified type - industrial product efficiency platform – is excluded as it explicitly focuses on data use for improving or monitoring internal production and business processes, whereas this study centres on creating value through data for external stakeholders.

4.1.1 Transactional Platform

According to Madanaguli et al. (2023), Industrial Transactional Platforms primarily function as a facilitator of interactions or exchanges between different user groups. They act as intermediaries, reducing transaction costs and efficiently matching supply and demands.

Strategic Dimension

Their business model is distinguished by high ecosystem actor integration and low degree of data integration. For that reason, the Data-as-a-Product value proposition aligns well with the transactional nature of these platforms, as it treats data as a simple commodity to be traded, similar to other goods or services on the platform.

The external DVC-options associated with this DDVP are:

- *Raw Data (DVC7):* Providing unprocessed data to external stakeholders, which is a straightforward offering that aligns well with a transactional model.
- *Prepared Data (DVC8):* Providing processed data to external stakeholders, which adds some value without requiring complex data analytic capabilities.

The external data monetisation strategy for this DDVP is 'Direct: selling data', which fits the straightforward transaction-focused approach of this business model (Parvinen et al., 2020).

Organisational Maturity Dimension

As posited by Ritala et al. (2024), the implementation of Data-as-a-Product necessitates the possession of fundamental data collection and data management abilities by the platform organisation. Furthermore, recipients must possess analytical skills to extract meaningful insights from the raw data and integrate these into their existing business processes. When this is substandard, adoption may be hindered.

Since the product being delivered involves raw or prepared datasets, according to Ritala et al. (2024), potential challenges include data ownership issues and legal risks. Unlike the strategic dimension, the maturity dimension's components are interconnected, with advancements in technical and analytical aspects required for higher-level DDVPs. The DSM-framework illustrates this interconnectedness with horizontal arrows in the upper quadrant.

4.1.2 Industrial Product-Service Platform

According to Madanaguli et al. (2023) Industrial Product-Service Platforms demonstrate a higher degree of data integration and a moderate integration of ecosystem integration. These platform types utilise data to create, deliver and capture value for both internal process improvements, as well as supporting close partners in the value chain. Examples of the aforementioned include investments in the creation of advanced digital services for key customers. Their business model has a growing emphasis on leveraging data for value creation beyond simple transaction. Based on the definitions given by Ritala et al. (2024), two DDVPs align to this type of business model: Data-enhanced Products and Data-driven Services. As both have unique characteristic features, they have been included in the framework separately and will be discussed separately.

Strategic dimension – Data-enhanced Products

The DDVP Data-enhanced Products involves integrating data into existing products to improve their functions and performance. This value proposition aligns well with the business model type Industrial Product-Service Platform, where the importance of developing digital services for customers using data is a key component. From Kakuschke's list of external DVC-options (2024), DVC11 Data Wrapping is the most applicable. Indeed, this includes integrating data directly into products or services to enhance their value, making it excellent to use in conveying this DDVP.

Additionally, 'Knowledge Product' and 'Insights' are also applicable when propagating this value proposition. Knowledge Product supports this by leveraging data to optimise and enhance products in terms of improvements or innovation of the product's intrinsic characteristics. Both options are relevant, but expected is that Data Wrapping is more applicable in this situation, as this research emphasises value creation for business partners (e.g., manufacturers) and innovations resulting from 'Knowledge Product' the end customer is mainly going to experience this value. Insights, while fundamental to both options, should be seen more as a tool that informs and supports these DVC-options, rather than a standalone approach.

The strategy to convert delivered value into monetary value is Indirect: Data Wrapping. The added value of the data is in improving the product rather than selling data directly. So, the monetisation value is in boosting product sales and/or being able to increase the selling price.

Organisational Maturity Dimension: Data-enhanced Products

According to Ritala et al. (2024), a successful implementation Data-enhanced Products requires the platform organisation to develop capabilities in product/service development and integrating data analytics. This goes beyond just collecting data, by integrating insights gained through data analytics into the product to increase its value.

One potential challenge is that external stakeholders must be able to utilise the data-driven features associated with the product. The additional data-driven features must be integrated in a comprehensible manner so that users can employ them and begin experiencing the additional delivered value. This immediately reduces the barrier to adoption. Furthermore, it is crucial to effectively communicate the added value of these features to customers. Ensuring that customers recognise and trust the enhanced product value is a significant obstacle for successful implementation.

Strategic Dimension – Data-driven Services:
This DDVP uses data to optimise external partners' business processes by transforming raw or processed data into actionable insights. It offers tailored services, such as Insight-as-a-Service and Analytics-as-a-Service, to meet specific customer needs and improve business outcomes.

This value proposition is well-aligned with the Industrial Product-Service Platform, as it allows platforms to transition from offering enhanced products to delivering valuable data-based services that complement or enhance their products. In Kakuschke's (2024) framework, Insights and Knowledge Products are suitable options. As a standalone product (e.g., Insight-as-a-Service), Insights provide actionable intelligence directly to stakeholders. In contrast, Knowledge Product involves offering more advanced, knowledge-based services that go beyond simple data delivery to guide customer strategies and operations, ensuring deeper value and long-term impact.

In order to monetise the value created, both direct and indirect external data monetisation proposed by Parvinen et al. (2020) offer viable solutions. The sale of insights (e.g., Insights-as-a-Service) is aligned with ‘Selling Analyses’, while the direct sale of Data-based Services is more closely related to features from ‘Knowledge Products’. Furthermore, the indirect monetisation strategy of Data Wrapping provides an additional solution when extracts from both value creation options are provided ‘for free’ to boost collaboration.

Organisational Maturity Dimension: Data-driven Services:
According to Ritala et al (2024), successful implementation of data-driven servicing requires capabilities in data interpretation, advisory services and data quality management. Platform organisations must be adept at collecting, analysing and translating data into valuable insights focused on the needs of external stakeholders. This also requires skill in being able to develop potential data-driven creations, such as Insights-as-a-Service.

In order to successfully integrate it in cooperation with external stakeholders, it is necessary for them to be proficient in applying it effectively within their own operations, which requires a deeper level of data literacy. If the recipient does not interpret the information correctly, or if the information is misinterpreted, this can have a negative impact on decision-making

Potential challenges in rolling out this DDVP amount to data quality issues and access to customer data. The latter is a key component for delivering tailored insights for business stakeholders. Ensuring high-quality data and building strong relationships to access customer data are critical hurdles in this model.

4.1.3 Industrial Platform Ecosystem

According to Madanaguli et al. (2023), an Industrial Platform Ecosystem is characterised by a high level of integration of both data and ecosystem actors. It involves extensive collaboration among stakeholders and deep data integration to drive overall ecosystem optimisation and collective value creation.

Strategic Dimension

The DDVP Data-Enabled Performance Outcomes, as defined by Ritala et al. (2024), is well-suited to this advanced platform model because it focuses on using data to enhance the performance of the entire ecosystem. This value proposition moves beyond individual product or service improvements and seeks to generate measurable outcomes that benefit all partners within the ecosystem.

To substantiate this value proposition, several options for creating external data value are particularly pertinent. By installing sensors into the product or service and use of advanced technological infrastructure between the two parties, actionable insights can be delivered on a real-time basis. This has the potential to realise more efficient resource allocation or the reduction of operational bottlenecks. Similarly, integrating IoT into the product can guarantee the capture of additional information and/or the monitoring of real-time product performance (Knowledge Product). By perform action through data-driven interventions, such as predictive maintenance based on sensor data, partners can anticipate machine failures, schedule timely maintenance and minimise downtime across the ecosystem (Perform Action). These results enable partners across the value chain to work more efficiently and effectively, ultimately improving collective performance.

The selected external data monetisation strategies include both direct (Selling Data-based Services) and indirect (Data Wrapping and Data Bartering). These approaches fit well with the DVC-options by allowing monetisation through performance-based contracts, consultancy services, and data-driven actions. Revenue models may include subscription fees for analytics services, pay-per-performance models, and bartering agreements for data exchanges between ecosystem partners. This mix ensures that the value derived from data benefits both the platform and its broader network of stakeholders.

Organisation-Maturity Dimension

Implementing Data-Enabled Performance Outcomes requires advanced technical infrastructure for IoT integration and real-time data processing. Both platform organisations and recipients must develop expertise in monitoring and optimising ecosystem-wide performance. Trust among stakeholders is crucial for data sharing, as is addressing challenges like privacy concerns, fair risk-sharing, and

measuring performance outcomes (Ofulue & Benyoucef, 2024; Ritala et al., 2024; Thomas & Leiponen, 2016).

4.2. Identified gaps and limitations

This research aims to address significant gaps in the existing literature by applying an integrated theoretical framework tailored to B2B platform business seeking to utilise their data to create value for their business partners and monetise it through DDVPs. While prior research predominantly focuses on external data-driven value creation for end users (e.g., customers) (Azionya, 2023; Gui et al., 2023; Heikkilä et al., 2023), less attention has been given to actors upstream the supply chain, such as manufacturers. These two platform user groups have distinct data-driven value needs, as pointed out by Trabucchi et al. (2022). However, the study lacks depth and only emphasises the creation of value-added services by B2B platforms for business stakeholders. This highlights the need for further research into data-driven value creation options developed by platforms operating in the B2B environment for their users.

Although the literature outlines the potential for such progress (Kakuschke, 2024; Ritala et al., 2024), its application remains at an abstract level. Existing studies focus on B2B organisations in general rather than specifically on platform businesses. Therefore, there is a need to identify which DDVPs and DVC-options are suitable for B2B platform companies operating in sector-specific industries, as they endeavor to monetise data externally. Moreover, while developing DDVPs is conceptually straightforward, effectively monetising them is considerably more complex. Factors such as data ownership, legal risks, data quality, and business partners ‘willingness to use advanced data solutions complicate monetisation efforts (Ritala et al., 2024).

The construction industry exemplifies these challenges, as it is characterised by traditional practices, fragmented supply chains, and slow adoption of digital innovations (Agarwal, 2016; Delloite, 2024; Sawhney, 2023). Existing studies often draw on insights from large, well-established platforms such as Uber, Spotify, and Just Eat Takeaway (Skog et al., 2018; Taeuscher & Laudien, 2017). This reinforces the need for sector-specific studies within this context and the need for tailored frameworks for external data monetisation strategies, specifically for B2B platforms operating in sector-specific industries.

By focusing on the evolution of platform business models, the development of DDVPs and the integration of organisational capabilities and challenges, the proposed framework provides a holistic approach to understanding and addressing the complex dynamics involved. The proposed framework connects theory to practice, ensuring its relevance to the construction industry and setting the stage for the research methodology, which will validate and refine the framework in this specific context.

5. Research Methodology

5.1 Research Design

This study aims to investigate how a two-sided B2B platform in the construction industry can leverage its data to create and deliver value to its business partners through DDVPs, and effectively monetise this value. Classical research approaches focus solely on understanding phenomena, which does not fully address the complex, real-world problem at hand. As van Aken (2004) argues: “understanding the problem is only halfway of solving it”. Therefore, this research adopts a case study research design top provide a comprehensive answer to the research question.

Case study research design is particularly suitable because it offers the opportunity for an in-depth examination of complex issues within their real-life context (Crowe et al., 2011). By focussing on a single case – the B2B platform in the construction industry and their business partners – the researcher can gain rich insights into how DDVPs can be developed and monetised effectively within the collaboration platform and business partner. This research design allows for the collection of detailed, contextual data that are not easily accessible through other means (Yin, 2017). Additionally, it delivers useful insights into complex organisational processes and stakeholders’ interactions specific to the case company. These stakeholders, the manufacturers associated with the platform organisation, can be seen as ‘embedded units’ according to Yin (2017). By employing a single case study with embedded units, the research can delve into both the perspective of the B2B platform and the perspectives of the manufacturers (Yin, 2017). This aligns with the research objective of understanding and addressing the complexities involved in leveraging data for value creation and monetisation. However, it is important to acknowledge that findings from a single case study may not be generalisable to broader populations or contexts (Massaro et al., 2019).

As a result of the research objective, the main stakeholders include: the Operations department and the Data & Analytics department of the two-sided B2B platform organisation and its business partners upstream into the supply chain. Engaging these stakeholders is crucial as it ensures that multiple perspectives are considered, leading to a more holistic understanding of the needs, challenges and opportunities associated with data-driven value creation (Kuechler & Vaishnavi, 2012; Mettler et al., 2014). Their involvement will help identify the specific needs of business partners in data-driven applications and/or services.

A qualitative research approach will be employed as part of data collection. This will involve conducting semi-structured interviews with the stakeholders to gather rich, detailed information. By doing so, this approach allows for the collection of qualitative data based on personal insights regarding the ways in which B2B platforms in the construction sector can create value for their business partners through the use of DDVPs, and subsequently monetise this value in an effective manner.

To analyse the qualitative data using a systematic approach, the Gioia method is applied. Furthermore, to gain a deeper understanding of the needs, challenges and opportunities associated with data-driven value creation and monetisation, within-case analysis and cross-case analysis are employed in a sequential manner. Within-case analysis entails the examination and comparison of the outcomes of manufacturers (business partners), whereas cross-case analysis involves the investigation of similarities and differences between the platform and its business partners (Ayres et al., 2003).

As a result, a roadmap for B2B platform organisations in the construction sector can be formulated, showing how they can best evolve from primarily industrial transactional platform to an industrial platform ecosystem (Madanaguli et al., 2023). By creating data-driven value that is aligned with the digital capabilities and data-driven maturity of themselves, and of course the relevant partner. This (maturity) roadmap is based on an analysis of academic literature, the integrated framework, and the personal motivations and perspectives of stakeholders of the case company. In addition, building upon the insights gained from the qualitative data, a data-driven service or product will ideally be designed for the case company that delivers value to their business partners.

5.2 Data Collection

Quantitative research focuses on numerical data and statistical analysis to test hypotheses and identify generalizable patterns. Therefore, aiming to objectively measure and quantify phenomena and often confirm or refute existing theories. In contrast, qualitative research centres on exploring and interpreting complex human experiences and social phenomena. Therefore, making use of descriptive data to gain in-depth understanding of specific context, often generating new theories or insights through inductive reasoning (Bryman, 2017).

Considering the qualitative characteristics of this research, semi-structured interviews will be conducted with key stakeholders from the Operations department, the Data & Analytics department, and the business partners of the two-sided B2B platform organisation. By using semi-structured interviews, it allows the researcher to take a flexible but focused approach to data collection. This enables both a more in-depth exploration of specific topics and the coverage of predetermined themes depicted from the literature analysis (Balushi, 2018). This degree of flexibility is advantageous when investigating complex issues, such as data-driven value creation, where participants from different departments may hold different perspectives to this concept. Furthermore, semi-structured interviews facilitate respondents' expression of thoughts in their own words, which typically yields more profound insights than structured data or questionnaires. Moreover, this form of interview allows the researcher to clarify answers, thus limiting the chances of misinterpretation (Adeoye-Olatunde & Olenik, 2021)

The interviews will be conducted individually, as group interviews make it difficult for the researcher to ask follow-up questions. Similarly, individual interviews prevent respondents from having their opinions influenced by statements made by other respondents. Furthermore, all respondents will be

given comprehensive instructions beforehand, as there is a chance that in the sample group, respondents are not or less familiar with the research topic: data-driven value creation and data monetisation using data-driven value propositions. However, this method of interviewing also allows the researcher to clarify issues during the interview.

5.3 Sample selection process

The stakeholders for this research encompass: Operations department of the case company, the Data & Analytics department of the case company and their associated business partners – specifically their window and frame manufacturers. This 'population' can be divided into homogenous subpopulations based on specific characteristics (e.g., department, role & responsibility and perspective towards the research subject). As these subgroups differ in size, principles of the stratified sampling method are adopted to capture representative insights from each subgroup (Mweshi & Sakyi, 2020). In this case, stratified sampling enhances the research generalisability and validity. Moreover, it helps prevent research biases like undercoverage bias (Sharma, 2017). Figure 3 shows the sample selection process.

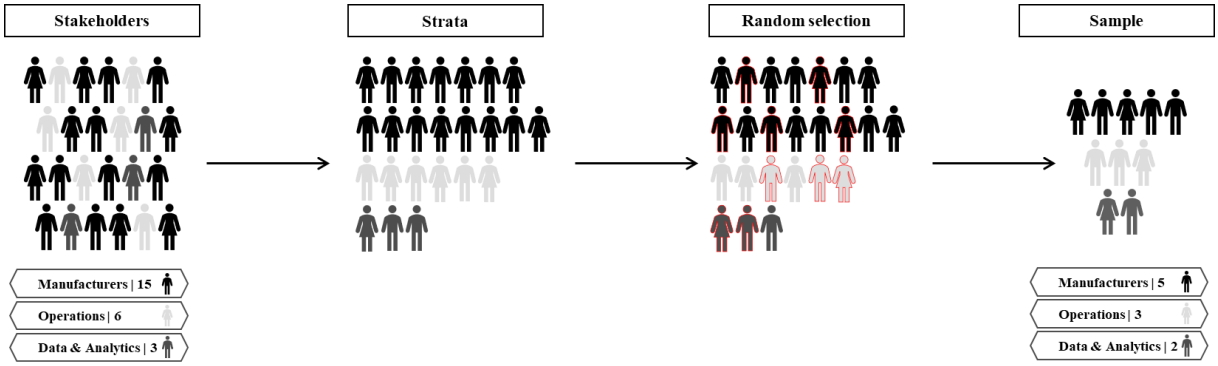


Figure 3: Stratified sample selection process

The total group of stakeholders consists of 24, divided into 15 attached manufacturers of windows and frames, 6 employees of the Operations department and 3 employees of the Data & Analytics department. Eventually, 10 suitable participants were selected. For single case studies, Creswell (2013) recommends involving 4 to 5 cases, which could correspond to a similar number of participants (Creswell, 2013). However, as the sample shows heterogeneity, a larger sample size is preferable to capture the diversity of perspectives. Therefore, Kuzel (1999) suggest a sample size of 12 to 20 participants (Sim et al., 2018). Given the relatively small population and available resources within the case company, 10 participants were selected for semi-structured interviews – five internal employees and five external manufacturers. As Emmel (2013) emphasizes: "it is not the number of cases that matters, it is what you do with them that counts" (Emmel, 2013).

By applying principles of stratified sampling method, it was ensured that every subgroup was represented in the data collection. In the random selection process, employees of the case company were selected based on their roles and responsibilities. Employees whose roles and responsibilities had the

most affinity on the research topic were chosen. The manufacturers, on the other hand, were selected based on the Roger's model of diffusion. Table 2 shows the list of participants, including their role, and interview duration.

Table 2: Participants interviews

Participant	**Subgroup**	**Role**	**Interview Duration**
Interviewee 1	Manufacturers	Head of Ecommerce	1:08:57
Interviewee 2	Manufacturers	Partner Manager	54:18
Interviewee 3	Manufacturers	Chief Commercial Officer	51:50
Interviewee 4	Manufacturers	Manager Operations	55:41
Interviewee 5	Manufacturers	Chief Commercial Officer	59:55
Interviewee 6	Operations	Partner Product Manager Wood	1:10:37
Interviewee 7	Operations	Partner Product Manager PVC/Alu	1:12:07
Interviewee 8	Operations	Manager Operations	1:09:19
Interviewee 9	Data & Analytics	Data Analyst	53:59
Interviewee 10	Data & Analytics	Chief Data Officer	1:07:23

Roger's Model of Diffusion categorises organisations and individuals into groups based on their readiness to adopt new ideas and technologies. Roger's model outlines five key stages of adoption: *innovators, early adopters, early majority, late majority,* and *laggards,* each representing a different degree of openness and speed in embracing innovation (Rogers, 2003). As the literature review revealed, a high-level of innovation capacity of both platform organisation and other actors in the chain, is an important factor for deploying data-driven applications in collaboration (Hartmann et al., 2016). By taking this into account in the selection process of manufacturers, the full spectrum of adoption behaviour is covered.

The Operation department, which works closely with the manufacturers on a daily basis, helped select the manufacturers. Their familiarity with the operational nuances of these partners allowed for an informed selection process. The selected manufacturers, referred to as MNF_A till MNF_E, and their key characteristics are presented in Table 3.

Table 3: Overview of manufacturing participants

Manu-facturer	*Material*	*Head-quarters*	*Founded*	*Employees*	*Revenue (2023)*	*% of revenue through platform*	*Classified as**
MNF_A	PVC – Alu	Lithuania	2014	76-100		60 - 80%	Innovators
MNF_B	Wood	The Netherlands	1979	51-75		27,5%	Early majority

MNF_C	ALU	The Netherlands	2009	26-50	4%	Early adopters
MNF_D	Wood	The Netherlands	1906	101-125	25%	Laggards
MNF_E	PVC	The Netherlands	2013	26-50	10%.	Late majority

By carefully selecting participants, this research can ensure that the data collected is highly relevant to the research question. This increases the likelihood of obtaining meaningful insights from different perspectives.

5.4 Development of semi-structured interview questions

High-quality interview questions are essential, especially when conducting a single case study, as the quality of the results heavily depends on them. For this reason, the researcher developed an interview protocol, which was briefly discussed with each participant before the interview began. The protocol is presented in Appendix H.

At the beginning of each interview, introductory questions were asked to gain a better understanding of the interviewee, their role, the organisation, the current collaboration between the platform business and the manufacturer, and the role data currently plays within this collaboration.

The main part of each interview consisted of questions regarding the interviewee's perspective on industrial business model types, external data-driven value creation, data-driven value propositions, and external data monetisation strategies. Additionally, it explored the necessary capabilities and challenges that might occur when transitioning to a more data-driven business model.

The questions in the semi-structured interviews were based on existing theory, combined with the established integrated framework and the specific characteristics of the platform company in the case study. Given that there were three subgroups involved, each subgroup received a slightly different interview guide to reflect their distinct roles within the concept under review; however, the questions were mostly similar across groups. The final part of the semi-structured interview focused on necessary capabilities and possible challenges that need to be addressed moving forward (Kallio et al., 2016). Together, the semi-structured interviews were designed to provide detailed answers to sub questions below (Table 4), in order to make a statement on the overarching research question.

Table 4: Sub questions

Sub-question	**Related to**
1. *Which external data-value creation options creates value according to business partners in the construction industry?*	Strategic dimension
2. *What data monetisation strategies can B2B platform companies adopt when creating data-driven value for their business partners in the construction industry?*	Strategic dimension

3. *What key capabilities influence the adoption and success of data-driven value propositions in the construction industry, and how can B2B platform companies address these potential challenges?*	Maturity dimension

Each interview guide can be seen in Appendix I-K. As most of the interviews are conducted in Dutch, the interview questions are formulated in their native language.

5.5 Data analysis

To analyse the qualitative data collected from semi-structured interviews, this study employed the Gioia Methodology (GM), a systematic approach appropriate for inductive research. It enables the development of new concepts or building theories by preserving participants' voices while simultaneously abstracting insights gathered into theoretical concepts (Gioia et al., 2013). This aligns with the study's objective of understanding and conceptualising how a two-sided B2B platform in the construction industry can leverage their data to create value for its business partners and monetise it effectively.

The GM approach involves a multi-step inferential process, leading to the development of a Data Structure.

1. ***Developing First-Order Concepts:***
   The analysis begins by carefully scanning the transcripts of the semi-structured interviews to identify words and phrases that describe the participants' views on the concept of integrating data-driven value creation into the collaboration between B2B platform and business partners (manufacturers). It also encompasses their views on the various DDVPs, data monetisation strategies and the required capabilities and expected challenges. At this stage, it is extremely important that their perspectives are authentically represented without researcher bias (Magnani & Gioia, 2023).
2. ***Generating Second-Order Themes:***
   In this stage, the researcher interprets the first-order concepts to identify underlying patterns or themes. This process involves sorting, reducing, and aggregating the first-order concepts into more abstract themes by combining empirical evidence with existence theory. This reduces the overwhelming number of categories to key categories, i.e. second-order themes (Magnani & Gioia, 2023).
3. ***Developing Aggregate Dimensions:***
   The last stage entails an inferential process that transitions from inductive reasoning to abductive reasoning, where the researcher creatively integrates emerging data with extant theory to produce novel theoretical insights. Second-order themes are hereby further distilled into overarching theoretical dimensions (Magnani & Gioia, 2023).

This step-by-step process results in a Data Structure, visually representing the progression from first-order concepts to second-order themes and finally to aggregate dimensions. It shows how participants' voices relate to theoretical constructs (Magnani & Gioia, 2023).

To develop a Data Structure, the semi-structured interviews were initially transcribed for analysis. The qualitative data was then systematically organised and coded using Atlas.ti software, which helped manage the large volume of text efficiently. The tool's features supported the researcher in applying the GM approach, enabling effective handling of codes and memos, as well as creating network visualisations that illustrated the data structure in a clear diagram.

The objective of the analysis was to identify the key aggregate dimensions that are relevant to the research question, and its sub questions. The resulting diagram of the Data Structure shows the progression from data to theory. It illustrates how first-order concepts derived from participants' own words were transformed into second-order themes through researcher interpretation and then distilled into aggregate dimensions. The Data Structure provides a clear and transparent path that adds credibility to the findings and demonstrates the rigorous analytical process. A data structure was developed for each subgroup and can be found in Appendix L, M & N.

Once the data structure had been developed, a within-case analysis was conducted to gain a deeper understanding of the specific findings relating to the manufacturers. A within-case analysis is an in-depth examination of each unit of analysis as a standalone case. This allows researchers to gain a deeper understanding of the unique contexts and nuances within each case (Yin, 2017). This approach ensures that the researcher can gain insight into how each manufacturer individually perceives the concepts of data-driven value creation and data monetisation. This will help discover whether a one-size fits all solution will be possible, or whether there is a need for customised data-driven services and/or products, as manufacturers' needs differ significantly. This will also provide a more comprehensive understanding of the digital maturity and data-driven literacy of the manufacturers themselves.

Subsequently, the perspective of the platform company was analysed and compared with that of the manufacturers, applying a form of cross-case analysis. Cross-case analysis involves comparing and contrasting the sub-units to identify similarities and differences, which helps to gain a more comprehensive understanding of the phenomenon under study (Yin, 2017). The use of within-case analysis provides a detailed understanding of individual cases, while subsequent cross-case analysis enables pattern recognition and theory building across the larger case. This sequential approach leverages the strengths of both methods to produce more insightful and generalisable research findings for being able to answer the research question.

By adopting the GM first, followed by a within-case and form of cross-case analysis, both the reliability and validity of this qualitative research was ensured. Reliability in qualitative research refers to the

consistency and dependability of the findings, indicating that the results are stable and consistent over time and across different observers (Solarino, 2019). Validity pertains to the accuracy and truthfulness of the findings, ensuring they accurately represent the phenomena being studied and that the conclusions drawn are credible (Junior et al., 2019). By systematically organising the data and clearly separating the participants' own words (first-order concepts) from the researcher's interpretations (second-order themes), this method reduces personal bias and makes the process more transparent (Gioia et al., 2013). Creating a Data Structure diagram provides a clear record of the analysis steps, allowing others to follow how the conclusions were reached, which strengthens the study's reliability.

6. Results

To explore how a two-sided B2B platform in the construction industry can leverage its data to create and monetise value through DDVPs, semi-structured interviews were conducted with key stakeholders. These stakeholders included members of the Operations and Data & Analytics departments of the case company, as well as associated manufacturers. The interview questions were informed by the literature review, the integrated theoretical framework, and the specific characteristics of the platform organisation. The interviews took place in September and October of 2024, of which the interviews with the Operations and Data & Analytics departments were conducted at the location of the case company. Manufacturer interviews took place both on-site and via Microsoft Teams.

Given the richness of the qualitative data collected, this section focuses on the key findings to highlight critical insights from the perspectives of both manufacturers and platform stakeholders. These key findings are derived from the within-case and cross-case analyses, in which the within-case analysis examined the perspectives of manufacturers and platform departments separately. Critical insights of each manufacturer and platform business are outlined using the aggregated dimensions, developed as part of the Data Structure based on the GM-approach. Subsequently, the findings are compared across manufacturers to identify recurring patterns, key challenges, and notable variations.

The cross-case analyses compared the perspectives of the manufacturers and the platform business. These comparisons revealed critical insights into data-driven value creation opportunities, external data monetisation strategies, and factors influencing the implementation of data-driven business models in the construction industry. For brevity, as mentioned earlier, this section summarises the key findings from these analyses. A detailed elaboration of both the within-case analysis and cross-case analysis, including tables showing the second-order themes and aggregated dimensions, can be found in Appendix O till Appendix Q.

Finally, the results are summarised in a roadmap for the B2B platform in the construction sector, describing the transition to an industrial platform ecosystem through DDVP (paragraph 6.2). Taking into account the external data-driven value creation options, monetisation strategies, capabilities and challenges in each phase.

6.1 Key Findings – summary

This paragraph summarises the insights of the manufacturers and the platform company, highlighting the key findings from the within-case and cross-case analyses. These findings are presented through frequently recurring themes such as readiness for data-driven collaboration, value needs, suitability of DDVPs, external data monetisation strategies, capabilities, and challenges associated with the adoption of DDVPs. By identifying clear similarities, differences, and obstacles, these refined insights pave the

way to enhance collaboration between the platform company and its business partners while fostering the platform's evolution from transactional into an industrial digital ecosystem.

Readiness for Data-Driven Collaboration

Readiness for data-driven initiatives varied widely across stakeholders, revealing a spectrum of digital maturity and readiness-level. MNF_B and MNF_C demonstrated an advanced stage of readiness by actively integrating tools such as AI and (predictive) analytics into their internal decision-making and process management. MNF_B remarked: "*We use big data through AI-driven software,"* showcasing their ability to enhance operational decision-making and gain efficiency.

Conversely, MNF_D and MNF_E were found to be less advanced, relying heavily on manual workflows and lacking sophisticated tools such as software packages to streamline digitalisation and automation. MNF_D noted: *"The ERP system must first be properly in place before our organisation is ready for the adoption of data-driven products and/or services."* Smaller manufacturers further highlighted limited budgets and short-term operational focus as significant barriers to achieving higher levels of data-driven collaboration. As MNF_A explained: *"If the costs are too high, we might not be able to implement certain technologies or services. For us, it's often a question of surviving from month to month."* This financial pressure diminishes their capacity to invest in digital tools and technologies, thereby widening the readiness gap.

The platform itself acknowledged its early stage of digital maturity, with its Chief Data Officer admitting: *"We have a lot of data but cannot always unlock it effectively. We also don't have everything available in data yet."* This highlighted the need for internal efforts to expand data resources and improve accessibility to increase data reliability. In addition to more effective data-driven collaboration, this will also build trust with its partners, fostering the future roll-out of data-driven initiatives.

Furthermore, cultural readiness varied significantly, with traditional manufacturers expressing scepticism about the benefits of digitalisation. As one Operations Manager noted: *"Some producers don't see the value of digitalisation, believing manual processes are sufficient."* This resistance underscores the importance of fostering an innovation mindset trough incremental change and demonstrated benefits. To bridge the cultural gap, the perception of traditionally minded stakeholders needs to be gradually adjusted to highlight the tangible benefits of digitalisation. The platform can do this by integrating small-scale initiatives (quick-wins) on the one hand and sharing success stories of stakeholders classified as innovators/early adopters on the other.

In summary, from the insights gained it can be argued that readiness for data-driven collaboration in this context is dependent on financial, technological and cultural factors. While more innovative-driven manufacturers are better prepared to engage in data-driven collaboration, traditional manufacturers, often smaller in size, face obstacles that require tailored interventions. Similarly, the platform's early-

stage digital maturity, as data is primarily used for internal purposes, highlights the need for internal improvements to fully realise its potential as a facilitator of data-driven collaboration. Moving forward, the identification of these readiness challenges forms the basis for exploring how data-driven value needs can align different stakeholder priorities.

Data-Driven Value Needs

Both the manufacturers and the platform shared a common priority: actionable insights that drive operational efficiency. Manufacturers emphasised the critical importance of predictability in production planning, with MNF_A stating: *"For us, it's crucial to have predictability in our production load, as it impacts how we plan three to six months in advance."* In addition, data should help automate the production process. For example, MNF_B indicated: *"We actually want to be able to achieve a very fast production process. If the data comes to us in a way where we only have to do a check, that would be ideal. The faster we can get that done, the faster we can reduce work preparation and reduce cost."*

From the platform's perspective, predictive analytics for more efficient capacity management and order routing were highly valued. Aligning these priorities is key to ensuring mutual benefits within the collaborative ecosystem.

Additionally, customer feedback and benchmarking data emerged as key needs for manufacturer. MNF_C identified opportunities for product refinement through feedback: *"If we receive feedback from end customers, it could help us improve our product or service."* The platform concurred, recognising the vital role of benchmarking and relaying valuable customer feedback to manufacturers in enhancing product and service quality, thereby strengthening competitiveness. This view highlighted the importance of data-driven feedback loops to drive product innovation and enhance platform competitiveness.

Manufacturers with advanced digital maturity showed interest in deeper insights to tackle operational inefficiencies. Proposed solutions included track-and-trace systems for glass and frame racks to reduce manual tasks and QR codes on frames for lifecycle monitoring and providing product-specific information to end customers. In contrast, manufacturers reliant on manual order allocation highlighted the need for digitalisation through XML- or API-driven integration. The differences in maturity leaves its mark in terms of the diversity of data-driven needs of manufacturers. This calls for tailored solution and targeted support from the platform.

The platform company shared these priorities regarding the data-driven value needs of its manufacturers and positioned itself as a facilitator to support these objectives. As described by the PVC/ALU Manager: *"I believe most of the value lies in running a factory as efficiently as possible through predictive data. If we can consistently provide the factory with predictable allocations, efficiency improves, and the price becomes better on both sides. It's not that a factory can offer a better price for a single frame, but the*

entire factory operates more efficiently. Perhaps additional production capacity is freed up, and that's where the real gains are."

In summary, it is important for a platform to align its data-driven initiatives with the needs of manufacturers. In this case, the shared emphasis on actionable insights, predictability and improving operational efficiency. While more sophisticated manufacturers benefit from more in-depth, more complex to arrange analytical tools, less mature stakeholders need fundamental support to firstly eliminate manual processes as possible through data-driven automation. The insights derived from this analysis facilitate the evaluation of the suitability of DDVPs to address these diverse needs and unlock further value for all stakeholders involved.

Suitability of DDVPs

The DDVPs identified by Ritala et al. (2024) were presented to the stakeholders, with Data-Driven Services unanimously emerging as the value proposition with the most immediate impact in this research context. Services aligned with this proposition, such as real-time dashboards and predictive analytics, were widely appreciated for their ability to streamline operations and provide actionable insights. As MNF_B noted: *"If data arrives in a way that we only need to verify it, that would be ideal, reducing preparation time and lowering costs."* The platform echoed this enthusiasm, emphasising: *"We enrich the data, present it, and provide them with insights into their production processes."*

Data-driven initiatives related to Data-Enhanced Products, such as QR-codes for life cycle monitoring, were regarded as promising for long-term use. MNF_E envisioned: *"The customer scans that code and immediately gets all the information about the specific window frame,"* while the platform highlighted its potential for maintenance and service efficiencies. The Manager Operations described it as follows: *"At the moment, we are primarily focused on selling, ordering, producing, and delivering frames. But we are increasingly dealing with the product's lifecycle, such as maintenance, damage, or replacements. What happens in those cases is that these service requests eventually come back to the manufacturer, whether it's due to a broken component or a part that needs to be delivered. In such situations, it would be useful to know which materials were used and where the product originated (bill of materials). A QR code could help with that. If you can quickly identify and order parts in this way, it saves a lot of time in preparing work and handling service requests. You could also analyse how much damage typically occurs with the frames and at what point in their lifecycle it happens. That would be valuable information for the manufacturer."* These insights highlighted the potential of Data-Enhanced Products to facilitate operational efficiency and support long-term product lifecycle management, paving the way for more innovation in the ecosystem.

In contrast, Data-as-a-Product received significant criticism. Most manufactures, except for MNF_C, lacked the expertise to process raw data. MNF_D stated: *"I do not think that expertise really lies with*

us as a timber factory." The platform agreed, adding: *"If you throw raw, unprocessed data over the fence, you cannot expect them to do anything with it."* This feedback highlighted the need for pre-processed, actionable insights rather than raw data. As well as the importance of facilitating tailored solutions by the platform, due to limited data expertise among stakeholders within this industry.

Data-Enabled Performance Outcomes was met with some scepticism by the stakeholders. The Wood Manager expressed doubts about the applicability of it: *"But beyond that [using QR codes for easily transferring of product information] I wonder what you would actually do with it in the collaboration [platform and frame manufacturer]. Apart from, for example, indicating earlier that something needs to be painted, I don't yet see what we would genuinely do with it at this point."*

The Manager Operations concurred, adding: *"In non-residential construction where large office buildings are built, this could be very interesting. Particularly for building maintenance and similar parties, as they want insight into the state of maintenance. And for example, in the case of profile suppliers such as Schüco and Gealan, they might also want to know how their PVC profiles are performing. How long do they last, and how do they perform under different weather conditions? But when we look at this case – in collaboration with frame manufacturers – I don't think they would have many interests in that [the valuableness for frame manufacturers of using sensors and chips in frames]."*

Despite these reservations, the cross-case analysis highlighted the potential for future applications of advanced DDVPs, such as life cycle monitoring and proactive maintenance through predictive analytics. These opportunities could be realised as stakeholders become more prepared and invest in incremental changes. The Operations Manager stressed that such data-driven innovations would extend their impact beyond the direct platform-manufacturer relationship to involve the entire ecosystem, observing: "*But if you look at it on a larger scale, as we aim to grow with [case company], it could be useful. Imagine we become a massive platform supplying various products, including frames. Then we could use that data, such as sensor data, to extend further into the supply chain."*

External Data Monetisation Strategies

The findings from both manufacturers and the platform revealed a strong preference for indirect data monetisation strategies embedded within the current partnership, as this foster collaboration and minimise friction. As the Chief Data Officer explained: *"Indirect data monetisation aligns with our strategy and fosters collaboration without disrupting partnerships."*

Manufacturers echoed this view, with MNF_D stating: *"Ultimately, as I mentioned earlier, you want the platform to improve. And I believe data can help achieve that. But to then tell a company, 'You need to improve, and if you want the necessary data, you have to pay for it,' that does sound a bit odd. If the platform grows, we receive more orders, and if we manufacture better frames, they gain satisfied customers. It's a win-win. So, in the end, everyone benefits from this collaboration. If we perform well,*

the platform benefits, and vice versa." This shows how indirect monetisation can help align the incentives of alle stakeholders.

Most manufacturers were opposed to direct data monetisation strategies. However, a few were open to paying if it yielded clear, measurable benefits. MNF_C remarked: *"Suppose hypothetically that it yields me a return improvement of €25,000 per year, then I would be willing to pay, for example, €5,000 for that."* However, such strategies were viewed most of the time as disruptive, potentially causing friction within partnerships. An Operations Manager remarked: *"If we charge for data that helps them improve, but they must first pay for that information, it conflicts with how we want to collaborate."* This hunch shows that while direct data monetisation is generally considered disruptive, it may have limited applicability when returns are demonstrated. Nevertheless, the risk-averse behaviour of stakeholders within this industry will likely result in the preference for indirect data monetisation strategies during the early stages of data-driven collaboration.

Hybrid models, combining free basic insights with premium options, were identified as a potential middle ground for future exploration. The platform suggested that *"a premium subscription could provide access to advanced data services"* while maintaining the collaborative nature of relationships. However, indirect monetisation remained most aligned with the existing partnership model.

Capabilities

The capabilities of manufacturers and the platform reveal a spectrum of readiness and innovation potential, influenced by their technological maturity and data literacy. MNF_B and MNF_C demonstrated advanced analytical capabilities and robust infrastructure, including AI-driven analytics and Power BI dashboards. These tools enable them to act autonomously based on data, although MNF_C currently remains limited to transforming data into actionable insights for decision-making. However, they possess the analytical skills necessary to process and interpret data. As MNF_C emphasised: *"We can derive insights using tools like Power BI if the data is well-prepared."*, referring to the suitability of 'Data-as-a-Product' as value proposition within the collaboration. These manufacturers are well-positioned to leverage data-driven tools and apply insights to enhance production efficiency.

Conversely, MNF_D and MNF_E displayed limited readiness, heavily reliant on manual processes and basic tools such as Excel. MNF_E admitted: *We are still very much an Excel-based organisation, but we are implementing an ERP system this year."* Financial and technological constraints further hinder their capacity to adopt advanced solutions, underlining the need for tailored support to bridge these gaps.

The platform benefits from a robust technological foundation, including cloud-based infrastructure and API-driven tools. However, gaps in data literacy and challenges in delivering actionable insights were noted. As a Data Analyst observed: *"We sometimes give too much information when just one figure would suffice. Interpretation must be clear and simple."* This internal comment underlines the

importance of clear unambiguous communication of information to stakeholders outside the organisation. And the fact that this information is well aligned with manufacturers' priorities will benefit mutual trust. By better establishing data governance, refining the communication of information and thus value, the platform can further strengthen its role as a trusted partner in data-driven initiatives.

Lastly, as mentioned earlier, differences in cultural and organisational readiness also emerged as critical. Traditional manufacturers exhibited resistance to digital transformation, often focusing on short-term operational priorities. These attitudes underline the importance of tailored communication of data-driven value and co-development strategies to foster engagement.

Challenges in Executing DDVPs

The successful execution of DDVPs in the construction industry is constrained by several challenges:

1. ***Data Accuracy and Trust:***

   Both manufacturers and the platform stressed the importance of reliable data. MNF_A noted: *"Incorrect data would definitely cause problems. If the data is wrong, we could end up with production delays, losses, or incorrect orders."* In addition, the platform works with several manufacturers, all of which have their own interests. This raises an additional concern, addressed by MNF_C: *"[case company] works with several manufacturers. The moment data is shared with our competitors [other manufacturers], you do have to look carefully at how you handle that. Ultimately, you want to strengthen your business operations, not weaken them"*.

   This situation stresses the need for robust data governance frameworks in order to guarantee the consistent and reliable delivery of information, thereby fostering and ideally increasing the trust between the platform and the manufacturer. Establishing clear data validation processes and real-time monitoring by the platform can mitigate risks around data accuracy.

2. ***Cultural Resistance:***

   Traditional attitudes among manufacturers limit enthusiasm for digitalisation, creating a significant barrier to the adoption of DDVPs. As an Operations Manager observed: *"Some producers don't see the value in digitalisation, believing manual processes are sufficient."* This attitude is at odds with the platform's approach to digitisation through data and its future intentions to collaborate with partners. To address this cultural divide, the Operational Product Manager PVC/Alu advocates a strategy of enhancing awareness among manufacturers regarding the added value of data. He explained it as follows in the interview: *"At [case company] we think data is very important. But that does not apply to all our partners; interests are not always the same. However, if we want our partners to work with it, we have to present the data in such a way they actually want to use it. The moment they know what you can do with it, they are definitely inclined to exploit the added value of our data. The challenge is: how do*

you show the partner the added value of using data? What do we have to offer them? If we make them aware of what they get from us and what it can deliver, I think we can overcome this barrier."

This finding aligns with the notion that demonstrating the tangible benefits of data-driven initiatives, in order to convince traditionally minded manufacturers to embrace this novel form of collaboration. The presentation of success stories and the introduction of incremental data-driven initiatives can help shift perspectives over time.

3. ***Maturity and Financial Barriers:***
   Smaller manufacturers face resource constraints that hinder their ability to adopt advanced systems. Incremental support and tailored implementation strategies can help address these barriers. Building on this, the majority of an organisation often determines the extent which in-depth investments can be pursued. Larger investments, such as those in digitalisation, are typically accompanied by an increasing focus on key factors like efficiency and payback periods.

   The Operations Manager highlighted this phenomenon, stating: *"As organisations grow their investments and professionalise, the significance of making efficient choices and ensuring optimal payback periods becomes increasingly critical. This evolution often results in the creation of dedicated roles responsible for strategic decision-making. To fulfil these responsibilities effectively, access to accurate, reliable, and actionable data becomes indispensable, enabling informed choices that drive efficiency and long-term success".*

   Addressing these barriers requires step-by-step support, tailored implementation strategies and accessible tools designed to deliver immediate value without significant upfront investment when financial resources are limited.

4. ***Technical Limitations:***
   Integrating APIs and managing complex data exchanges remain significant challenges for manufacturers with lower technological maturity. The platform must address these limitations to create a cohesive data ecosystem. However, manufacturers do not see this as a major challenge. It is a matter of time, willingness, having the right people and having the right systems on both sides to work together at a higher level of data and technology.

   This transition is already underway, with MNF_E stating that a new ERP system will be implemented in 2025: *"...with a new ERP system and everything that goes with it, we can move forward with [case company] to automate orders."*

5. ***Privacy and Security Concerns:***

   Manufacturers expressed concerns about data sharing within a competitive ecosystem, as mentioned by MNF_C. The platform acknowledged this sensitivity, emphasising anonymisation and transparent governance to build trust. These measures are essential for encouraging collaboration in a data-driven environment. To promote mutual trust within the collaboration, it is important to pay attention to security and privacy. Clear protocols and anonymised datasets with information can address concerns while encouraging wider stakeholder participation.

6.1.1 Conclusion

The findings reveal alignment in priorities but disparities in readiness and capabilities across stakeholders. Data-Driven Services emerged as the most promising DDVP, due to their ability to deliver immediate operational improvements, while advanced propositions like Data-Enabled Performances Outcomes require further readiness. Stakeholders preferred indirect monetisation strategies that align with collaborative partnerships, though it can change with the use of hybrid models with premium options if these suits the situation in the future better.

Key challenges include data accuracy, cultural resistance, financial constraints, and technical limitations. Incremental implementation, trust-building, and tailored support are critical to overcoming these barriers. By addressing these challenges, platforms can foster data-driven collaboration, enhance operational efficiency, and drive sustainable innovation, ultimately transitioning into industrial digital ecosystem.

6.2 DDVP-continuum roadmap

The strategic roadmap, based on critical insights obtained through the analysis of semi-structured interviews with stakeholders, as depicted in Figure 4, provides a clear progression for B2B platforms in the construction industry to incrementally develop data-driven collaboration with business partners through the Data-Driven Value Proposition Continuum (DDVP-continuum). The roadmap consists of three phases, each outlining how the DDVP creates value and can best be monetised using strategy(‘s).

1. ***Start with Data-Driven Services (Servitisation):***

   In the initial phase, B2B platforms offer tailored basic customised data to enable quick operational improvements. These dashboards provide insights into key, aligned KPIs such as on-time delivery, capacity utilisation, and error rates, allowing partners to gain greater control over their own operations and performance. Additionally, it adds value to discreetly provide benchmarking data and current market insights, enabling manufacturers to react more quickly to trends and developments, benefiting the platform itself. Supplementary services may include predictive analytics, such as demand forecasting, to anticipate future data-driven needs.

For the case company, these actionable insights are delivered through the existing partner portal. Generally, the quickest way to integrate such services is within already established shared workspaces, simplifying the process of transferring data-driven services. Since this marks the first step towards a data-driven collaboration between platform and business partner, the primary aim is to familiarise partners with the benefits of data-driven decision-making. The most suitable strategy for this is Data Wrapping, a form of indirect data monetisation, where no direct price tag is attached to the developed and delivered data-driven services by the platform. Instead, it should be viewed as an integral part of the partnership, where the integration of the DDVP brings mutual (indirect-monetary) benefits.

This phase lays the groundwork for digital adoption by building trust, demonstrating immediate operational benefits, and encouraging long-term collaboration.

2. ***Progress to Data-enhanced Products (Productisation):***

   After the desired DVC options have been implemented, and the business partners have primarily advanced in terms of both technological and analytical maturity, the second phase starts. This phase focuses on integrating data-driven features into products, providing practical benefits for collaboration and potentially extending beyond it (e.g., to the end customer). For instance, QR codes enable lifecycle monitoring by providing users (e.g., homeowners) with maintenance information, product-specific details, and simplifying cross-sell purchases. In the case company's context, this could involve items like ventilation grilles or screens. A track-and-trace system for glass and frame trestles eliminates manual tasks, significantly enhancing efficiency. This study has revealed that this is a key focus area for value creation among business partners.

   Platforms still employ Data Wrapping as strategy for data monetisation, where enhanced tools are integrated into existing portals to increase their value. Additionally, hybrid pricing models, such as subscriptions or pay-per-use, can be adopted, offering flexibility for business partners with diverse needs.

   By embedding data into products and providing actionable insights, platforms enhance product utility, improve customer engagement, and establish themselves as strategic enablers. Success requires robust IT systems, such as ERP or CRM integrations, and a collaborative effort to demonstrate value through co-development.

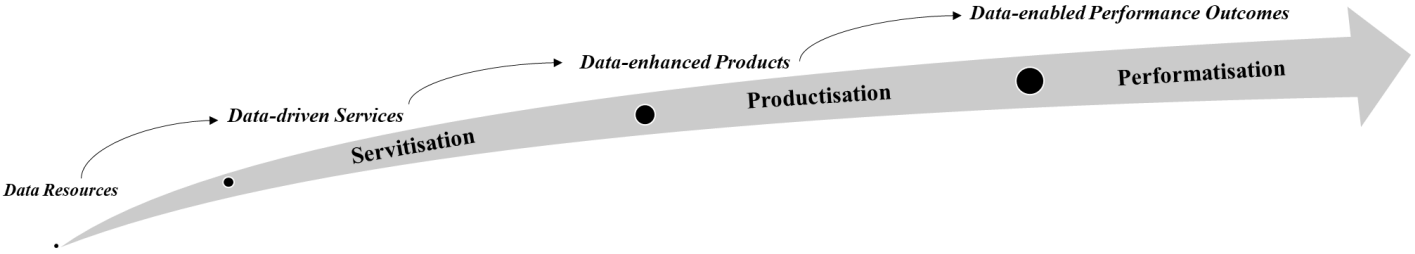
3. ***Aspire to Data-Enabled Performance Outcomes (Performatisation):***

   The final stage enables performance optimisation across the ecosystem. Platforms integrate IoT devices such as NFC chips and other sensors into products to enable real-time performance monitoring, facilitating predictive maintenance and lifecycle management. These tools create ecosystem-wide efficiency and long-term value creation.

Platforms need expertise in advanced analytics (e.g. AI/ML), IoT infrastructure and ecosystem management. Business partners need to adapt to value-based contracts and data-sharing practices to collaborate effectively.

Monetisation is moving towards outcome-based pricing, linked to measurable results such as fewer defects or faster completion of projects. Licence or pay-per-use models can complement advanced lifecycle tools.

Key challenges include measuring performance outcomes, establishing fair contracts and dealing with privacy and security issues. In addition, some tools may not have immediate operational relevance for every actor in the chain, which may delay their adoption or prevent their integration. Despite these challenges, this phase offers transformative value and positions platforms as leaders. By addressing barriers and providing measurable benefits, platforms can drive adoption and foster a performance-based ecosystem.



		Servitisation	Productisation	Performatisation
Strategic	**External Data Value Creation Options** *Kakuschke (2024)*	**DVC9 - Insights** - Basic tailored dashboards for operational visibility and KPI tracking *(on-time delivery, capacity utilisation, error rates)* - Sharing of market insights *(seasonal trends, customer preferences)* - Predictive analytics to enhance production planning and streamline operations - Transition to XML and/or API-integration based on digital maturity level of business partners	**DVC10: Knowledge Product** - QR-codes for lifecycle monitoring, enabling providing of product details, maintenance needs and after-sales services **DVC11: Wrapping** - Track-and-Trace system (e.g., glass and frame trestles)	**DVC12: Perform Action** - Predictive maintenance insights through IoT-integrations (e.g., sensors, NFC-chip), allowing for real-time lifecycle management - IoT-driven performance monitoring
	External Data Monetisation Strategies *Parvinen et al. (2020)*	**Indirect: Data Wrapping** - Indirect data monetisation strategy: embedding insights into existing Partner Portal to increase its value (Partnership focused)	**Indirect: Data Wrapping** - Indirect data monetisation strategy: embedding insights from QR code into existing Partner Portal to increase its value (Partnership focused)	**Indirect: Data Wrapping** - Indirect data monetisation strategy: embedding insights from IoT-applications into existing Partner Portal to increase its value (Partnership focused) **Hybrid model:** - Hybrid data monetisation strategy: use of pricing models (e.g., licensing or pay-per-use) for advanced lifecycle monitoring tools
Maturity	**Capabilities** *Ritala et al. (2024)*	- *Platform*: Advanced data analysis, predictive capabilities, and consulting skills to deliver actionable insights - *Business Partners:* At least access to Partner Portal to receive actionable insights. Additionally, sufficient level of data analytics knowledge to interpret and integrate insights into operations.	- *Platform:* Product development capabilities, integrating data analytics into existing products - *Platform:* Capabilities for aggregating and analysing lifecycle data - *Business Partners:* Digitally mature to develop and integrate data-enhanced features (e.g., QR codes and Track-and-Trace system)	- *Platform:* Expertise in advanced analytics (e.g., AI/ML), IoT infrastructure for sensors/chips, and ecosystem management - *Business Partner:* Ability to engage in value-based contracts (hybrid-model) and share operational data
	Challenges *Ritala et al. (2024)*	- Access to customer data, requiring mutual trust and willingness to share - Ensuring high-quality, reliable data to prevent errors. - Resistance to digitalisation among traditional businesses - Entry-level digital solutions (e.g., XML-based integrations) provide a phased approach for less advanced partners	- Manufacturers' ability to adopt and understand new data-driven features - Lack of clear short-term ROI for traditional-minded partners - Risk of overcomplication diminishing product usability	- Managing and measuring performance outcomes in dynamic environments - Designing fair and transparant contracts for value-sharing - Addressing privacy and data security concerns accross the ecosystem - Limited immediate relevance for day-to-day operational needs

Figure 4: Data-driven value proposition continuum for B2B platforms in the construction industry

For a successful implementation of the DDVP continuum, B2B platforms must prioritise collaboration and alignment with partners. Building trust, ensuring secure data exchange, and maintaining flexibility are crucial for addressing the varying levels of digital maturity among stakeholders. Solutions must be

scalable, deliver immediate benefits in the initial phase, and remain adaptable for future developments as partners expand their digital capabilities.

Most importantly, this roadmap serves as a practical guide for mutual growth rather than a theoretical framework. By progressing through the stages of Servitisation, Productisation, and Performatisation, platforms and their partners can achieve operational efficiency, improved decision-making, and enhanced customer satisfaction. This process fosters the development of a robust data-driven ecosystem that delivers measurable results and establishes a strong foundation for sustainable innovation and competitive advantage in the construction sector.

Additionally, the DDVP continuum, drawing from real-world insights, is adaptable and designed to address varying levels of readiness among business partners. As a result, its applicability extends beyond the case company and is relevant for other B2B platforms in the construction sector looking to introduce data-driven initiatives to their existing or future business partners.

7 Discussion

7.1 Main findings

The purpose of this thesis was to explore how B2B platform businesses in the construction industry can create and monetise data-driven value for their manufacturing partners through tailored DDVPs. The corresponding research question was: *"How can a B2B platform in the construction industry utilise their data to create and deliver value to their business partners through data-driven value propositions, and effectively monetise this value?"* To address this overarching question, three sub-questions were formulated and investigated.

The first sub-question addressed was: *"Which external data-value creation options create value according to business partners in the construction industry?"*

This question was explored through semi-structured interviews with manufacturers and platform stakeholders. The findings indicated that business partners benefit most from external DVC-options that improve operational efficiency. One option that strongly prevailed was gaining "Insights" from data. Manufacturers valued actionable insights such as dashboards that display KPIs (e.g. on-time delivery, capacity utilisation, error rates and seasonal trends) and forecasting analytics for demand and capacity forecasting. Integrated into their Partner Portal, these insights enabled manufacturers to make informed decisions, optimise production planning, and reduce manual workload. Similarly, external DVC-option "Prepared Data" was identified as more valuable than raw data, as it reduces the analytical burden on manufacturers of whom lacked the resources or expertise for in-depth data analyses.

In addition, manufacturers also showed interest in data-driven services allied to 'Wrapping'. Manufacturers identified technologies such as track-and-trace systems for glass trestles as valuable tools to reduce manual activities, improve logistical efficiency, and prevent errors in supply chain operations. Similarly, QR codes on window frames were highlighted as a means of providing essential product information to end users, such as performance specifications, maintenance guidance, and service requests. This facilitates smoother after-sales processes and enhances customer satisfaction. However, more advanced DVC-options encounter barriers such as limited digital maturity and perceived relevance for manufacturers in the window and door frame industry. These insights highlighted the need for platforms to prioritise simpler, operationally focused solutions that address manufacturers' immediate needs, while paving the way for the adoption of more complex data-driven solutions.

The second sub-question investigated: *"What data monetisation strategies could B2B platform companies adopt when creating data-driven value for their business partners in the construction industry?"*

The study revealed a strong preference for indirect monetisation strategies embedded within existing partnerships. Both manufacturers and the platform agreed that sharing tailored insights based on collected data would foster trust, create mutual benefits, and optimise collaboration. Direct monetisation strategies—like subscriptions or pay-per-use models—were seen as more applicable to end-customer value creation, where individualised focus and a willingness to pay directly for added value are prevalent. In the B2B context, however, such strategies were viewed as disruptive, potentially causing friction within partnerships. This distinction underscores the impact of supply chain roles and the interdependence between stakeholders on the choice of monetisation strategies.

In contrast, some manufacturers were sympathetic to the application of hybrid models, such as offering basic insights for free with premium options (e.g. predictive tools or benchmark data). However, as currently no data-driven insights are shared by the platform on an active basis, no data monetisation strategy is currently applicable. So once the platform starts integrating the low-hanging fruit related to data-driven value creation, it is wise to consider it as an investment in collaboration optimisation and thus observe principles of indirect data monetisation.

The third sub-question examined: *"What key capabilities influence the adoption and success of data-driven value propositions in the construction industry, and how could B2B platform companies address these potential challenges?",* highlighted critical organisational, technical and relational factors shaping success.

The results derived from the semi-structured interviews revealed substantial variation in data literacy and analytical skills within the 'manufacturers' stakeholder group. The majority of manufacturers had a strong need for actionable insights rather than raw data due to a lack of analytical expertise. A few, partner MNF_B and MNF_C, could already handle analytical visualisation programmes like Power BI and were actively using data for internal (process) optimisation and decision making. In contrast, the remaining participants benefited from processed insights that ease the analytical burden. Another striking observation was the widely varying level of technological infrastructure. Whereas MNF_B has an advanced ERP system and is trying to integrate AI-driven solutions into their business operations, MNF_D and MNF_E were above all using manual workflows (e.g., order intake). B2B platforms are forced by these analytical and technological differences per factory to offer customised data-driven solutions and XML and/or API integrations that match the digital maturity level of the factory.

The main challenges were data quality and trust in each other, where delivery of unreliable data can undermine trust and hinder adoption. Reliable governance and validation practices are essential to maintain accuracy and enable informed decisions. Cultural openness and willingness to innovate were also barriers, as traditional ways of thinking and short-term financial priorities limited enthusiasm for new technologies. Concerns about privacy and security further highlighted the need for transparent agreements, anonymisation practices and secure systems to promote trust. Stakeholders of the platform

company indicated that the biggest challenge, besides delivering reliable, quality customised insights, was clearly communicating the value delivered to manufacturers.

To address these challenges, platforms should focus on incremental implementation, starting with simple, actionable insights and scaling up to advanced solutions as partners improve. Tailor-made training, joint development efforts and robust data management were identified as essential prerequisites for collaboration and mutual engagement. By building trust, supporting incremental adoption and responding to partners' different readiness levels, platforms can drive sustainable innovation and build a robust ecosystem. On top of that, the platform company itself said to take into account their digital maturity level and willingness to innovate when pairing new factories.

7.2 Theoretical alignment and implications

This research underscores the transformative potential of data-driven value creation for B2B platforms, as highlighted by Trabucchi et al. (2022) and Ritala et al. (2024). The adoption of DDVPs such as Data-Driven Services and Data-Enhanced Products reflects the evolution of platform business models from purely transactional operations towards integrated, ecosystem-driven approaches. Manufacturers expressed strong interest in (predictive) analytics and operational efficiencies—key elements of Data-Driven Services. This aligns with Diane et al. (2020), who emphasised the importance of actionable insights through data analytics for optimising business processes.

However, this study adds a new perspective to the existing literature by focusing on the B2B construction industry, where the recipients of value are manufacturing partners rather than end-users. This distinction highlights that data-driven value creation must prioritise the specific requirements of manufacturing partners, reinforcing the need for operationally focused insights over consumer-style personalisation. Unlike consumer-oriented models, where personalisation and usability are key drivers, manufacturing partners prefer operational efficiency through actionable (predictive) insights around agreed KPIs, as well as market insights and insights into the performance of other affiliated manufacturers. This aligns with Ritala et al.'s (2024) continuum framework for data-driven value propositions, while also demonstrating that Data-Driven Services are the most practical and impactful choice for the construction sector, given its operational focus. This is a marked difference from Ritala et al.'s (2024) continuum framework, where the value propositions Data-as-a-Product and Data-Enhanced Products are the first steps for value creation in B2B environments. This finding suggests that the needs and priorities of business partners in the construction industry demand a tailored approach to DDVP design and implementation.

Furthermore, the study makes a theoretical contribution by broadening the understanding of value creation within platform ecosystems to encompass collaborative, trust-based relationships between platforms and their partners. Trust emerged as a critical enabler of data-sharing initiatives, confirming that robust data governance and transparency are prerequisites for fostering collaborative partnerships

in platform ecosystems. These insights reinforce the findings of Parvinen et al. (2020) on value-based pricing, while adding a layer of specificity regarding the collaborative dynamics inherent in industrial ecosystems.

These sector-specific insights advance the broader understanding of DDVPs by illustrating how contextualised theoretical frameworks can effectively address industrial B2B challenges. It suggests that platforms need to balance generalisable principles of value creation with the unique requirements of their target sectors, especially in industrial B2B contexts. This dual focus not only increases the applicability of existing models, but also paves the way for developing sector-specific strategies that pursue both operational and strategic objectives.

7.3 Practical implications

For managers of platform companies in the construction sector, this study offers several key insights. First, aligning data-driven strategies with manufacturing partners' operational goals is crucial. Platforms should prioritise tailored Data-Driven Services, such as presenting actionable insights based on (predictive) analytics, to demonstrate tangible value and enhance operational efficiency. Offering "quick win" solutions, like dashboards featuring KPIs and delivery performance metrics, helps overcome resistance, builds trust, and strengthens partnerships. These efforts not only address immediate needs but also lay the foundation for deeper collaboration.

Second, the findings emphasise the importance of indirect data monetisation strategies for creating value with business partners. Indirect strategies foster win-win scenarios by embedding data insights within collaborative frameworks, strengthening relationships while avoiding friction from direct monetisation methods. This approach aligns with the collaborative nature of data-driven initiatives, as manufacturing partners are rarely willing to pay directly for the value they receive, as they consider it as part of the partnership.

Third, platforms must assess the digital maturity and innovation capacity of their current production partners, and in their search for future collaborations. Gradually introducing solutions, such as seasonal trend forecasts, end-customer preferences, and predictive planning, ensures alignment with partners' readiness levels. Investing in shared technological infrastructure and co-developing solutions helps reduce the analytical burden on partners with limited data literacy, while fostering a culture of innovation and collaboration.

Finally, progressing through the DDVP-continuum involves transitioning from Data-Driven Services to Data-Enhanced Products and, ultimately, to Data-Enabled Performance Outcomes. This progression requires transparent data-sharing agreements, robust governance, and scalable solutions to build trust and support long-term collaboration. Advanced capabilities, such as QR codes for lifecycle monitoring and IoT-enabled predictive maintenance, offer opportunities for platforms and partners to unlock new

growth avenues. These tools should be introduced in a phased manner to ensure adoption and effectiveness.

For manufacturers, adopting data-driven tools such as dashboards and eventually integrating QR codes into their products represents a critical step towards enhancing operational efficiency and fostering data-driven partnerships. These tools provide actionable insights and enable continuous improvement, helping manufacturers to consistently optimise their processes. By leveraging the DDVP-continuum as a strategic framework, platforms and their partners can collaboratively build a sustainable ecosystem that promotes innovation, mutual growth, and competitive advantage in the construction industry. This gradual, phased approach not only improves operational performance but also strengthens the overall value proposition of platform-based business models.

7.4 Limitations and further research

This study provides valuable insights into data-driven business model innovation for B2B platform businesses in the construction industry. However, several limitations must be acknowledged.

Firstly, the single-case study design, which allows for in-depth research, limits the generalisability of the findings to broader contexts or industries. While the selected case aligns well with the research objectives, it is conceivable that the specific dynamics and characteristics of the platform and its partners may not be fully representative of the broader challenges or opportunities in other construction-based platforms or across industries.

Secondly, the focus on Data-Driven Services within the DDVP continuum stemmed from the digital maturity levels of the case company's partners. While this value proposition appeared to have the greatest impact for the case study, the limited focus on Data-enhanced Products and Data-enabled Performances Outcomes may have precluded insights into longer-term opportunities that arise as platforms progress through the DDVP continuum.

Thirdly, heterogeneity among manufacturing partners, particularly in terms of digital maturity and readiness, created variability that affected the acceptance of the proposed value propositions. Despite identifying commonalities and providing tailored recommendations, the findings may not reflect the nuanced needs of all partners, especially those at the extremes of digital readiness.

Moreover, emerging trends such as AI-driven analytics, IoT-based performance monitoring and advanced data monetisation strategies have not been extensively addressed. This reflects the sector's traditional nature, and the early stage of digital adoption observed among many partners. Nevertheless, these trends represent important opportunities for future research, especially in shaping data-driven business models.

Finally, the reliance on semi-structured interviews and qualitative analysis creates potential subjectivity in the interpretation of results. While systematic methodologies such as the Gioia approach have been used to mitigate this risk, quantitative data or longitudinal studies could provide additional validation and increase the robustness of the conclusions. The exploratory nature of this study remains valuable for uncovering fundamental insights, but a mixed-methods approach could provide a more comprehensive understanding of the phenomenon.

To address these limitations, future research could explore cross-industry comparisons or multiple case studies to validate and expand the applicability of the proposed framework. Investigating the long-term effects of implementing DDVPs on platform scalability and partner satisfaction could provide more robust evidence of their effectiveness. In addition, future studies could incorporate quantitative metrics to measure the financial and operational benefits of specific data-driven strategies.

Finally, given the dynamic nature of technology and business ecosystems, research on emerging trends such as the integration of AI-driven analytics, IoT-based performance monitoring or sector-specific data monetisation strategies would be of great value. Extending the scope to end-user perspectives or multi-sided platform models could also lead to a more holistic understanding of data-driven business model innovation.

7.5 Conclusion

The aim of this study was to identify how B2B platform companies in the construction industry can create value for their business partners using data-driven value propositions, and how the value created can be monetised. Hence, the following research question was formulated*: "How can a B2B platform in the construction industry utilise their data to create and deliver value to their business partners through data-driven value propositions, and effectively monetise this value?"*

To address this question, a qualitative study design was employed, encompassing a comprehensive literature review that examined key concepts such as: platform business model evolution, data-driven value creation, data-driven value propositions, external data monetisation strategies, and data-driven business models. This process eventually led to the development of the DSM-framework, a structured roadmap aligning organisational maturity with strategic initiatives for value creation and monetisation though DDVPs. While this framework offered a generalised approach to B2B platforms, it lacked specific focus on platform companies within the construction industry. To address this gap, a case study was conducted at a Dutch B2B platform in the construction sector, which aimed to create data-driven value for its business partners. The case study involved semi-structured interviews with key stakeholders, including platform representatives and affiliated manufacturers of window frames and doors.

Insights gained from the DSM-framework and results from the interviews revealed a structured continuum of DDVPs specifically tailored to B2B platforms operating in the construction sector. This continuum provides an industry-specific roadmap to create and monetise value, starting with the Data-Driven Services value proposition. In this stage, platforms deliver value by making key pieces of information—such as KPIs, market insights, and customer order patterns—easily and efficiently accessible to their business partners. A prime example of this is the implementation of customised dashboards that align with the specific needs of the receiving parties. These dashboards are expected to enhance operational efficiency and improve decision-making processes. Components business partners highly valuate according to the results of this study. This differs completely from value creation for end-customers, which is more focused on personalisation and usability (Diane et al., 2020; Fast et al., 2021). These findings align with Ritala et al.'s (2024) continuum framework for data-driven value propositions but highlights that Data-Driven Services have more immediate impact in this sector compared to Data-Enhanced Products, which underscores the importance of a tailored approach to DDVP design and implementation.

Platforms can then move to Data-Enhanced Products, where more advanced technologies such as QR codes can provide better monitoring of the life cycle of products, i.e., in this specific case, windows and door frames. In addition, some manufacturers have recognised the value of QR codes in creating track-and-trace systems for items such as window frame trestles and glass trestles. These systems allow all stakeholders in the supply chain to check the location of trestles at any time. Additionally, QR codes can facilitate seamless information transfer to end users, such as homeowners, by providing essential details that enable them to reorder identical products or purchase add-ons like screens or ventilation grilles. Although implementing Data-Enhanced Products in the construction industry is more complex, these applications can significantly boost engagement from both manufacturers and end customers.

Finally, when data integration at both the platform and manufacturer levels reaches a sufficient level of maturity, and earlier value propositions have been deployed, platforms can achieve Data-Enabled Performance Outcomes. This stage offers the potential for ecosystem-wide optimisation and transformative evolution of business models. In the construction sector, IoT applications, such as NFC-chips and sensors, play a crucial role in enabling real-time monitoring of product performance. Predictive analytics powered by AI and ML can further enhance both the products (e.g., windows or door frames) and services offered by platform companies by introducing predictive maintenance. The latter, a data-driven approach, enables timely interventions to enhance product reliability, reduce downtime and deliver added value across the ecosystem.

The DDVP-continuum bridges the transition between data-driven value creation and external data monetisation. The findings from the case study strongly indicate that indirect data monetisation is the preferred strategy for monetising the identified DDVPs between platform and business partners. This

approach, as opposed to direct data monetisation strategies, integrates data insights into value-added services (e.g., data wrapping), thereby avoiding the friction often associated with direct monetisation. Stakeholders highlighted the shared benefits of this strategy, which aligns with the collaborative ethos of the platform and ensures the creation of a win-win scenario that fosters mutual growth. As indirect monetisation strategies dominate, pricing models naturally take a secondary role, in contrast to data-driven value creation for end consumers, where direct monetisation strategies such as subscription or pay-per-use models are more commonly applied. Despite the findings of this research indicating that indirect data monetisation is the primary strategy, the DDVP continuum remains a valuable tool. The continuum provides a structured approach to integrating data-driven insights into services (Servitisation) and deployment of additional features within existing products (Productisation). Going through these phases not only boost efficiency, but by opting for indirect data monetisation, it also aims to promote collaboration between the platform and its business partners. The model's emphasis on gradual integration that matches the digital maturity of both, allowing platforms to scale up their value creation step by step. Even without direct monetisation strategies in the early stages of the data-driven transition, platforms can increase their revenues. This is because operational efficiencies lead to a growing number of users on the platform.

While direct monetisation may be feasible in specific cases, it was largely deemed unsuitable due to concerns about data ownership and usability, particularly given the limited data analytics capabilities of (some) receiving parties in the construction industry. However, opportunities for direct monetisation may arise in the future (Performatisation stage), depending on the digital maturity of both the platform and business partner increases. Consequently, the development of standalone data-driven services or products by the platform may result in the creation of significant value for business partners, thereby providing additional revenue stream through pricing models such as subscription models or pay-per-use mechanisms. Most important for successful deployment of pricing models is that the advanced service and/or product (e.g., advanced analytics services, premium dashboards or IoT-driven performance monitoring) can demonstrate measurable, partner-specific benefits.

Ultimately, this study bridges the gap between theoretical models and practical implementation, offering a tailored data-driven value continuum that enables B2B platforms in the construction industry to create and monetise data-driven value. This step-by-step roadmap lay the foundation for mutual growth and competitive advantage in an industry traditionally slow to embrace digital innovation.

This study contributes to the academic literature by enhancing the understanding of data-driven value propositions in the context of industrial B2B platforms. It reaffirms existing theories, such as Trabucchi et al. (2022), which identify 'data-driven extensions' as a key driver of value creation for two-sided platforms. Additionally, it nuances frameworks like Ritala et al.'s (2024) data-driven value continuum by demonstrating the immediate applicability of Data-Driven Services and the limited relevance of Data-

as-a-Product within the construction industry. The nuanced potential of Data-Enhanced Products as a starting point for value creation is also highlighted, given the complex data integration requirements and varying (above all deficient) digital maturity levels among stakeholders.

Moreover, this study advances the discourse on platform ecosystems by emphasising the importance of collaborative, trust-based relationships in value creation. This trust-centric approach underscores the need for robust data management and highlights the contextual variation necessary when implementing DDVPs. By bridging the gap between generic frameworks and industry-specific practices, this research provides a refined lens for understanding the dynamics of data-driven innovation in B2B platforms.

For practitioners, this research underscores the importance of aligning data-driven strategies with partners' operational goals. Platforms should prioritise data-driven services that enhance efficiency, such as predictive analytics and real-time dashboards, while embedding insights into existing services (if possible) to deliver immediate value. Indirect monetisation strategies are identified as the most effective approach, fostering trust and collaboration while avoiding friction caused by direct payments. Additionally, transparency in data-sharing processes and joint solution development are crucial for strengthening partnerships and ensuring sustainable growth. To accelerate this transition, platforms should consider the technological maturity and innovation capacity of prospective manufacturing partners, as traditionally-minded stakeholders in the construction industry may slow the shift to data-driven collaboration

The single-case study design somewhat limits the generalisability of the findings, as the results focus on the specific dynamics and characteristics of the case company. Additionally, variability in the digital maturity of production partners introduces heterogeneity that could affect the direct applicability of the developed DDVP continuum. Nevertheless, the developed framework remains a valuable guideline for platforms in similar contexts, as it provides a phased roadmap for value creation and monetisation, which can be adapted based on specific industry needs and partner’s capabilities. In addition, as the case company is a pioneer in collaborating with multiple window and door frame production partners in the Netherlands, the framework provides a useful tool for other (future) B2B platforms in this sector-specific industry. Moreover, it can be used as a tool in the search for finding new production partners, particularly w data is expected to play a key role in the collaboration. In such cases, the framework’s capabilities and challenges sections can then be used to partially test the digital maturity of prospective partners.

Future research could extend these findings through traditional cross-sector comparisons or multi-case studies to validate the DDVP continuum both within and beyond the construction sector. Longitudinal studies could assess the practical application of the framework and examine its long-term impact on platform scalability and partner satisfaction. Additionally, while qualitative methods were highly suitable for gathering exploratory insights, they leave room for subjective interpretation, which could be addressed through supplementary quantitative research validation. Moreover, quantitative research

could measure the actual financial and operational benefits of specific DDVPs. Exploring emerging technologies, such as AI-driven analytics and IoT-based performance monitoring, within the DDVP framework could further enrich understanding of data-driven business model innovation in industrial platforms.

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Appendices

Appendix A: Company background

Toelevering Online, hereafter called TO, developed the initial concept for the research, and as a result, the company serves as a case in which the research will be conducted.

TO was founded in April 2017 in Rijssen, The Netherlands, by the brothers Nijhuis as a side branch of Nijhuis Toelevering. Whereas the latter is a producer of wooden custom-made window frames and acted as a supplier for third parties, TO was established to launch their own online sales channel. The main reason for this came away from the concept that custom-made window frames could be delivered to customers faster. The goal at the time was: “deliver a window frame in five working days”. TO achieved this by working closely together with a single supplier and logistic partner, keeping communication lines short and making use of intelligent systems (e.g., high-tech machines for lead time reduction). This approach has revolutionised the traditional building industry, whereby a delivery time of 8-12 working weeks is very common (Toelevering Online, 2023).

TO has experienced rapid growth in recent years thanks to its innovative strategy. Whereas in 2017 it only worked with one supplier, the number of suppliers has increased to 15 by 2024 (Toelevering Online, 2024). In these years, TO transitioned form a traditional web shop model to a dynamic platform-based structure, where it functions as an intermediary in the supply chain connecting producers to consumers (Figure 5). Currently, the platform is mainly B2B oriented (about 85% of sales).

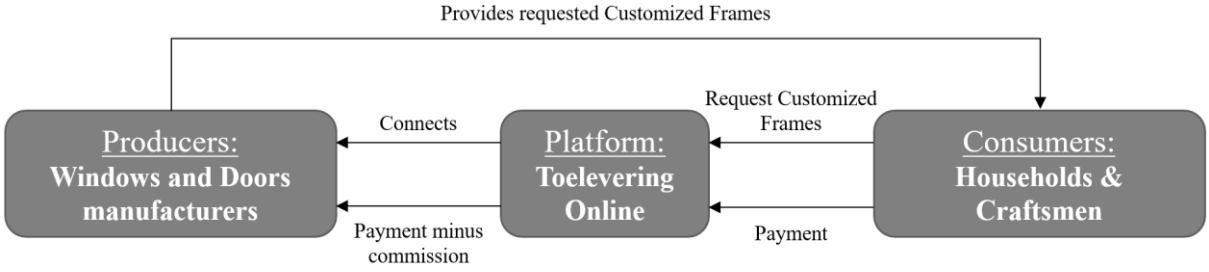


Figure 5: Interaction Model of TO's Two-Sided Platform

As a two-sided platform intermediary, TO adds value from the ‘consumers’ point of view by providing a user-friendly platform where custom-made window frames can be ordered in just a few steps. From the point of view of ‘producers’, TO adds value by acting as an (additional) sales channel. The transaction takes place on the platform, on which TO takes a commission and thus uses the commission model as a source of income. In addition, 'consumers' can join a loyalty programme for a fixed fee per year. In return, they receive benefits such as a fixed discount on products. This means that TO also uses the subscription model as a source of revenue (Toelevering Online, 2023).

The first steps in data-driven working were taken in 2022 through a partnership with Infotopics. With the help of this specialised business-intelligence company, the platform's data environment was set-up

and the first dashboards were developed (Infotopics, 2023). Additionally, the first employees of TO were trained to generate valuable insights from data through their data academy program. In 2023, the 'Data & Analytics' department was created to consolidate the company's commitment to harnessing the power of data and retrieve valuable information. Their current data architecture is displayed in Figure 6:

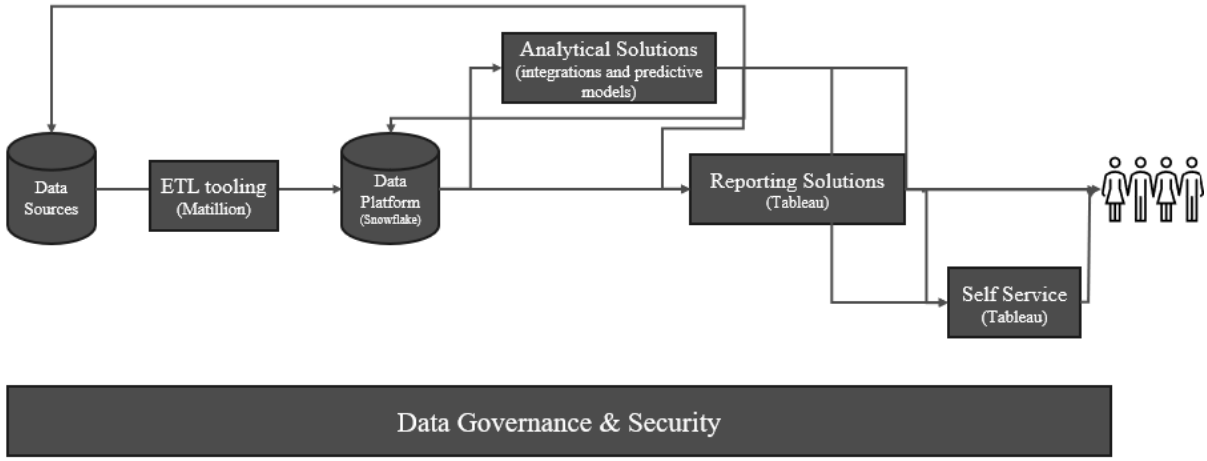


Figure 6: Data Architecture of case company

The shift to data-driven activities is largely confined to the organisational level. To achieve the success strategy of an 'integrated digital chain that creates value for both customer and partner', the platform recognises the need to implement a data-driven approach at the supply chain level. An interview with the manager of the Operations department revealed that TO currently shares some form of information with manufacturers. This entails the provision of prepared data pertaining to establish Key Performance Indicators (KPIs), such as the number of complaints and the capacity rate, to foster collaboration. Nevertheless, the sharing of prepared data is not perceived to be of sufficient value from the perspective of the manufacturer in question, and thus no revenue is currently generated from it. The manager of the Data & Analytics department suggests that developing and exploiting data value creation options of higher value increases the likelihood of monetisation. The monetisation of exchanging data-driven insights could facilitate the attainment of the revenue goal.

Appendix B: Five-stage Grounded Theory model

The five-stage Grounded Theory model by Wolfswinkel et al., (2013) is used as starting point for the literature review. The model shown in Figure 7 consists of the following phases: Define, Search, Select, Analyse and Present. It provides guidance for systematically addressing the review process. The rest of this appendix provides a brief description of the work done, choices made, and results obtained for each phase.

Number	*Task*
1. DEFINE	
1.1	Define the criteria for inclusion/exclusion
1.2	Identify the fields of research
1.3	Determine the appropriate sources
1.4	Decide on the specific search terms
2. SEARCH	
2.1	Search
3. SELECT	
3.1	Refine the sample
4. ANALYZE	
4.1	Open coding
4.2	Axial coding
4.3	Selective coding
5. PRESENT	
5.1	Represent and structure the content
5.2	Structure the article

Figure 7: Five-stage grounded model (Wolfswinkel et al., 2013)

1. Define

The first phase relates to defining the scope of the review. This scope is closely related to the well-defined research problem described in the introduction section of this paper. Therefore, the topics covered relate to the application of data to create value-added services affiliated to a two-sided platform. In addition, the existing knowledge on how to capture these services for platform owners was explored. As the narrowly defined scope produced few or no search results, the criteria for finding relevant literature were broadened to a more general context.

Define the criteria for inclusion/exclusion

In order to obtain precise results in the form op publications, it is essential to consider the criteria that are relevant to the scope of the review. Therefore, inclusion and exclusion criteria were established as the first step.

Criteria for inclusion:

- Publications that focus on data-driven value creation within the context of two-sided platforms,
- Publications that focus data monetisation strategies, preferably within the context of two-sided platforms,
- Publications involving data-driven business models innovation, preferably within the context of two-sided platforms,
- Recent publications; approximately a time frame of 7 years from now,

Criteria for exclusion:

- Publications predating 2017 are excluded, except for articles that serve as foundational references for more recent works,
- Publications unable to substantiate their hypotheses,

Identify the fields of research

The associated topics are tangential to the fields of Business, Management and Accounting research. The study addresses a business problem faced by two-sided platforms, including the case company. The possible outcomes need to be communicated to affiliated partners before proceeding to actual implementation. In this process, supply chain managers will have an important role to play in getting it right. Furthermore, the outcome is likely to affect the current business model of the case company. Therefore, it is important to discuss the outcomes with the members of the case company's management team. Another field of study that applies to this research is Decision Science. The case company has implemented a data-driven approach internally, making data-driven decisions part of the day-to-day business. The research aims to expand this horizon by providing data-driven services to platform producers, enabling them to make informed decisions, for value creation purposes. Finally, a possible research area is Information Systems, as the case company facilitates a platform on which information flows from both groups. This valuable data is collected with the help of advanced software and hardware technology. It is therefore likely that the outcomes of the research will result in adjustments to the case company's information system, also known as the platform.

Determine the appropriate sources

In step 1.3, the most appropriate databases are selected based on the criteria established in step 1.1 and the fields of research identified in step 1.2. The databases used to find relevant publications on the chosen topic are Scopus, Web of Science, ScienceDirect and Google Scholar. These databases allow the researcher to search broadly, but also to search specifically, using operators such as 'AND' and 'OR'.

Decide on the specific search terms

The fourth and final step in the Define phase is to formulate a precise set of possible search terms. Preferably, the set of search terms reflects the full spectrum of the chosen research area. The search terms used in the literature review are: two-sided platform, data-driven value creation, value capture, data monetisation, data-driven business models, business model innovation. The search terms are used in various combinations using operators. Synonyms of terms are also included to avoid missing relevant articles, e.g. digital platforms, or two-sided markets instead of two-sided platforms. The search strings that returned the most relevant articles are listed in Table 5 below.

Table 5 Search strings in different databases

Database	Search string	# Results	# Relevant articles	Comments
Scopus	"two-sided platform" OR "digital platform" AND "business model" AND "value creation"	46	2	Selection of relevant articles that addresses value creation in the context of two-sided platform business model.
Google Scholar	"two-sided platform" AND "value creation" AND "business model"	10.200	1 new	Out of 10.200 results, Scholar yielded the highest number of articles. Within these, 2 items overlapped with those deemed relevant in Scopus. Additionally, Scholar identified 1 new relevant article.
Scopus	“data monetization” OR "monetization" AND "data driven business model" AND “value creation”	1	1	Selection of articles that addresses data monetization strategies in order to capture the data-driven created value in the context of data-driven business models.
Google Scholar	“data monetization” OR "monetization" AND "data driven business model" AND “value creation”	175	3 new	Out of 175 results, Scholar yielded the highest number of articles. Within these, 1 item overlapped with those deemed relevant in Scopus. Additionally, Scholar identified 3 new relevant article that addresses the concept of monetization strategies in order to capture the data-driven created value in the context of data-driven business models.
Scopus	"data driven business model" OR "data-based business model" AND "monetization" AND "digital platform" OR "two-sided platform"	0	0	Scopus didn’t return any hits.
Google Scholar	"data driven business model" OR "data-based business model" AND "monetization" AND "digital platform" OR "two-sided platform"	85	1 new	Out of 85 results, Scholar yielded the highest number of articles. Within these, 3 items overlapped with those deemed relevant in Scopus / Google Scholar, using the previous search string. Additionally, Scholar identified 1 new relevant article that addresses data-driven value propositions related to monetizing data.

2. **Search**

The second phase, called Search, the actual search for relevant literature using the selected search terms takes place. For a thorough literature review, forward-and backward tracking was applied. The final list of relevant articles is shown in Table 6.

Table 6 Relevant articles

Article	Year	Author	Title	Journal	Comment
1	2022	D. Trabucchi & L. Muzellec & S. Ronteau & T. Buganza	The platforms' DNA: drivers of value creation in digital two-sided platforms	Technology Analysis & Strategic Management	Forward tracked from Trabucchi & Buganza (2022) article
2	2022	D. Trabucchi & T. Buganza	Landlords with no lands: a systematic literature review on hybrid multi-sided platforms and platform thinking	European Journal of Innovation Management	Systematic Literature Review of Two-Sided Platforms and it's business model
3	2020	D. Isabelle & M. Westerlund & M. Mane & S. Leminen	The Role of Analytics in Data-Driven Business Models of Multi-Sided Platforms: An exploration in the food industry	Technology Innovation Management Review	Research identifies 8 key factors that illustrate the role of data analytics in Data-Driven Business Models of MSPs.
4	2022	R. Woroch & G. Strobel	Show me the Money: How to monetize data in data-driven business models?	17th International Conference on Wirtschaftsinformatik, WI 2022	Research presents 5 key components of data-driven business models that impact data-based value creation and value capturing
5	2024	J. Ofulue & M. Benyoucef	Data monetization: insights from a technology-enabled literature review and research agenda	Management Review Quarterly	Forward tracked from R. Woroch & G. Strobel (2022)
6	2024	P. Ritala & J. Keränen & J. Fishburn & M. Ruokonen	Selling and monetizing data in B2B markets: Four data-driven value propositions	Technovation	Multiple case study that identifies four archetypical data-driven value propositions for B2B firms to sell and monetize data
7	2023	A. Madanaguli & D. Sjödin	Literature review on industrial digital platforms: A business model perspective and suggestions for future research	Technological Forecasting and Social Change	Literature review on industrial digital platforms through the theoretical lens of business models
8	2024	N. Kakuschke	Data Value Creation Matrix – Options for Organizations to Create Value from Data	European Conference on Information Systems (ECIS)	Research identifies options for organizational data value creation

3. **Select**

Following the refinement steps of Wolfswinkel et al. (2013), which included reading the titles, abstracts and more of the text, eliminating duplications, and checking forward and backward citations, resulted in a list of relevant articles. This list is shown in the previous section, labelled as Table 6 and includes articles that have a strong connection with the research question, as well as to the case company's desire to deliver more value for users of their platform.

The list consists of articles that, on the one hand, address the aspect of value creation within the business model of two-sided platforms. On the other hand, the articles address the aspect of value capture, in the form of data monetisation. An article within the context of two-sided platforms that addresses both data-driven value creation and its monetisation was not found during the literature search. This reinforces the relevance of the research. However, backtracking the founded articles revealed that most of the articles within the context of (data-driven) value creation in two-sided platforms (article 1, article 2, article 3) referenced the work of Muzellec et al. (2015) which researched the lifecycle of two-sided platform business models. Despite the article's publication in a marketing journal, the insights are also applicable to non-marketing-focused two-sided platforms. Furthermore, an article by Hartmann et al. (2016) is added to the list of relevant articles. This paper made an important contribution regarding the research direction of data-driven business models (DDBM). Hartmann et al. (2016) developed a DDBM-framework, thereby classifying six different types of DDBM start-ups use. While the paper focused on start-up companies, the DDBMs are applicable to a broader range of organisations, including platform businesses that are beyond the start-up phase. The paper was found to be a key reference point for the articles on data-driven business models and data monetisation, providing a foundation for further research in this area. Finally, by backward citation, an article by Parvinen et al. (2020) has been added that addresses direct selling and monetisation of data. The article also explicitly addresses aspects such as data privacy, security and, at the same time, the development into data-driven services. The added articles are listed in Table 7 below.

Table 7 Relevant articles (continued)

Article	Year	Author	Title	Journal	Comment
9	2015	L. Muzellec & S. Ronteau, M. Lambin	Two-sided Internet platforms: A business model lifecycle perspective	Industrial Marketing Management	Fundamental paper about the business model lifecycle perspective of two-sided platforms
10	2016	P.M. Hartmann & N. Feldmann & A. Neely	Capturing value from big data – a taxonomy of data-driven business models used by start-up firms	International Journal of Operations & Production Management	Paper that laid the foundation for the research direction of data-driven business models and provided a framework as a starting

					point for further research.
11	2020	P. Parvinen & E. Pöyry & R. Gustaffson & M. Laitila & M. Rossi	Advancing data monetization and the creation of data-based business models	Communications of the association for information systems	This paper explores how organisations can capture, value, and monetise their data assets, addressing the components of data-based business models and the challenges in data monetisation.

4. **Analyze**

By employing a systematic approach to open, axial, and selective coding, concepts and/or categories were identified. The extracted concepts from the selected articles serve as the foundation for understanding and theorizing about data-based value creation and capturing value in two-sided platform business models. To enhance readability, the articles and associated concepts have been tabulated. This Table 8 can be found later in this chapter.

5. **Present**

The present phase entails the structuring and visual presentation of the knowledge acquired during the analyze phase. The concepts identified in each article is presented in an organized manner, with the most relevant articles displayed first. Based on the identified concepts using open coding, axial coding and selective coding, aggregated concepts are formulated and presented at the top of the table. These aggregated concepts serve as overarching themes and are closely related to the formulated research question.

Table 8 Literature coding of relevant concepts

Aggregated concepts										
	Two-sided platform dynamics		Platform business model evolution		Data-driven value creation		External data monetisation strategies		Identify capabilities and challenges for data-driven business models	
Open coding										
Article #	*Network Effects*	*Pricing Strate-gies*	*Platform's value proposi-tions*	*Business Model Innova-tion*	*Data Driven Value Creation*	*Data-Driven Value Proposi-tions*	*Data Moneti-sation*	*Data Driven Business Models (DDBM)*	*Capabili-ties for DDBM*	*Challen-ges for DDBM*
[7] *(Madanaguli et al., 2023)*	X	X	X	X	X	X	X		X	X
[4] *(Woroch & Strobel, 2022)*	X			X	X	X	X	X	X	X
[6] *(Ritala et al., 2024)*				X	X	X	X	X	X	X
[3] *(Diane et al., 2020)*	X			X	X			X	X	X
[10] *(Hartmann et al., 2016)*				X	X	X	X	X		X
[11] *(Parvinen et al., 2020)*		X				X	X	X	X	X

[1] *(Trabucchi et al., 2022)*	X	X	X	X	X				X	
[2] *(Trabucchi & Buganza, 2022)*	X	X	X	X	X		X			
[8] *(Kakuschke, 2024)*					X	X	X	X	X	X
[5] *(Ofulue & Benyoucef, 2024)*					X		X	X	X	X
[9] *(Muzellec et al., 2015)*	X	X	X	X			X			

Structure the article

The relevant sections from the selected core articles with associated concept, will serve as the foundation for the literature review. Supported by additional literature that aligns with the context, it will become clear on which existing literature this research is based. As illustrated in Table 8, the concepts of business model innovation, data-driven value creation and data monetisation are the most frequently cited in the literature. Although these are important topics according to the literature, the literature review starts by explaining the dynamics surrounding two-sided platforms. It is fundamental to understand the characteristics and development of a two-sided platform business model before theorising about innovating the business model on behalf of data-driven value creation and data monetisation strategies. Finally, the (organisational) capabilities, challenges and opportunities related to the development of a data-driven business model are discussed in more detail.

The structure of the theoretical background is as follows:

1. Two-sided platform dynamics
2. Business model evolution
3. Data-driven value creation
4. Data monetisation strategies
5. Identifying capabilities and challenges for data-driven business models

Appendix C: Extended Literature Review

The core concepts, emerging from the rigorous literature review, are described in detail in this appendix. The same structure as presented in Appendix B is used, starting with ‘two-sided platform dynamics’. Critical insights from all core concepts described that directly influence the research question are compiled and presented in section 3.1 Literature Analysis. This mode of presentation was preferred for brevity reasons.

Two-sided platform dynamics

The concept of two-sided platforms, also known as two-sided markets, was first introduced by Rochet and Tirole (2003). They argued that these markets are “characterised by the presence of two distinct sides whose ultimate benefit stems from interacting through a common platform.” Additionally, they highlighted how network externalities are crucial to the functioning and success of two-sided platforms (Rochet & Tirole, 2003). This theory, developed by Katz and Shapiro (1985), assumes the phenomenon whereby the value of a product of service (e.g., platform) increases as more people use it, creating a positive feedback loop of adoption and use (Katz & Shapiro, 1985). Building on the work of Rochet and Tirole (2003), Eisenmann, Parker, and Van Alstyne (2006) conducted comprehensive research that expanded the existing literature on network externalities in two-sided markets. They identified two distinct types of network effects: the 'same-side effect' and the 'cross-side effect'. Whereas same-side effect refers to “an increase in the number of users on one side of the network, making it either more or less valuable to users on the same side (e.g., producers)”, while cross-side effect refers to “an increase of in the number of users on one side of the network makes it either more or less valuable to the users on the other side” (Eisenmann et al., 2006).

In order to benefit from the positive effects of network externalities as an intermediary, it is essential that platform businesses create value for their users. As outlined by Rochet and Tirole (2006), the value creation occurs as a result of facilitating interactions between the two distinct group of users (Rochet & Tirole, 2006). This approach of value creation contrasts with the traditional pipeline business model, which relies on the principles of the resource-based view (Barney, 1991), by creating competitive advantage despite not having ownership of tangible (and/or intangible) assets. The most significant intangible asset for two-sided platforms is presence of network of divers, interdependent group of users, which enables them to facilitate the transactional role. These intangible assets represent a powerful competitive advantage that is difficult for competitors to replicate, as noted by Astyne et al. (2016) and Ye et al. (2012). In addition, they emphasise that the presence of this asset is a crucial factor for platform businesses to achieve rapid growth and scalability (Astyne et al., 2016; Ye et al., 2012). Furthermore, Hagiu and Wright (2015) stressed the importance of the innovativeness of platform businesses to maintain their relevance, fend of competitors and stimulating growth (Hagiu & Wright, 2015).

However, creating and maintaining a critical mass on the platform is challenging, as the value of one group of users depends on the other. This so-called 'chicken-and-egg problem' involves simultaneously attracting users on both sides of the platform (Caillaud & Jullien, 2003; Li et al., 2010). Despite extensive research on strategies to overcome this paradox (Trabucchi, 2020; Wanner et al., 2019), it remains one of the most significant obstacles to achieving sustainable growth, as stated by Trabucchi et al. (2021). Consequently, more recent studies have focused on finding new ways of creating value for platform users, in addition to matching supply and demand. Trabucchi et al. (2022) identified four key pillars for value creation, including the development of data-driven extension by platforms for their users. Previous research has acknowledged the critical role that (big) data plays in value creation, irrespective of whether the focus is specifically on two-sided platform organisations (Faroukhi et al., 2020). However, the majority of studies on value creation using data have predominantly concentrated on internal processes, aiming to optimise business operations and support decision-making. Research on data-driven value creation for external purposes remains limited, and existing literature primarily addresses data-driven extensions aimed at consumers. Little is known about how platform businesses can leverage their data to generate value for their business partners. To address this gap, this research explores how platform businesses can create value for their business partners through the strategic use of data.

Platform business model evolution

According to Osterwalder & Pigneur (2010), a business model describes the rationale of how an organisation creates, delivers, and captures value (Osterwalder & Pigneur, 2010). Their framework places the value proposition at the core, initially for two-sided platform businesses this involves focusing on matchmaking as noted by Rochet & Tirole (2003). But as platform businesses evolve, their value propositions change to meet the needs of both user groups. The literature characterises this as the 'business model lifecycle', which Muzellec et al. (2015) and Madanaguli et al. (2023) extensively researched within the context of platform businesses.

Muzellec et al. (2015) identified four stages in the platform business model lifecycle: embryonic, emerging, growth, and maturity, emphasising the shift from end-user focus (e.g., consumers) in early stages to business partner focused (e.g., manufacturers) strategies as platform mature. This evolution involves refining value propositions to serve both groups effectively, often resulting in differentiated services powered by the smart use of data. This development leads to the emergence of new revenue streams beyond transaction commissions, such as affiliate commissions or monetisation of these additional service provided (Muzellec et al., 2015).

Similarly, Madanaguli et al. (2023) emphasise the pivotal role of data integration in the evolution of industrial digital platform business models. The study identifies four types of industrial platforms: *product efficiency platforms, product-service platforms, transaction platforms,* and *digital platform ecosystems*, each characterised by varying levels of data integration and ecosystem involvement. The

framework is presented in Figure 8, and the types are further discussed in detail in Appendix D. They highlight that as data integration at platform businesses increases, it opens new opportunities to create data-driven services for business partners, transforming their role from mere transactional intermediaries to active ecosystem orchestrators. Their proposed framework highlights the potential for DDVPs to reshape platforms business models (Madanaguli et al., 2023).

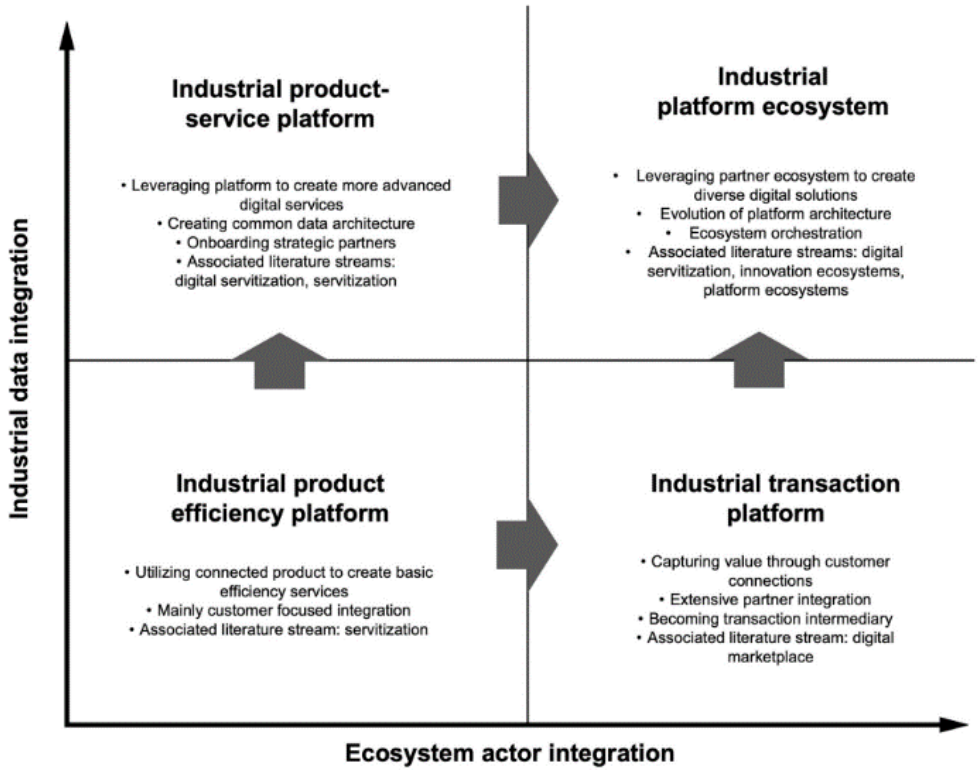


Figure 8: Types of industrial digital platforms and their interrelationship. Extracted from Madanaguli et al. (2023).

Trabucchi and Buganza (2022) contribute to this discussion about the role of data in the evolution of platforms businesses, by distinguishing between transactional platforms and orthogonal platforms (non-transactional platforms). Transactional platforms are value creation driven, focusing on bringing together supply and demand. This type shares similarities with the 'transactional platform' defined by Madanaguli et al. (2023). Orthogonal platforms focus more on the value capture aspect of the business model. These types of platforms benefit more from creating a large user base to generate interest from advertisers for instance (the other group of the platform), thus generating revenue. Their proposal of a hybrid model that combines elements of both platform types align with Madanaguli et al.'s (2023) concept of ecosystem platforms, where data becomes a critical asset for innovation, servitization and the provision of solutions for business partners. This hybrid model supports the development of DDVPs and diversified revenue streams, particularly in mature platform businesses (Trabucchi & Buganza, 2022). From these studies, it can be concluded that the level of maturity and the level of data integration

of a platform plays a crucial role in its ability to develop DDVPs and exploit them within their ecosystem.

Given the case company's intermediary role in the industrial construction sector and the variety of terms used in the literature, this study adopts the classification system proposed by Madanaguli et al. (2023).

Data-driven value creation

Value creation is a fundamental aspect of business strategy, with the objective of capturing ultimate value. The literature defines value creation as a mechanism whereby organisations carry out a process or set of dynamics activities to develop products or services that are of certain value to stakeholders by fulfilling their needs (Chesbrough, 2007). In the digital era, "most companies are awash in data" (Wixom & Ross, 2017). With the continual increase in data volume, the opportunities for platform businesses to derive value from it also grows (Baecker et al., 2021). This study refers to this process of creating value using data as "data-driven value creation".

Kakuschke (2024) conducted research into the various options available to organisations wishing to create value by leveraging data. By conducting systematic literature review, an overarching framework was developed consisting of twelve distinct options for data value creation (DVC). These options range from *data preparation* (DVC1) to *performing actions* based on insights (DVC12). Based on the underlying 'value object' (data or information) and 'value type' (use or exchange) pursued by the organisation, a two-dimensional classification scheme was subjected. This Data Value Creation Matrix, which is presented in Figure 9 is crucial for understanding how two-sided platforms can leverage data to create value (Kakuschke, 2024). As this study focuses on creating data-driven value for external business partners, only the DVC options allied to 'exchange' are included in the remainder of the study. For a complete overview of the DVC options, see Appendix E.

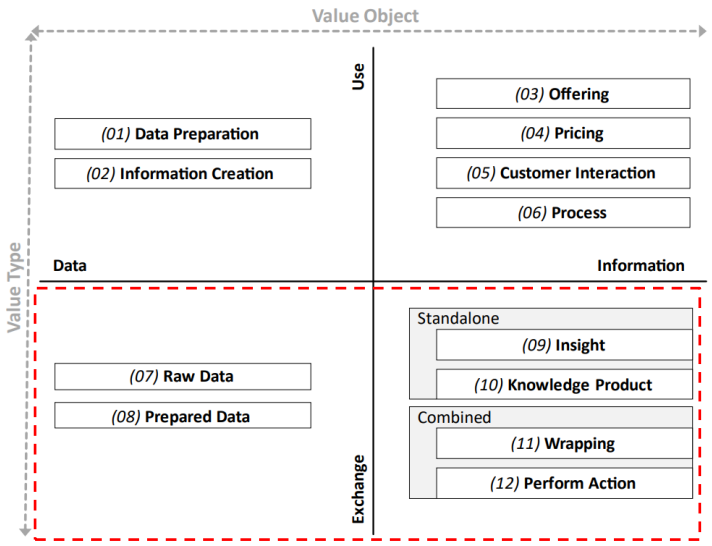


Figure 9: Data Value Creation Matrix. Extracted from Kakuschke (2024).

Furthermore, this matrix visualises the crucial role of data analytics in deriving valuable information from data, as most DVC-options fall into the 'information' category. As Kakuschke (2024) pointed out, the deployment and application of data analytics skills and tools is essential for extracting valuable information from data. Platform businesses with a high level of data integration and ecosystem actor integration (a.k.a. industrial platform ecosystem by Madanaguli et al. (2023), can thus be expected to develop and exploit multiple data-driven value creation options.

Prior research by Diane et al. (2020) also highlighted the significant role of data analytics by examining its impact on developing data-based business models for multi-sided platforms. They identified eight key factors for data-based business models, all of which are inextricably linked to data analytics. For a more detailed explanation of the factors identified, this study refers to Appendix E. These factors include real-time operations, delivery optimisation, customised recommendations, and market trend analysis. Step by step, these factors are vital for optimising of current services, predicting future value, and developing partnerships (Diane et al., 2020). Data analytics is thus a prerequisite for a platform to become a platform ecosystem, allowing data-driven value creation to flourish. However, given that this study focused on multi-sided platforms in the food industry, the researcher expects that in the construction sector, other key factors will be important for the creation and exploitation of data-driven value creation.

The study by Trabucchi et al. (2022) also emphasises the significance of this concept and identifies the creation and exploitation of 'data-driven extensions' as a key pillar to create value for platform users. Furthermore, they argue that platforms operating in a C2C environment data should be utilised to enhance the matchmaking process. In the case of business-orientated platforms, data should be utilised to develop and deliver value-added services (VAS). As this research aims how to create value for business partners, it is anticipated that the development and delivery of VAS will prove more beneficial for them. The aim is to ascertain which VAS or in other words DVC option(s) associated with 'exchange,' are perceived as the most valuable by business partners of platforms in the construction sector. In order to effectively tap into new revenue streams, it is essential to capture the data-driven VAS. The subsequent paragraph will therefore explore in greater detail the ways in which data-driven value can be monetised according to the literature.

External data monetisation strategies

The literature describes 'value capture' as "the process of securing financial or non-financial returns from value creation." This is often reflected in the customer's willingness to pay, through which suppliers (e.g., platform businesses) generate revenue (Chesbrough, 2007). When it comes explicitly to capturing data-driven value creation, the literature speaks of 'data monetisation.' Although data monetisation is often described as "turning the intangible value of data into tangible value (Najjar & Kettinger, 2014)", "transforming data insights into actionable actions or extracting value from data

assets (Diane et al., 2020)", the primary goal remains to use data to generate quantifiable economic benefits. According to Gartner's definition (2022), this can be translated into cost savings or additional revenue streams (Gartner, 2022).

Delving deeper into the concept of data monetisation, the literature defines two main approaches: internal and external data monetisation. The majority of studies concentrates on the internal monetisation of data, which involves using data to optimise internal processes, such as decision-making and business operations (Trabucchi et al., 2017; Urbinati et al., 2019). In contrast, relatively few studies have explored the approach of external data monetisation, leaving a gap in the literature. External data monetisation refers to generating revenue by offering data or data-driven products or services to external parties. This study aims to address this gap by focusing exclusively on external data monetisation strategies, which remain underexplored despite their potential for substantial value creation for platform businesses.

According to Susan Moore (2015), this can take various forms: direct monetisation and indirect monetisation. Direct monetisation involves selling data directly to customers, generating value through explicit transactions. Thereby, the literature distinguishes three primary strategies (Parvinen et al., 2020):

1. *Selling data:* Selling raw or processed data directly to customers.
2. *Selling analyses:* Transforming data into insights that are directly applicable to customer's business needs.
3. *Selling data-based services*: Leverages data insights to deliver tailored solutions, such as real-time analytics or consulting, directly to customers.

Parvinen et al. (2020) note that these strategies are interconnected, with each step adding complexity and increasing the value created for customers. As a result, customers are generally more willing to pay a premium for data-based services compared to selling raw or processed data as a standalone product.

In contrast, indirect monetisation uses data to enhance existing (non-data) products or services, thereby increasing their value and customers' willingness to pay. Within this category, two primary strategies emerge:

1. *Data bartering:* Exchanging data for non-monetary purposes, such as insights or services. This is widely used by social media platforms, to improve their own advertising services.
2. *Data wrapping:* Embedding data within existing products or service to enhance their value without selling the data as a separate entity.

The direct and indirect data monetisation strategies previously discussed are inextricably linked to the DDVPs that platform businesses may adopt in order to create and monetise external value. Ritala et al. (2024) identified four archetypal data-driven value propositions (DDVP) in the context of B2B organisations, which align to a greater of lesser extent with the various monetisation strategies (Ritala et al., 2024).

1. *Data-as-a-Product:* This DDVP involves selling raw or processed data directly to customers and supports the direct monetisation strategy ‘selling data’.
2. *Data-enhanced Products:* This DDVP involves embedding data into products using smart sensors, software and IoT applications, to enhance functionalities and/or user experiences. By leveraging and analysing the data, advanced features and improved functionalities such as real-time monitoring and automated updates can be developed and delivered. This DDVP supports indirect data monetisation strategies.
3. *Data-driven services:* This DDVP utilises data to offer services that optimise business processes of external partners. This is achieved by transforming raw or processed data into actionable insights, providing tailored services (e.g., Insight-as-a-Service or Analytics-as-a-Service) that address specific customer needs and enforce better business outcomes. This DDVP could supports both direct monetisation (selling analyses and selling data-based services) and indirect monetisation, if the services offered for free to boost collaboration.
4. *Data-enabled performance outcomes:* This DDVP entails integrating data-enhanced products and data-driven services to create smart solutions that deliver quantifiable performance outcomes using analytics and IoT features. This supports both ‘data wrapping’ as the data is embedded in products to improve functionality, increasing customer value. It also aligns with ‘selling data-based services’ as performance outcomes are often delivered through IoT and analytics services that customers can subscribe to or pay a premium for getting access.

In addition, Parvinen et al. (2020) also highlights a ‘maturity path’ for organisations, suggesting a progression from offering raw data to trusted partners to eventually selling sophisticated data products or services across the ecosystem (Parvinen et al., 2020). These studies underscore a gradual transition in data monetisation strategies as organisation build trust and capabilities.

To derive economic benefits from DDVPs, an appropriate revenue model must be applied. A literature review by Ofulue and Benyoucef (2024) identifies several revenue models that support data monetisation, and are briefly explained in Appendix G. The choice of a revenue model is closely tied to the type of product or service being offered. However, their review does not differentiate between internal and external data monetisation strategies. Consequently, this study aims to determine which revenue models are most suitable in the exchange of DDVPs between business partners, in this case manufacturers, and the platform business.

The final section of the extensive literature review considers the capabilities that a two-sided platform must possess to establish a data-driven business model. Furthermore, the review considers the challenges that arise, according to the literature, when developing a data-driven business model.

Identifying capabilities and challenges for data-driven business models.

"*Data-driven business models are business models that rely on data as a key resource*", as first defined by Hartmann et al. (2016). With the increase of data captured by smart products that comprise the IoT and the vast array of analytics technologies available, the potential for business value is immense. However, the development of data-driven business models (DDBM) requires specific organisational capabilities (Wiener et al., 2020). The concept of organisational capabilities has been extensively explored with notable contributions from scholars such as Amit and Schoemaker (1993), Helfat and Peteraf (2009), and Nelson et al. (2000). However, despite the similarities between the definitions, there is no consensus on the use of a single definition. To avoid ambiguities, this study uses the following definition: "Organisational capabilities are a firm's ability to execute tasks effectively using the right set of resources and skills in order to achieve strategic goals." In this context, the question arises as to what organisational capabilities two-sided platform businesses must have to create, deliver, and ultimately monetise their DDVPs.

Besides identifying them, Ritala et al. (2024) also provided an in-depth analysis of capabilities required for each DDVP. As DDVPs increase in complexity, the list of required capabilities also increases. Basic propositions like data-as-a-product, and data-enhanced products, demand straightforward data collection, analysis and interpretation skills, while more advanced propositions such as Data-as-a-Service and Data-enabled Performance Outcomes, require deeper customer understanding, predictive analytics and consulting capabilities (Ritala et al., 2024). The advantage of more advanced value propositions is that it creates and delivers more value to the recipient, potentially generating more revenue. However, the researchers highlight an important caveat: the recipient must also perceive the product or service received as valuable, otherwise the value proposition will hardly ever be monetised. The ability to effectively communicate tangible benefits, such as those conveyed in visualisations and reports, significantly increases the likelihood of monetisation. In addition, the study also encompasses the importance of required capabilities of the recipient. Those who receive for raw or curated data, must have skills in data analytics, interpretation and integration. Only then the greatest value from the purchased product will be derived (Ritala et al., 2024).

Other studies that have conducted in-depth analysis on the skills needed to monetise data distinguish between analytical capabilities and technical capabilities. According to Ofulue & Benyoucef (2024), "Analytical capabilities refer to evaluating data skills and identifying data skill gaps, while technical capabilities refer to evaluating the technical data infrastructure (digital platform)." The term "data skills" encompasses the competencies required to interpret, analyse, and derive insights from data. These capabilities complement those identified by Ritala et al. (2024). In contrast, technical capabilities pertain to the technological infrastructure and tools that support data-related activities. These capabilities enable the organisation to collect, store, process, and manage data. For instance, the use of statistical models

and machine learning algorithms for predictive analytics or the use of visualisation software programmes like Power BI and Tableau to visually present data-driven insights are examples of tools frequently used (Ofulue & Benyoucef, 2024).

The transition towards DDBM also entails challenges beyond analytical of technical capabilities. The study of Ritala et al. (2024) identified related challenges in addition to required capabilities per DDVP. Based on their findings, selling data-as-a-product brings issues of data ownership and legal risks, particularly for intermediaries handling external data. Organisations that collect their own data from their customer groups and then sell it are less likely to encounter privacy issues (e.g., GDPR). Selling data-enhanced products depends on customer willingness and ability to use the new data-enhanced features. If they are too complex, the ‘added value’ to the core product will be lost. This necessitates effective communication and education from data providers to their customers, in order to mitigate the potential loss of value (Ritala et al., 2024).

Selling data-driven services to business partners or end-customers presents additional challenges. Access to customer data is crucial for developing these services, but customers may be reluctant to share their data, which could be due to cultural factors. Moreover, business partners may prefer handling their own data analytics, opting for ‘data-as-a-product’ instead. Additionally, data quality is frequently problematic, resulting in the delivery of misleading insights. Inaccurate data creates the well-know ‘garbage in, garbage out’ situation, which undermines the value of data-driven services. It is therefore of paramount importance to ensure accuracy, by cleaning and correcting data sources beforehand (Ritala et al., 2024). Ofulue & Benyoucef (2024) also point out that poor quality data has a negative impact on customer trust, product reliability, and ultimately, business reputation.

The main challenge in selling data-enabled performance outcomes is achieving, monitoring, and measuring the results. When exploiting this DDVP, organisations need to understand and bear the risks of associated with performance improvements in the customer environment, where they lack control over variables. Fluctuations in customer processes make the gathering of accurate insights challenging and necessitate careful consideration of the feasibility of performance-based pricing. Furthermore, it is challenging for suppliers to demonstrate consistent performance improvements after easily achievable targets have been reached (Ritala et al., 2024). This complicates the design of an optimal and fair contract that is acceptable to all parties, as shown by the study by Ofulue & Benyoucef (2024). This key challenge is characterised as 'contract design' and they believe that in addition to the pricing aspect, a contract can also address privacy and data security issues.

Other research on the constraints and challenges to developing and implementing data-driven business models (e.g., (Ofulue & Benyoucef, 2024; Parvinen et al., 2020; Woroch & Strobel, 2022) confirm Ritala et al. (2024) findings. Parvinen et al. (2020) highlight data privacy, data quality and an organisations stability and maturity as primary obstacles to data monetisation. Extracting accurate information from

acquired data is crucial, as inaccuracies can erode customer trust and put pressure on data-driven business models. This view is supported by Woroch & Strobel (2022), who emphasize the need for innovation capacity, alignment of organisational structures, and data analytics understanding. Organisations lacking resources are limited in establishing DDBMs.

Furthermore, an organisation's position within the value network influences their ability to externally monetise data. Thomas & Leiponen (2014) suggest that access to diverse data sources enables successful data monetisation through for- and backwards integration (Thomas & Leiponen, 2016). However, data security remains a critical challenge, requiring organisations to protect confidentiality, prevent theft, and safeguard data from errors or destruction. Managing authorization, access control, auditing, and encryption is essential to protect sensitive information (Yousif, 2015). Trust and ownership issues can cause conflicts in external data monetisation (Thomas & Leiponen, 2016), and security risks may limit the development of data-driven business model options (Parvinen et al., 2020). Spiekermann (2019) adds that having shared values is crucial for collaborative data-sharing initiatives.

To give a good overview of the capabilities and challenges found, the key findings are listed in Table 9 for each DDVP.

Table 9: Overview of capabilities, challenges, and DDBM-options for two-sided platforms.

<table>
<tr><th>DDVP</th><th colspan="2">Related capabilities*</th><th>Related challenges*</th></tr>
<tr><td rowspan="2">Data-as-a-Product</td><td>Provider:</td><td>Recipient:</td><td rowspan="2">- Data ownership,
- Legal risks: ensuring data complies with GDPR,
- Buyers' data interpretation and integration skills
- Finding shared values for deploying data-driven initiatives.</td></tr>
<tr><td>- Data collection,
- Data analysis,
- Data interpretation</td><td>- Data interpretation,
- Data integration</td></tr>
<tr><td>Data-enhanced Products</td><td colspan="2">- Product development
- Product monitoring</td><td>- Customers' willingness and ability to use data-enhanced features
- Communicating added value effectively</td></tr>
<tr><td>Data-driven Services</td><td colspan="2">- Customer data analysis,
- Consulting,</td><td>- Access to customer data: Customers' willingness to share data.
- Data quality: inaccurate data leads to 'garbage in, garbage out,' harming customer trust, product reliability, and business reputation.</td></tr>
<tr><td>Data-enabled Performance Outcomes</td><td colspan="2">- Understanding customer industries,
- Predictive maintenance,
- Control capabilities,</td><td>- Achieving, monitoring, and measuring performance outcomes; Risk-bearing for consistent performance improvements, when platform lacks control over all variables
- Contract design challenges</td></tr>
</table>

** Capabilities and challenges for each DDVP are interconnected and cumulative: more complex DDVPs require the earlier capabilities and challenges as a foundation for successful implementation.*

Appendix D: Industrial digital platform types

Madanaguli et al. (2023) investigates the evolving landscape of industrial digital platforms, emphasising how data integration and ecosystem actor integration shape platform business models. Building on this research, four distinct types of industrial digital platforms are identified, each varying in their levels of data integration and ecosystem collaboration, which is presented in Figure 8 in Appendix C.

Industrial product efficiency platforms are distinguished by their limited data integration and involvement of ecosystem players. Data usage is primarily internal, focusing on monitoring production processes (e.g., machines, spare parts, and maintenance intervals) and providing basic digital services. However, there is potential for evolution through enhanced data integration or expanded partnerships within the ecosystem.

Industrial product-service platforms, on the other hand, demonstrate a higher degree of data integration and a moderate integration of ecosystem integration. They utilize data to create, deliver, and capture value, focusing both on improving processes internally and efforts to support their closest partners in the value chain. This is evidenced by their investments in platform development and the provision of advanced digital services to their most valuable customers (e.g., producers or consumers).

Industrial transaction platforms are distinguished by high ecosystem actor integration yet exhibit a low degree of data integration. They act as intermediaries in B2B and/or B2C transactions, reducing transaction costs and efficiently matching supply and demand. These platforms generate value by charging commissions on transactions and aim to create cross-side network effects by solving the "chicken and egg" problem of attracting both suppliers and customers. However, this type of platform fails to create and capture additional values enabled by ample data ownership.

Industrial digital platform ecosystems represent the most advanced type, with high levels of both data and ecosystem actor integration. These platforms deeply utilize data for comprehensive value creation, delivery, and capture processes. They enable complex value propositions through collaborative business models and digital servitization, moving beyond mere transaction efficiency. The evolution of these platforms involves the balancing of data integration with partner integration in order to sustain growth and deliver sophisticated digital services.

The developed matrix of industrial digital platforms reveals a clear correlation between data integration and ecosystem actor integration, where higher levels of both lead to more advanced platform types. These platforms enhance the possibilities of data-driven value creation and monetisation. As platforms evolve, those that balance these elements are positioned to deliver more sophisticated digital services and sustain long-term growth.

Appendix E: Data value creation options

Kakuschke (2024) conducted research into the various options available to organisations wishing to create value by leveraging data. By conducting systematic literature review, an overarching framework was developed that included twelve possible options for data value creation (DVC), which are described below (Kakuschke, 2024).

DVC1: Data Preparation

DVC1 involves preprocessing and enriching raw data to improve quality. Activities include integrating or transforming raw data into a more refined, prepared state (Baecker et al., 2020; Sorescu, 2017). The enhanced data maintains its symbolic nature but offers higher quality for subsequent use (Ackoff, 1989).

DVC2: Information Creation

DVC2 increases the value of an organisation information assets by processing and analysing prepared data. For instance, statistical evaluations from census data can reveal trends, turning raw data into actionable insights (Ackoff, 1989).

DVC3: Offering

Organisations can utilize the information to refine their existing products or create new offerings. Market analysis is a typical example where customer data informs product development. The information indirectly enhances the final product of service through its development or improvement, rather than being directly part of the created product or service to customers (e.g., DVC11 wrapping) (Baecker et al., 2020).

DVC4: Pricing

Information can optimize pricing strategies, allowing for dynamic adjustments based on various factors such as customer segmentation, weather, or location (Baecker et al., 2020; Schüritz & Satzger, 2016).

DVC5: Customer Interaction

Analysing customer data helps tailor marketing efforts, such as personalized advertisements and product recommendations (Fast et al., 2021). This approach also includes optimising the online presence to match customers preferences.

DVC6: Process (optimizing organizational processes)

Information derived from data can streamline and enhance organisational processes. For instance, analysing workflow data to identify bottlenecks and improve efficiency. In addition, information can be used for improving operational efficiency through process automation or support for decision-making (Eber et al., 2021).

DVC7: Raw Data

DVC7 involves exchanging data in raw or pure form to for instance consumer research companies (Thomas & Leiponen, 2016).

DVC8: Prepared Data

DVC8 involves exchanging data in modified form. Pre-processed data offers higher quality and usability for further analysis or application. Examples of pre-processed data is anonymised customer usage data (Thomas & Leiponen, 2016).

DVC9: Insights

Insights are independent information offerings and are part of standalone offerings. Insights represents outcomes of data analysis processes that can be exchanged with other actors in the supply chain (Parvinen et al., 2020). Insights include descriptive reports as well as advanced predictive and prescriptive analytics outcomes, such as those generated by machine learning models (Buff et al., 2015).

DVC10: Knowledge product

Another standalone DVC option is ‘knowledge product’, which goes even a step further by transforming insights into a product or service that deliver specific knowledge to customers (Trabucchi et al., 2022), such as analytical reports or trained machine learning models (Hartmann et al., 2016).

DVC11: Wrapping

DVC11 involves embedding the information in actual products or services, enhancing their value. The literature frequently refers to non-data products or services. A great example is the additional service provided by FedEx, which enables customers to track their packages. This is in addition to the company's core service of package delivery (Hartmann et al., 2016).

DVC12: Perform action

The final option Kakuschke (2024) addresses in their study is ‘perform action’, which refers to exchanging services that utilise information to take actions for the benefit of customers. This could involve predictive maintenance, which allow service providers to proactively maintain provisioned machines or involving in strategic decisions, based on the derived insights (Buff et al., 2015; Ritala et al., 2024)

All the possible DVC options identified in Kakuschke’s paper (2024) was subjected to a two-dimensional classification scheme based on the underlying value object and the value type pursued by the organisation. This resulted in the creation of the Data Value Creation Matrix, shown in Figure 9 in appendix C.

Appendix F: Key factors for data-based value creation

Diane et al. (2020) investigated the role of data analytics within multi-sided platforms operating in the food industry. In doing so, the researchers identified eight essential factors characterising data-based value creation and their role in data-driven business models (DDBM). The eight key factors (KF) are as follows (Diane et al., 2020) :

KF1: Real-time operations
Real-time data analytics allows platform organisations to optimise their operations dynamically, such as by adjusting delivery routes or managing inventory based on current conditions like weather or traffic.

KF2: Optimisation of delivery
Analytics helps in streamlining the delivery process by determining the most efficient routes and schedules, thereby reducing costs, and improving customer satisfaction.

KF3: Customised recommendations
By analysing customer data, platform businesses can offer personalised product recommendations, enhancing the customer experience and increasing the likelihood of repeat business.

KF4: Market trends
Platform businesses use data analytics to monitor and predict market trends, helping them make informed decisions about product offerings and marketing strategies to better meet customer demands.

KF5: Customer orders
Analysis of customer order data allows platform businesses to understand purchasing patterns and preferences, enabling more accurate demand forecasting and inventory management.

KF6: Customer seasonal demand
Platform businesses use analytics to predict and respond to seasonal variations in customer demand, ensuring they have the right products available at the right times.

KF7: Cross industry affiliation
Platform businesses leverage data from related industries to identify potential partnerships and collaborative opportunities, enhancing their value proposition and operational efficiency.

KF8: Business results of media plans
Analytics is used to evaluate the effectiveness of marketing and media plans, helping platform organizations optimize their advertising strategies for better return on investment.

These eight key factors facilitate progress on several fronts within the business model of multi-sided platforms, namely optimisation of current services, prediction of future value and development of partnerships. The findings of the study by Diane et al. (2020) demonstrate the significance of data

analytics within platform organisations, underscoring the essential role of data analytics in developing and deploying previously described DVC-options in Appendix E (Diane et al., 2020; Kakuschke, 2024).

Appendix G: Data monetisation framework

Building on the work of Parvinen et al. (2020) and other academics, Ofulue & Benyoucef (2024) developed a framework for data monetisation. The framework consists of three core components: operating model, players, and revenue models. This framework enhances existing literature classifications by integrating value generated by players within the monetization ecosystem and the overarching revenue models. The framework is depicted in Figure 10 and is briefly explained for each core component (Ofulue & Benyoucef, 2024).

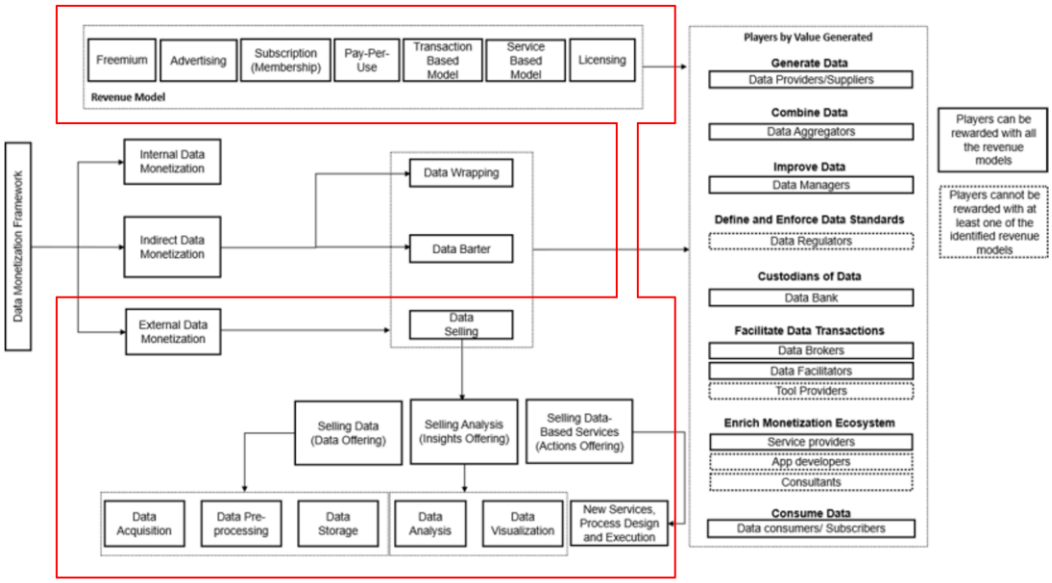


Figure 10: Data monetisation framework. Extracted from Ofulue & Benyoucef (2024).

Operating Model: The operating model component encompasses all forms of data monetisation as described in the literature. In addition to the previously mentioned possibilities of monetising either internal or external data, this framework introduces the concept of indirect data monetisation, which includes data wrapping and data barter. The latter involves providing data in exchange for non-monetary rewards and is a popular strategy among social media platforms. As this study examines value capture opportunities for two-sided platforms outside the organisation, internal data and indirect data monetization are excluded.

Players*:* Players are entities within the ecosystem that contribute value to data monetisation. Players are organized based on the value they add, encompassing various roles from data providers to data consumers.

Revenue Model*:* These models describe how revenue is generated from data monetization activities. All identified revenue models will be briefly explained, as this information is of value for the remainder of the study:

Freemium:

This model aims to attract a large user base by offering basic data services at no cost while charging for premium features or detailed data. This approach fosters the formation of a community and encourages user engagement. Thomas & Leiponen (2016) and de Reuver et al. (2015) provide illustrative examples from platforms such as YouTube and Spotify, which provide basic access for free but charge for additional features (De Reuver et al., 2015; Thomas & Leiponen, 2016).

Advertising:

The revenue generated by this model is primarily derived from advertisements. Platforms collect and analyse user data to provide targeted advertising, which enhances the value for advertisers. Tucker (2011) posits that the platform's capacity to gather and evaluate data effectively represents a competitive advantage. Kemppainen et al. (2018) observe that the evolving attitudes towards personal data privacy have led to some models adopting a policy of no advertising (Kemppainen et al., 2018; Tucker, 2011).

Subscription (membership):

This model entails the periodic payment of a fee for the right to access data, which is often structured in tiered packages. The initial access to data may be provided at no cost or at a low cost, whereas more comprehensive and aggregated data may require a subscription. Najjar (2014) and Spiekermann (2019) discuss a number of subscription models, emphasizing that the willingness of users to pay is a significant source of revenue (Najjar & Kettinger, 2014; Spiekermann, 2019).

Pay-per-Use:

Users are charged based on the amount of data they consume. This model is common for services like APIs, where pricing is determined per data unit accessed. It offers flexibility and scalability depending on data consumption needs, as stated by Ofulue & Benyoucef (2024).

Transaction-based model:

Revenue is generated through fees on transactions, either based on time or volume. The platform operator facilitates these data transactions, earning a fee for each transaction. This model emphasises the transactional nature of data exchange (Kemppainen et al., 2018).

Service-based model:

This involves generating revenue through fees for services provided on the platform. These may include service fees, connection fees, and membership fees, where the platform offers value-added services to its users. The objective is to enhance the user experience through the provision of additional services (Kemppainen et al., 2018).

Licensing:

The monetisation of data occurs through licensing agreements, which regulate and standardize data

access and usage. This model ensures that data usage is controlled and consistent, a feature that is often observed in data marketplaces (Spiekermann, 2019).

Appendix H: Interview Protocol

1. Opening the interview

Welcome participant,

Thank you for your participation! My name is Wietse Schuurman, and I am currently writing my master thesis as part of the completion of the Masters's in Business Administration.

Before we start with the actual interview, I briefly explain the purpose of the interview and discuss some formalities so that the interview complies with the rules imposed by the University of Twente's ethics committee.

2. Explain the purpose of the interview and research

The purpose of this research is to investigate how B2B platform organisations in the construction industry can utilise data-driven initiatives to create more value for their user groups. Specifically, this research investigate how data-driven value can be created and delivered by platform organisations to affiliated manufacturers. Additionally, within the scope of the research includes exploring how the data-driven value created can be captured by the platform organisation, enabling the business model of platform organisations to unlock potential new revenue streams through the development and implementation of data-driven products or services.

[Example from Amazon and Werkspot.nl]

To investigate whether the concept of introducing data-driven services or products in this specific industry is feasible, it is essential to understand how [platform company / manufacturer], perceive this concept. By conducting a series of interviews with the platform company and manufacturers collaborating with the platform company, I aim to determine whether manufacturers have a need for data-driven services or products from the platform company. If so, I seek to uncover which data or information is considered valuable, which specific services or products would be suitable, and whether manufacturers are genuinely willing to pay for such services. Additionally, I am interested in exploring the capabilities required by platform company and manufacturer to facilitate a smooth transition to a more data-driven business model and identifying any challenges that may arise in the process.

3. Ethical aspects

a. Is it all right with you if I record this interview?
    i. The recording will help create a transcript, ensuring that no important data is missed.
    ii. All research data will be anonymised and treated confidentially.

b. The data collected will only be used for research purposes, shared exclusively with the case company and the University of Twente to support my master's thesis.
c. There are no physical, legal, or financial risks associated with participating in this study.
d. You are free to skip any questions you do not wish to answer.
    i. Participation is entirely voluntary, and you may withdraw at any time.
e. [Manufacturer]
    i. Please note, this research is completely separate from the case company
    ii. Your participation and responses will have no impact on any current or future collaboration with the case company.

Formalities are now all discussed. Do you have any questions before we start? [Question]

4. Introductory questions

Questions about their role at [company], key figures of [company], and understanding of current collaboration between [case company] and [manufacturer], including the current use of data within the collaboration.

5. Key questions per concept:

a. ***Data-driven Value creation***

i. Were you familiar with the concept of data-driven value creation beforehand?

b. ***Data-driven Value Propositions***

Discussing the DDVPs one by one as I am interested in your thoughts on the value proposition and whether this DDVP could be of added value to [manufacturer].

i. Which DDVP creates the most value for [manufacturer(s)] in the short term/ long term, and why?

ii. Which DDVP does not create value for [manufacturer(s)] and why?

c. ***Data Monetisation strategies & Willingness to pay***

Discussing the difference between direct data monetisation and indirect data monetisation.

i. How do you view the idea of monetising data and/or insights within the collaboration between platform organisation and manufacturers?
ii. To what extent do you think indirect data monetisation is suitable for monetising data in the collaboration between platform organisation and manufacturer? Please explain your answer.
iii. To what extent do you think direct data monetisation is suitable for monetising data in the collaboration between platform organisation and manufacturer? Please explain your answer.
iv. Which variant within direct data monetisation do you think is most suitable within the collaboration between platform organisation and manufacturer?

Discussing the revenue models that are used according to literature when data is monetised.

v. What pricing model or pricing models are appropriate for a platform organisation like [case company] to adopt when monetising data towards their manufacturers?

vi. Do you think manufacturers in general would be willing to pay for data-driven products/services offered by [case company]

- If yes, which of the aforementioned data-driven value propositions do you think would add enough value to be monetised?
- If not, what would be possible barriers to it not being seen as valuable by manufacturers?

d. *Capabilities & Challenges*

From the literature analysis, it is emphasised that platform organisations must have certain analytical skills, such as data collection, data analysis and data interpretation skills, to develop and deliver data-driven products or services for customers at all. In this context:

i. Can you describe what the level of data integration of [case company] is, and does the extent of this level constitute an obstacle to the development of data-driven products or services?

ii. When implementing data-driven services intended for frame manufacturers, do you expect other internal obstacles? Think of technical challenges, data quality or data ownership?

On the other hand, to fully benefit from data-driven value creation delivered by platform organisations, it is important that the receiving party, in this case manufacturer, also have certain analytical skills. In this context:

iii. When implementing data-driven services intended for [manufacturer], do you expect obstacles? Think technical challenges, data literacy of staff, adoption level, etcetera?

iv. What would be needed to successfully integrate data-driven services into collaboration with [case company]?

6. Additional comments

Provide the interviewee with an opportunity to share additional comments, offer feedback, and ask any questions related to the topic.

7. Closing the interview

Appendix I: Interview Guide Manufacturers

Algemene vragen:

Q1. Wat is uw functie?

Q2. Hoeveel medewerkers heeft *bedrijf*?

Q3. Wat bedroeg de omzet van *bedrijf* in 2023 in Euro's?

Q4. In welk jaar is *bedrijf* een samenwerkingsverband gestart met Toelevering Online?

Q5. Welk percentage van de omzet werd verkregen uit orders afkomstig van Toelevering Online in 2023?

Begrijpen van de huidige situatie en samenwerking:

Q6A. Hoe ziet u de rol die Toelevering Online speelt binnen *bedrijf* ?

Q6B. Welke waarde creëert en/of levert het samenwerken met een platform als Toelevering Online voor *bedrijf*?

Q7. Kunt u de huidige samenwerking met Toelevering Online beschrijven?

Q8. Wat is het verschil in samenwerking met Toelevering Online en non-platform organisaties?

Q9. In welke mate is het delen van data en inzichten op dit moment aan de orde in de samenwerking met Toelevering Online en *bedrijf*?

Q9A. Welke data en inzichten worden momenteel uitgewisseld en welke systemen maken de uitwisseling ervan mogelijk?

Data-driven value creation

In de introductie werd al kort het begrip 'data-gedreven waarde creatie' genoemd.

Q10. Was u op voorhand bekend met het begrip 'data-gedreven waarde creatie'?

Data-gedreven waarde creatie staat voor: "Het creëren van waarde door gebruik van data". Het specifiek creëren van waarde voor derden, dus buiten de organisatie wordt gezien als externe data-gedreven waarde creatie. Hetgeen waar dit onderzoek de aandacht op heeft gevestigd. Vandaar dat de volgende vragen over dit onderwerp zullen gaan. Aan de hand van deze vragen hoop ik een beeld te kunnen schetsen hoe *bedrijf* tegen het idee aankijkt dat een platformorganisatie, aldus Toelevering Online, waarde gaat creëren door slim om te gaan met de beschikbare gegevens, en deze vervolgens te delen met *bedrijf* ter bevordering van een verbeterende samenwerking.

Nu is gebleken uit de literatuurstudie dat platformen die gefocust zijn op het creëren van waarde voor consumenten, de data moeten inzetten om het matchmakingsproces en gebruikerservaring te verbeteren. Daarentegen, platformen die waarde willen creëren voor bedrijven, dus de business-to-business omgeving, zou de data moeten gebruiken voor de ontwikkeling en levering van waarde toevoegende diensten, zoals inzicht in seizoensgebonden vraagpatronen.

Q11. Welke variant van data-gedreven waarde creatie is voor *bedrijf* het meest waardevol en waarom?

Data-gedreven waarde creatie en data-gedreven waarde proposities zijn twee termen die onlosmakelijk verbonden met elkaar zijn. Data-gedreven waarde proposities zijn beloftes die vanuit platformorganisaties gedaan worden door slim om te gaan met gebruik van data. Onder data-gedreven waarde creatie valt hoe het platform de data daadwerkelijk inzet om de belofte waar te maken. Door bijvoorbeeld het te analyseren van productprestaties zodat productverbeteringen kunnen worden doorgevoerd.

Uit de literatuur naar platformorganisaties die gefocust zijn op het creëren van waarde voor andere bedrijven (B2B-markt), zijn er vier gebruikelijke data-gedreven waarde proposities die platformen ontwikkelen en beloven richting hun klanten. Omdat de volgende vragen betrekking hebben op de waarde proposities, worden deze even kort toegelicht.

1. *Data-as-a-Product:*
   Deze waarde propositie betreft het aanleveren van gegevens in hun ruwe of bewerkte vorm door de platformorganisatie aan hun partners. Bewerkte gegevens bieden een hogere kwaliteit en bruikbaarheid voor verdere analyse of doeleinden dan ruwe gegevens.

Q12A Welke waarde denkt u dat data-gedreven waarde propositie Data-as-a-Product kan leveren voor *bedrijf*?

2. *Data-enhanced Products:*
   Deze waarde propositie betreft het integreren van gegevens in producten door de platformorganisatie om de functionaliteit en/of gebruikerservaring te verbeteren voor hun partners. Voorbeelden zijn real-time analytische rapporten (dashboards) of getrainde machine learning modellen ter bevordering van de procesprestaties.

Q12B. Welke waarde denkt u dat data-gedreven waarde propositie Data-enhanced Product kan leveren voor *bedrijf*?

3. *Data-driven services:*
   Deze waarde propositie hangt nauw samen met de waarde propositie ‘data-enhanced product’, echter gaat het hier om het leveren van een dienst door de platformorganisatie aan hun partners.

Hierbij worden ruwe of bewerkte gegevens omgezet tot bruikbare inzichten, waardoor platformorganisaties diensten op maat leveren die inspelen op de specifieke behoefte van klanten. Een voorbeeld van een dergelijke data-gedreven dienst een tracking-systeem voor klanten die kozijnen besteld hebben.

Q12C. Welke waarde denkt u dat data-gedreven waarde propositie Data-Driven Services kan leveren voor *bedrijf*?

4. *Data-enabled performance outcomes:*
   Deze waarde propositie omvat de integratie van producten met data-uitbreiding en data gestuurde diensten om slimme oplossingen te creëren die meetbare resultaten opleveren via data analyse en gebruik van geavanceerde technologie. Een voorbeeld is het leveren van slimme kozijnen, uitgerust met sensoren om voorspellend onderhoud te kunnen activeren. Sensoren die slijtage, isolatieproblemen of verzakkingen kunnen detecteren, stelt veelvoorkomende problemen vroegtijdig aan het licht. Deze data kan gebruikt worden voor productverbetering en dergelijke en voorkomt dat problemen escaleren.

Q12D. Welke waarde denkt u dat data-gedreven waarde propositie Data-enabled Performance Outcomes kan leveren voor *bedrijf*?

Q13A. Welke van de genoemde data-gedreven waarde proposities creëert op korte termijn de meeste waarde voor *bedrijf* en waarom?

Q13B. Welke soorten gegevens zou u hierbij graag ontvangen van een platformorganisatie en mogen daarom niet ontbreken?

Q14A. Welke van de genoemde data-gedreven waarde proposities zou op de lange termijn de meeste waarde creëren voor *bedrijf* en waarom?

Q14B. Welke soorten gegevens zou hierbij graag ontvangen van een platformorganisatie en mogen daarom niet ontbreken?

Q15. Welke van de genoemde data-gedreven waarde proposities creëert daarentegen geen waarde voor *bedrijf* en waarom?

<u>Data monetisation en betalingsbereidheid</u>

Data monetisation omvat het gebruik van gegevens om kwantificeerbare economische voordelen te genereren. Dit kan gerealiseerd worden door een prijsmodel aan de geleverde data-gedreven dienst of product te hangen. Uit literatuuronderzoek is gebleken dat de volgende prijsmodellen gehanteerd worden bij het monetariseren van data:

- *Freemium:*

De basisversie van de geleverde dienst/product is gratis, maar voor geavanceerdere functionaliteiten of betere prestaties moet betaald worden.

- *Advertising:*
  Het platform verzamelt en analyseert gebruikersgegevens om gerichte advertenties aan te bieden, wat de waarde voor adverteerders verhoogt. In deze situatie vallen onder de adverteerders de partners die de kozijnen leveren.
- *Subscription:*
  Partners betalen op periodieke basis (maandelijks/jaarlijks) voor toegang tot het product of dienst.
- *Pay-per use:*
  Partners betalen alleen voor de hoeveelheid data of diensten die ze daadwerkelijk gebruiken. Dit model is gebruikelijk voor diensten zoals API's, waarbij de prijs wordt bepaald per gebruikte gegevenseenheid.
- *Transaction-based model:*
  Inkomsten worden gegenereerd door vergoedingen op transacties, gebaseerd op tijd of volume. De platformorganisatie faciliteert deze gegevenstransacties en verdient een vergoeding voor elke transactie.
- *Service-based model:*
  Hierbij worden inkomsten gegenereerd via vergoedingen voor diensten die op het platform worden geleverd. Dit kunnen servicekosten, verbindingskosten en lidmaatschapskosten zijn, wanneer het platform diensten met toegevoegde waarde aanbiedt aan zijn gebruikers. Het doel is om de gebruikerservaring te verbeteren door extra diensten aan te bieden.
- *Licensing:*
  Partners nemen een licentie af om recht/toegang te krijgen tot het product of dienst ontwikkeld en geleverd door het platform.

Door het stellen van de volgende vragen hoop ik een beeld te kunnen schetsen van de betalingsbereidheid van *bedrijf* voor het ontvangen van waarde geleverd door een platformorganisatie, in dit geval Toelevering Online. Daarnaast hoop ik te achterhalen of bepaalde prijsmodellen uw voorkeur hebben of niet.

Q16. Zou uw bedrijf bereid zijn om te betalen voor geleverde data-gedreven waarde creatie opties behorende bij de waarde propositie Data-as-a-Product? Beredeneer uw antwoord.

Indien bedrijf bereid is om te betalen:

A. Hoeveel zou *bedrijf* betalen voor de geleverde dienst/product in Euro's?
B. Welk prijsmodel heeft hierbij uw voorkeur?

Q17. Zou uw bedrijf bereid zijn om te betalen voor geleverde data-gedreven waarde creatie opties behorende bij de waarde propositie Data-enhanced Product? Beredeneer uw antwoord.

Indien bedrijf bereid is om te betalen:

A. Hoeveel zou *bedrijf* betalen voor de geleverde dienst/product in Euro's?
B. Welk prijsmodel heeft hierbij uw voorkeur?

Q18. Zou uw bedrijf bereid zijn om te betalen voor geleverde data-gedreven waarde creatie opties behorende bij de waarde propositie Data-driven services? Beredeneer uw antwoord.

Indien bedrijf bereid is om te betalen:

A. Hoeveel zou *bedrijf* betalen voor de geleverde dienst/product in Euro's?
B. Welk prijsmodel heeft hierbij uw voorkeur?

Q19. Zou uw bedrijf bereid zijn om te betalen voor geleverde data-gedreven waarde creatie opties behorende bij de waarde propositie Data-enabled performance outcomes? Beredeneer uw antwoord.

Indien bedrijf bereid is om te betalen:

A. Hoeveel zou *bedrijf* betalen voor de geleverde dienst/product in Euro's?
B. Welk prijsmodel heeft hierbij uw voorkeur?

Capabilities

Uit de literatuuranalyse wordt benadrukt dat organisaties een bepaald niveau van data-geletterdheid moeten bezitten om volledig te kunnen profiteren van data-gedreven waarde creatie geleverd door het platform. In dit verband:

Q20. Kunt u beschrijven hoe uw bedrijf momenteel data gebruikt in de dagelijkse operaties?

Uit de literatuuranalyse wordt benadrukt dat sterke data-analysevaardigheden essentieel zijn voor organisaties om waarde uit data te halen. In dit licht:

Q21. Hoe comfortabel bent u en uw team met het interpreteren en gebruiken van data om bedrijfsbeslissingen te nemen?

Q21A. Maakt uw bedrijf gebruik van data-analyse en visualisatie tools als Power BI of Tableau?

Q22. Zijn er nog andere factoren op het gebied die momenteel het ontvangen van data-gedreven waarde creatie van Toelevering Online in de weg staat?

Challenges:

Ook blijkt dat innovatiecapaciteit en organisatorische volwassenheid een aanzienlijke invloed hebben op het vermogen van een bedrijf om data-gedreven initiatieven te omarmen. Gezien dit inzicht:

Q23. Denkt u dat de structuur en middelen van uw organisatie de adoptie van data-gedreven producten en diensten ondersteunen en waarom?

Q23A. Ziet u overige belemmeringen in de samenwerking met Toelevering Online betreft het ontvangen van data-gedreven producten/diensten in de weg kan staan?

Daarentegen kunnen vertrouwen en zorgen over dataprivacy conflicten veroorzaken in relaties rond data-uitwisseling. Gezien deze bevinding:

Q24. Hoe belangrijk is vertrouwen in uw relatie met Toelevering Online, met name als het gaat om het ontvangen van gevoelige data?

Q25. Welk effect zou het ontvangen van incorrecte data hebben op uw relatie met Toelevering Online?

We zijn bijna aan het einde van het interview gekomen. Nog een laatste vraag en dat sluiten we ‘m af.

Q26. Zijn er nog andere aspecten met betrekking tot data-gedreven waarde creatie en het te gelde maken van data volgens u belangrijk om in overweging te nemen in het kader van dit onderzoek?

Bedankt voor uw deelname!

Appendix J: Interview Guide Operations

Algemene vragen:

Q1. Wat is uw functie?

Q2. Met hoeveel kozijnproducenten heeft Toelevering Online een samenwerkingsverband?

Q3. Hoe omschrijft u de rol die Toelevering Online vervult in de keten, specifiek in relatie tot kozijnproducenten?

Begrijpen van de huidige situatie en data-gedreven samenwerking:

Q4. Welke processen in de samenwerking met kozijnproducenten worden momenteel ondersteund door data en/of inzichten?

Q5. Worden data en/of inzichten verkregen uit data momenteel uitgewisseld met kozijnproducenten? Zo ja, op welke manier en vanuit welke overweging?

Q5A. Zijn er verschillen aan te duiden in de samenwerking met verschillende kozijnproducenten en Toelevering Online op gebied van data en/of informatie-uitwisseling?

Q5B. Wat zijn de belangrijkste factoren die ten grondslag liggen aan deze verschillen (bijvoorbeeld grootte van de producent, technologische volwassenheid, geografische locatie)?

Q6. Wat zijn volgens u de belangrijkste knelpunten in de huidige samenwerking met kozijnproducenten, welke door data-gedreven oplossingen kunnen worden aangepakt?

Business model evolution:

De literatuur benadrukt hoe het niveau van data-integratie en ecosysteemsamenwerking het business model van industriële digitale platformen vormgeeft. Hieruit voortkomend heeft de literatuur vier verschillende typen industriële digitale platformen gedefinieerd, en zullen kort worden beschreven:

Industrial product efficiency platforms: Dit type platform wordt gekenmerkt door hun beperkte data-integratie en betrokkenheid met andere actoren in de keten. Data gebruik is voornamelijk intern gericht en gericht op het monitoren van productieprocessen.

Industrial product-service platforms: Dit type platform wordt gekenmerkt door hun hoger niveau van data-integratie, maar beperkte invloed en betrokkenheid binnen het ecosysteem waarin ze acteren. De data wordt gebruikt voor het creëren en leveren van waarde intern, maar ook om hun naaste partners in de waardeketen te ondersteunen. Dit blijkt uit hun investeringen in platformontwikkeling en het leveren van geavanceerde digitale diensten/producten aan hun meest waardevolle klanten.

Industrial transaction platforms: Dit type platform wordt gekenmerkt door hun grote betrokkenheid binnen het ecosysteem waarin ze opereren, maar lage mate van data-integratie. Deze platformen fungeren als tussenpersoon en creëren waarde voor hun klantgroepen door het matchmakingsproces te verbeteren, waardoor transactiekosten verlaagd worden. Dit soort platformen zijn transactie-gefocust maar slagen er niet in waarde te creëren middels slim gebruik van gegevens.

Industrial digital platform ecosystem: Dit type platform vertegenwoordigt het meeste geavanceerde type, met hoge mate van data-integratie en invloed/samenwerking met actoren binnen het ecosysteem.

Q7. Binnen welk type industrieel digitaal platform categoriseert u het huidige business model van Toelevering Online, en waarom?

Data-driven value creation:

In de introductie werd al kort het begrip ‘data-gedreven waarde creatie’ aangekaart.

Q8. Was u op voorhand bekend met het begrip ‘data-gedreven waarde creatie’?

Data-gedreven waarde creatie staat voor: “Het creëren van waarde door gebruik van data”. Het specifiek creëren van waarde voor derden, dus buiten de organisatie wordt gezien als externe data-gedreven waarde creatie. Hetgeen waar dit onderzoek de aandacht op heeft gevestigd.

Uit de literatuurstudie naar data-gedreven waarde creatie blijkt dat de manier waarop data wordt ingezet, afhangt van de klantgroep waarvoor de waarde is bedoeld. Bij data-gedreven waarde creatie gericht op de consument, wordt de data ingezet om zowel het matchmakingsproces als de gebruikerservaring op het platform te verbeteren. Daarentegen, platformen die waarde willen creëren voor bedrijven, kortom de business-to-business omgeving, zou de data moeten gebruiken voor de ontwikkeling en levering van waarde toevoegende diensten, zoals bijvoorbeeld inzicht in seizoensgebonden vraagpatronen.

Q9. Wat is uw opvatting hierover en op welke wijze zou Toelevering Online de meeste waarde leveren voor hun kozijnproducenten?

Q10. Heeft Toelevering Online al stappen gezet in de richting van het creëren en leveren van data-gedreven waarde voor hun kozijnproducenten? Zo ja, beschrijf het.

Data-gedreven waarde creatie en data-gedreven waarde proposities zijn twee termen die onlosmakelijk verbonden zijn elkaar. Data-gedreven waarde proposities zijn beloftes die vanuit platformorganisaties gedaan worden door slim om te gaan met gebruik van data. Onder data-gedreven waarde creatie valt hoe het platform de data daadwerkelijk inzet om de belofte waar te maken. Door bijvoorbeeld het analyseren van productprestaties zodat productverbeteringen kunnen worden doorgevoerd.

Uit de literatuur over platformorganisaties in een B2B-omgeving, die gericht zijn op het creëren van data-gedreven waarde voor andere bedrijven, komen vier gebruikelijke data-gedreven waarde

proposities naar voren. Deze komen één voor één aanbod, en ben benieuwd hoe u over de waarde propositie denkt en of het geschikt is om te hanteren als platformbedrijf in de kozijnindustrie in de samenwerking met kozijnproducenten.

1. *Data-as-a-Product:*

   Deze waarde propositie betreft het aanleveren van gegevens in hun ruwe of bewerkte vorm door de platformorganisatie aan hun partners. Bewerkte gegevens bieden een hogere kwaliteit en bruikbaarheid voor verdere analyse of doeleinden dan ruwe gegevens.

Q11. Zou de data-gedreven waarde propositie 'Data-as-a-Product' waarde creëren voor jullie kozijnproducenten? Licht uw antwoord toe?

Q11A. Welke soorten data (of informatie) zouden volgens u van toegevoegde waarde kunnen zijn voor kozijnproducenten, en waarom?

2. *Data-enhanced Products:*

   Deze waarde propositie integreert gegevens en/of analytische functies in bestaande producten om de waarde van het bestaande product te vergroten. Hierdoor kunnen geavanceerde functies worden aangeboden zoals real-time monitoring of het ontvangen van automatische updates door het platform aan hun business partners. Dit kan de gebruikerservaring bevorderen.

Q12. Zou de data-gedreven waarde propositie 'Data-enhanced Product' waarde creëren voor jullie kozijnproducenten? Licht uw antwoord toe.

Q12A. Welke soorten data of informatie zouden volgens u van toegevoegde waarde kunnen zijn voor kozijnproducenten, en waarom?

3. *Data-driven services:*

   Deze waarde propositie hangt nauw samen met de waarde propositie 'data-enhanced product', echter gaat het hier om het leveren van een dienst door de platformorganisatie aan hun partners. De geleverde data-gedreven dienst staat niet in directe verbinding met 'het product', en moet gezien worden als losstaande (aanvullende) dienst. Hierbij worden ruwe of bewerkte gegevens omgezet tot bruikbare inzichten, waardoor platformorganisaties diensten op maat leveren die inspelen op de specifieke behoefte van klanten. Een voorbeeld van een dergelijke data-gedreven dienst een tracking-systeem voor klanten die kozijnen besteld hebben.

Q13. Zou de data-gedreven waarde propositie ‘Data-driven Services’ waarde creëren voor jullie kozijnproducenten? Licht uw antwoord toe.

Q13A. Welke soorten informatie zouden volgens u van toegevoegde waarde kunnen zijn voor kozijnproducenten, en waarom?

4. *Data-enabled performance outcomes:*

   Deze waarde propositie omvat de integratie van producten met data-uitbreiding en data gestuurde diensten om slimme oplossingen te creëren die meetbare resultaten opleveren via data analyse en gebruik van geavanceerde technologie. Een voorbeeld is het leveren van slimme kozijnen, uitgerust met sensoren om voorspellend onderhoud te kunnen activeren. Sensoren die slijtage, isolatieproblemen of verzakkingen kunnen detecteren, stelt veelvoorkomende problemen vroegtijdig aan het licht. Deze data kan gebruikt worden voor productverbetering en dergelijke en voorkomt dat problemen escaleren.

Q14. Zou de data-gedreven waardepropositie ‘Data-enabled performance outcomes’ waarde creëren voor jullie kozijnproducenten? Licht uw antwoord toe.

Q14A. Welke elementen mogen hierbij absoluut niet ontbreken volgens u en waarom?

Als je de huidige manier van samenwerking met jullie kozijnproducten in acht neemt:

Q15. Welke van de genoemde data-gedreven waarde proposities creëert op korte termijn de meeste waarde voor jullie kozijnproducenten en waarom?

Q16. Welke van de genoemde data-gedreven waarde proposities zou op de lange termijn de meeste waarde creëren voor jullie kozijnproducenten en waarom?

Literatuur over het adoptievermogen van organisaties om data-gedreven waarde creatie te omarmen, benadrukt dat innovatiecapaciteit en organisatorische volwassenheid een aanzienlijke invloed hierop hebben.

Q17. Denkt u dat er bepaalde kozijnproducenten zijn die sneller geneigd zijn om data-gedreven diensten of producten te adopteren dan anderen.

Q17A. Wat maakt deze producenten meer of minder geneigd om data-gedreven diensten of producten te omarmen?

Data monetisation en betalingsbereidheid:

Data monetisation omvat het gebruik van gegevens om kwantificeerbare economische voordelen te genereren. Dit onderzoek is gericht op het creëren van waarde voor externe partijen (kozijnproducenten), waardoor men spreekt over external data monetisation.

Q18. Hoe kijkt u aan tegen het idee om data en/of gegevens te gelde te maken binnen de samenwerking tussen platformorganisatie en kozijnproducenten?

Uit de literatuur komt naar voren dat het extern monetariseren van gegevens kan op twee manieren:

1. *Indirect data monetisation:* Deze methode gebruikt data/gegevens om producten met toegevoegde waarde aan te bieden, te ruilen of inzichten en diensten te verkopen. Hierbinnen vallen data wrapping en data bartering.
    a. *Data wrapping:*
       Data wrapping integreert analytische functies in bestaande producten om de waarde te vergroten. Een voorbeeld is wanneer commerciële banken financiële tools aanbieden die automatisch klanttransacties categoriseren in budgetcategorieën. Dit verbetert de klantbeleving en voegt waarde toe zonder de data direct te verkopen.
    b. *Data bartering:*
       Het ruilen van data voor niet-monetaire doeleinden, zoals inzichten of diensten. Dit wordt veel gebruikt door social media platforms, om bijvoorbeeld hun eigen advertentiediensten te verbeteren.

Q19. In hoeverre denkt u dat indirect data monetisation geschikt is voor het monetariseren van gegevens in de samenwerking tussen platformorganisatie en kozijnproducent? Licht uw antwoord toe.

2. *Direct data monetisation:* Deze methode bevat het direct verkopen van data en/of informatie. Volgens de literatuur kan dit op drie manieren:
    a. *Selling data:*
       Bevat het direct verkopen van ruwe of bewerkte gegevens aan klanten.
    b. *Selling analysis:*
       Bevat het direct verkopen van inzichten, afkomstig van data-analyse.
    c. *Selling data-based services:*
       Bevat het creëren van een dienst die klanten voorzien van direct toepasbare inzichten op basis van data, vaak in real-time. Deze diensten helpen bedrijven om hun omgeving beter te begrijpen en weloverwogen beslissingen te nemen. Vaak wordt hierbij gebruik gemaakt van digitale technologieën om bijvoorbeeld de productie, installatie, en het onderhoud van kozijnen efficiënter en nauwkeuriger te maken. Een mogelijk voorbeeld is het kunnen doen

van predictive maintenance door het plaatsen van een sensor/chip in het kozijn en de real-time prestaties te verkopen aan de producent ter bevordering van de product eigenschappen.

Q20. In hoeverre denkt u dat direct data monetisation geschikt is voor het monetariseren van gegevens in de samenwerking tussen platformorganisatie en kozijnproducent? Licht uw antwoord toe.

Q21. Welke variant binnen direct data monetisation is volgens u het meest geschikt binnen de samenwerking platformorganisatie en kozijnproducent?

Om daadwerkelijk een nieuwe inkomstenbron aan te boren, dient een prijsmodel gekoppeld te worden aan de geleverde data-gedreven dienst(en) of product(en). Uit literatuuronderzoek is gebleken dat de volgende prijsmodellen gehanteerd worden bij het monetariseren van data.

- *Freemium:*
  De basisversie van de geleverde dienst/product is gratis, maar voor geavanceerdere functionaliteiten of betere prestaties moet betaald worden.
- *Advertising:*
  Het platform verzamelt en analyseert gebruikersgegevens om gerichte advertenties aan te bieden, wat de waarde voor adverteerders verhoogt. In deze situatie vallen onder de adverteerders de partners die de kozijnen leveren. ‘
- *Subscription:*
  Partners betalen op periodieke basis (maandelijks/jaarlijks) voor toegang tot het product of dienst.
- *Pay-per use:*
  Partners betalen alleen voor de hoeveelheid data of diensten die ze daadwerkelijk gebruiken. Dit model is gebruikelijk voor diensten zoals API’s, waarbij de prijs wordt bepaald per gebruikte gegevenseenheid.
- *Transaction-based model:*
  Inkomsten worden gegenereerd door vergoedingen op transacties, gebaseerd op tijd of volume. De platformorganisatie faciliteert deze gegevenstransacties en verdient een vergoeding voor elke transactie.
- *Service-based model:*
  Hierbij worden inkomsten gegenereerd via vergoedingen voor diensten die op het platform worden geleverd. Dit kunnen servicekosten, verbindingskosten en lidmaatschapskosten zijn, wanneer het platform diensten met toegevoegde waarde aanbiedt aan zijn gebruikers. Het doel is om de gebruikerservaring te verbeteren door extra diensten aan te bieden.
- *Licensing:*
  Partners nemen een licentie af om recht/toegang te krijgen tot het product of dienst ontwikkeld en geleverd door het platform.

Q22. Welk prijsmodel of prijsmodellen zijn geschikt om te hanteren voor een platformorganisatie als Toelevering Online bij het te gelde maken van data richting hun kozijnproducenten?

Q22A. Denkt u dat bepaalde prijsmodellen beter aansluiten, afhankelijk van de specifieke data-gedreven waarde propositie die gekozen is?

Q22B. Wat maakt het dat de overige prijsmodellen niet of minder geschikt zijn voor Toelevering Online bij het te gelde maken van data?

Q23. Denkt u dat kozijnproducenten in het algemeen bereid zouden zijn om te betalen voor data-gedreven producten/diensten die Toelevering Online aanbiedt?

Q23A. Zo ja, welke van de eerdergenoemde data-gedreven waarde proposities zouden volgens u voldoende waarde toevoegen om te gelde gemaakt te kunnen worden?

Q23B. Zo nee, wat zouden mogelijke barrières zijn waardoor het niet als waardevol door de kozijnproducenten wordt beschouwd?

Capabilities & challenges:

Uit de literatuuranalyse wordt benadrukt dat platform organisaties over bepaalde analytische vaardigheden moeten beschikken, zoals data collectie, data analyse en data interpretatie skills, om überhaupt data-gedreven producten of diensten te ontwikkelen en leveren voor de klant. In dit verband:

Q24. Kunt u beschrijven wat het niveau van data-integratie van Toelevering Online is, en vormt de mate van dit niveau een obstakel voor de ontwikkeling van data-gedreven producten of diensten?

Q25. Verwacht u bij het implementeren van data-gedreven diensten bestemd voor kozijnproducenten andere interne obstakels? Denk aan technische uitdagingen, data kwaliteit of data eigenaarschap?

Anderzijds is het van belang dat de ontvangende partij, in dit geval kozijnproducenten, ook over bepaalde analytische vaardigheden beschikken, om volledig te kunnen profiteren van data-gedreven waarde creatie geleverd door platformorganisaties. In dit verband:

Q26. Verwacht u bij het implementeren van data-gedreven diensten bestemd voor kozijnproducenten obstakels bij de ontvangende partij? Denk aan technische uitdagingen, data-geletterdheid van personeel, adoptieniveau enz.?

Q27. Wat zou volgens u nodig zijn om data-gedreven diensten succesvol te integreren in de samenwerking met kozijnproducenten?

Afsluiting:

Het interview is bijna ten einde en daarbij wil ik nog enkele afsluitende vragen stellen.

Zojuist hadden we het al even over de vier typen business modellen en gaf je aan dat Toelevering Online momenteel *type business model* hanteert.

Q28. In hoeverre zou de ontwikkeling en het uitrollen van data-gedreven oplossingen met kozijnfabrikanten het huidige business model van Toelevering Online kunnen veranderen?

Q29. Hoe belangrijk denkt u dat het creëren van waarde op basis van data zal zijn voor de groei van het platform en in de samenwerking met kozijnproducenten?

Q30. Zijn er nog andere aspecten met betrekking tot data-gedreven waarde creatie en het te gelde maken van data volgens u belangrijk om in overweging te nemen in het kader van dit onderzoek?

Bedankt voor uw deelname!

Appendix K: Interview Guide Data & Analytics

Algemene vragen:

Q1. Wat is uw functie?

Q2. Welke rol speelt data binnen de huidige strategie van Toelevering Online?

Data verzameling en vastlegging:

Het Big Data Value Chain framework bestaat uit diverse stappen en geeft weer hoe waarde gecreëerd kan worden uit data. De volgende vragen zullen betrekking hebben op dit framework om zodoende te beoordelen hoe ver een platformorganisatie gevorderd is met het gebruik en delen van data.

Data acquisition:

Q3. Welke data domeinen worden gebruikt door Toelevering Online? Denk aan machine data, klantdata of salesdata.

Q4. Welke systemen of tools gebruikt Toelevering Online om data te verzamelen?

Data pre-processing:

Q5. Hoe zorgt Toelevering Online ervoor dat de data die wordt verzameld volledig, kwalitatief en betrouwbaar is?

Data storage:

Q6. Welke infrastructuur gebruikt voor de dataopslag?

Data analysis:

Q7. Welke analysetechnieken en -tools worden ingezet om informatie uit de data te halen (bijv. SQL, machine learning, AI, statistische analyses)?

Q8. Hoe vaardig zijn medewerkers van Toelevering Online in het interpreteren van inzichten verworven uit data analyses?

Data visualisation:

Q8. Welke tools en technologieën gebruiken jullie momenteel voor data-analyse (bijv. Tableau, Power BI, Google Data Studio), en in hoeverre zijn deze voorbereid op schaalbare externe samenwerking?

Q9. In welke mate worden visualisaties gebruikt bij strategische of operationele besluitvorming zowel intern als extern?

Q10. Hoe vaardig zijn medewerkers in het creëren van duidelijke, toegankelijke visualisaties?

Data exposition:

Data exposition verwijst naar het proces waarin de resultaten van data-analyse en visualisaties worden gedeeld en gebruikt. Hierbij zien we twee gebruikelijke stromingen, namelijk het delen van de data-gedreven inzichten intern (binnen de organisatie) of extern, zoals met leveranciers, klanten of partners.

Q11A. Worden er momenteel data of inzichten intern gedeeld? Zo ja, vanuit welke overweging?

Q11B. Wordt er momenteel data of inzichten gedeeld met externe partijen, zoals leverancier? Zo ja, hoe wordt deze uitwisseling mogelijk gemaakt en om welke soorten gegevens gaat het?

Communicatie speelt bij het extern willen creëren van waarde een cruciale rol, omdat de waarde van data of informatie pas echt tot zijn recht komt wanneer het begrijpelijk en bruikbaar wordt voor de betrokken partijen. Zonder effectieve communicatie kunnen waardevolle datagedreveen inzichten verloren gaan of niet optimaal benut worden.

Q11C. In hoeverre zijn medewerkers vaardig in het communiceren van complexe data-inzichten aan niet-technische stakeholders, zowel intern als extern indien van toepassing?

Q12. Wat is of zou de meerwaarde van het delen van data en/of inzichten aan externe partijen zoals leveranciers zijn volgens u?

Data-gedreven waarde creatie:

Zoals gezegd gaat dit onderzoek in op het creëren van waarde uit data door platform organisaties bestemd voor fabrikanten/producenten. De literatuur beschrijft meerdere opties voor platform organisaties om waarde extern te creëren. Dit betreft het delen van:

Ruwe data: Het delen van ruwe data aan externe partijen.

Prepared data: Het delen van gemodificeerde data aan externe partijen, zoals het opschonen of anonimiseren van gebruikers gegeven. Deze vorm is van hogere kwaliteit en bruikbaarheid voor verdere analyses.

Insights: Inzichten zijn resultaten van gegevensanalyseprocessen die kunnen worden uitgewisseld met andere actoren in de toeleveringsketen. Insights omvatten zowel beschrijvende rapporten als geavanceerde voorspellende en prescriptieve analyseresultaten. Een voorbeeld van een product is een dashboard met daarom de belangrijkste KPIs gemonitord.

Knowledge product: Deze optie gaat nog een stap verder dan *insights* door inzichten om te zitten in een product of dienst die specifieke kennis levert aan klanten. Voorbeelden zijn analytische rapporten of getrainde modellen voor machinaal leren.

Wrapping: Deze waarde creatie optie houdt in dat informatie wordt ingebed in bestaande producten of diensten, waardoor de waarde van het originele product of dienst toeneemt. In de literatuur wordt vaak verwezen naar niet data-producten of -diensten. Een goed voorbeeld is hiervan is een track- and trace service bij het versturen van pakketjes.

Perform action: Deze waarde creatie optie verwijst naar het uitwisselen van diensten die informatie gebruiken om acties te ondernemen ten voordele van klanten. Hierbij kan het gaan om voorspellend onderhoud, waardoor dienstverleners proactief onderhoud kunnen plegen aan geleverde machines of in dit geval kozijnen. Ook kan het een bijdrage leveren voor het nemen van strategische beslissingen op basis van verkregen inzichten.

Q13. Worden één of meerder data value creation opties ingezet in de samenwerking met kozijnproducenten?

Q14A. Welke data value creation optie zou volgens u het meest waardevol zijn voor de bij u aangesloten kozijnproducenten?

Q14B. Welke soorten data of informatie zou hierbij gedeeld kunnen worden?

Q15A Welke data value creation optie zou op lange termijn het meest waardevol zijn voor de bij u aangesloten kozijnproducenten?

Q15B. Welke soorten data of informatie zou hierbij gedeeld kunnen worden?

Data monetisation:

Data monetisation omvat het gebruik van gegevens om kwantificeerbare economische voordelen te genereren. Dit onderzoek is gericht op het creëren van waarde voor externe partijen, waardoor men spreekt over external data monetisation. Het extern monetariseren van gegevens kan op twee manieren:

1. *Indirect data monetisation:* Deze methode gebruikt data/gegevens om producten met toegevoegde waarde aan te bieden, te ruilen of inzichten en diensten te verkopen. Hierbinnen vallen data wrapping en data bartering.
    a. *Data wrapping:* Data wrapping integreert analytische functies in bestaande producten om de waarde te vergroten. Een voorbeeld is wanneer commerciële banken financiële tools aanbieden die automatisch klanttransacties categoriseren in bugetcategorieën. Dit verbetert de klantbeleving en voegt waarde toe zonder de data direct te verkopen.
    b. *Data bartering:* Het ruilen van data voor niet-monetaire doeleinden, zoals inzichten of diensten. Dit wordt veel gebruikt door social media platforms, om hun eigen advertentiediensten te verbeteren.

Q16. Op welke manieren zou Toelevering Online hun data kunnen inzetten om indirect data monetisation in de samenwerking met producenten te kunnen realiseren? Voorbeelden zijn data-analyse en gepersonaliseerde klantoplossingen?

2. *Direct data monetisation:* Deze methode bevat het direct verkopen van data en/of informatie. Volgens de literatuur kan dit op drie manieren:
    a. *Selling data:*
       Bevat het direct verkopen van ruwe of bewerkte gegevens aan klanten.
    b. *Selling analysis:*
       Bevat het direct verkopen van inzichten, afkomstig van data-analyse.
    c. *Selling data-based services:*
       Bevat het creëren van een dienst die klanten voorzien van direct toepasbare inzichten op basis van data, vaak in real-time. Deze diensten helpen bedrijven om hun omgeving beter te begrijpen en weloverwogen beslissingen te nemen. Vaak wordt hierbij gebruik gemaakt van digitale technologieën om bijvoorbeeld de productie, installatie, en het onderhoud van kozijnen efficiënter en nauwkeuriger te maken. Een mogelijk voorbeeld is het kunnen doen van predictive maintenance door het plaatsen van een sensor/chip in het kozijn en de real-time prestaties te verkopen aan de producent ter bevordering van de product eigenschappen.

Q17A. Welke variant binnen direct data monetisation is het best toepasbaar in de samenwerking met producenten, en waarom?

Q17B. Welke variant binnen direct data monetisation is volgens u niet geschikt in de samenwerking met producenten, en waarom?

Q17C. Welke vorm van external data monetisation (direct of indirect) denkt u dat het beste aansluit op de doelen en strategie van Toelevering Online, en waarom?

<u>Capabilities:</u>

Q18. Beschikt Toelevering Online op dit moment over de analytische vaardigheden (zoals data-analyse, machine-learning, voorspellende modellen) om waarde te kunnen creëren voor kozijnproducenten?

Q19. Beschikt Toelevering Online op dit moment over de technische vaardigheden (bijv. API's, data-integratieplatformen, cloudtechnologieën) om data-gedreven producten en/of diensten te delen met externe partijen, zoals kozijnproducenten? Denk hierbij ook aan menselijke vaardigheden.

Q20. Beschikt Toelevering Online over een datagedreven cultuur, om effectief data gedreven producten en/of diensten te ontwikkelen en delen met externe partijen, zoals kozijnleveranciers?

Uit de literatuur komt sterk naar voren dat de ontvangende partij, in dit geval de kozijnproducenten, ook over bepaalde analytische en technische vaardigheden dienen te beschikken, om zodoende volledig te kunnen profiteren van data-gedreven waarde creatie geleverd door de platformorganisatie.

Q21. Verwacht u bij het implementeren van data-gedreven diensten of producten bestemd voor kozijnproducenten obstakels bij de ontvangende partij op het gebied van analytische vaardigheden? Zoals bijvoorbeeld het vermogen om data / informatie te kunnen interpreteren en/of integreren.

Q22. Verwacht u bij het implementeren van data-gedreven diensten of producten bestemd voor kozijnproducenten obstakels bij de ontvangende partij op het gebied van technische vaardigheden?

Q23. Verwacht u bij het implementeren van data-gedreven diensten of producten bestemd voor kozijnproducenten culturele uitdagingen bij de ontvangende partij?

Q24. Wat zou volgens u nodig zijn om data-gedreven diensten of producten in de toekomst succesvol te integreren in de samenwerking met kozijnproducenten?

Challenges:

Q25. Verwacht u uitdagen op het gebied van het garanderen van kwaliteit, betrouwbaarheid en privacy van gegevens, wanneer het delen van data-gedreven producten en/of diensten gerealiseerd gaat worden?

Q26. Verwacht u uitdagingen op het gebied van data ownership, wanneer het delen van data-gedreven producten en/of diensten gerealiseerd gaat worden?

Q27. Welke uitdagingen ziet u in het effectief vermarkten van data-gedreven producten en/of diensten aan kozijnproducenten?

Vertrouwen onderling speelt een grote rol bij het proces rondom het delen van data-gedreven inzichten en het te gelde maken van deze gecreëerde waarde.

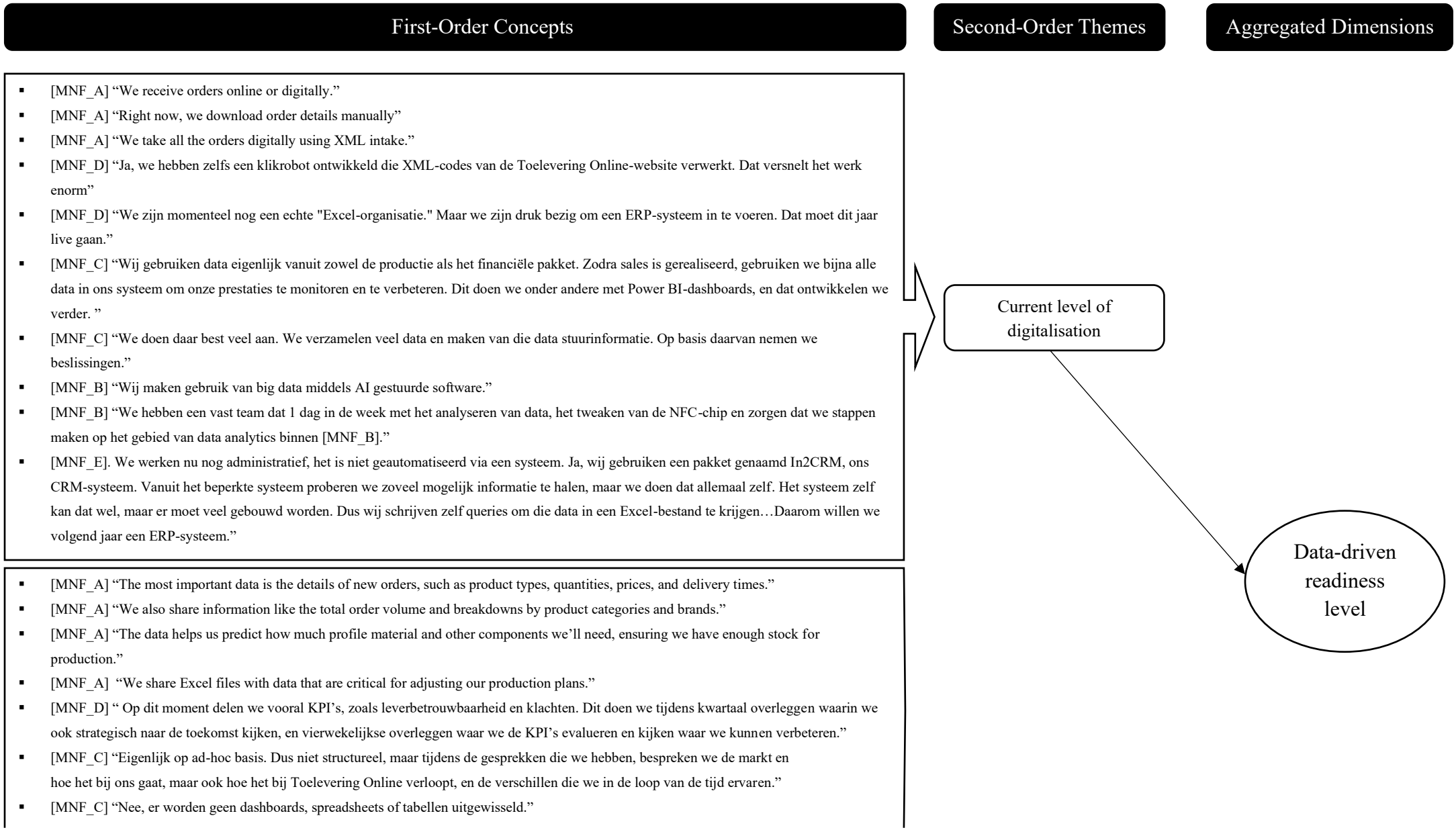
Q28. In hoeverre denkt u dat vertrouwen een rol gaat spelen in dit hele proces binnen de kozijnindustrie?

Q29. Welke factoren zouden volgens u nog meer bepalend zijn voor het succes van data-gedreven waardecreatie en datamonetisatie binnen de kozijnindustrie?

Afsluiting

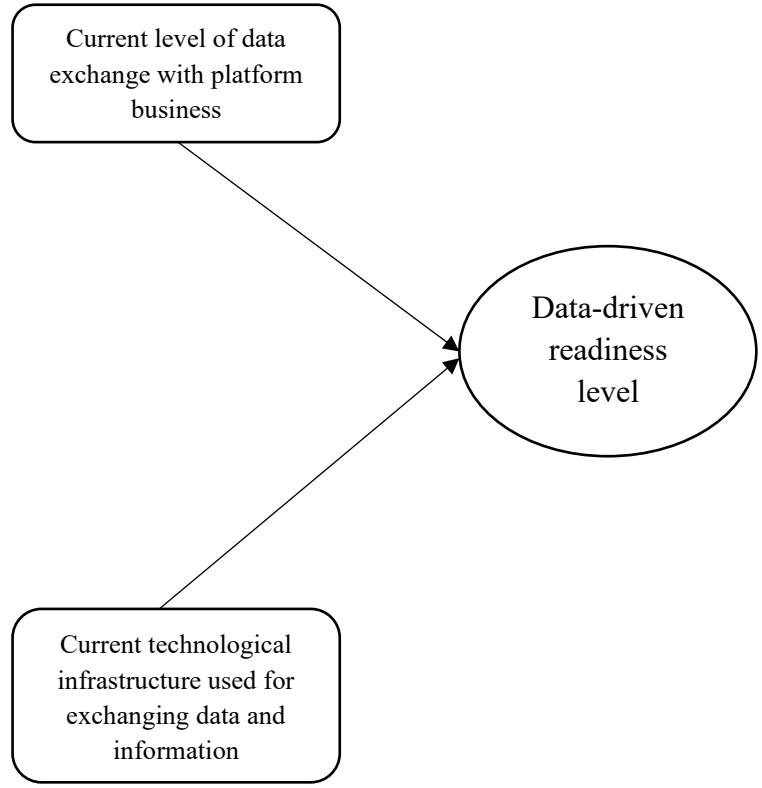
Q30. Zijn er nog andere aspecten met betrekking tot data-gedreven waarde creatie en het te gelde maken van data volgens u belangrijk om in overweging te nemen in het kader van dit onderzoek?

Appendix L: Data Structure Manufacturers



- [MNF_B] “Het is een Excel-sheet, met grafieken…Ja, de voortgang wordt besproken, de kwaliteit wordt besproken, en ook eventuele vertragingen.”
- [MNF_B] “Ja, via de mail. We krijgen Excel-bestanden met linkjes, en daar kunnen we de CSV-bestanden downloaden.”
- [MNF_E] “We ontvangen nu gewoon een mail met een pdf. Daarin staat een uitgewerkt kozijnontwerp, dat wij dan overtekenen in ons tekenprogramma.”
- [MNF_E] “Toelevering Online heeft ook een portaal waar wij zelf in kunnen, en daar kunnen we alles terugvinden: de status van de order, eventuele vertragingen melden enzovoort. Maar ik denk dat we daar nog te weinig gebruik van maken, hoewel er wel mogelijkheden zijn.

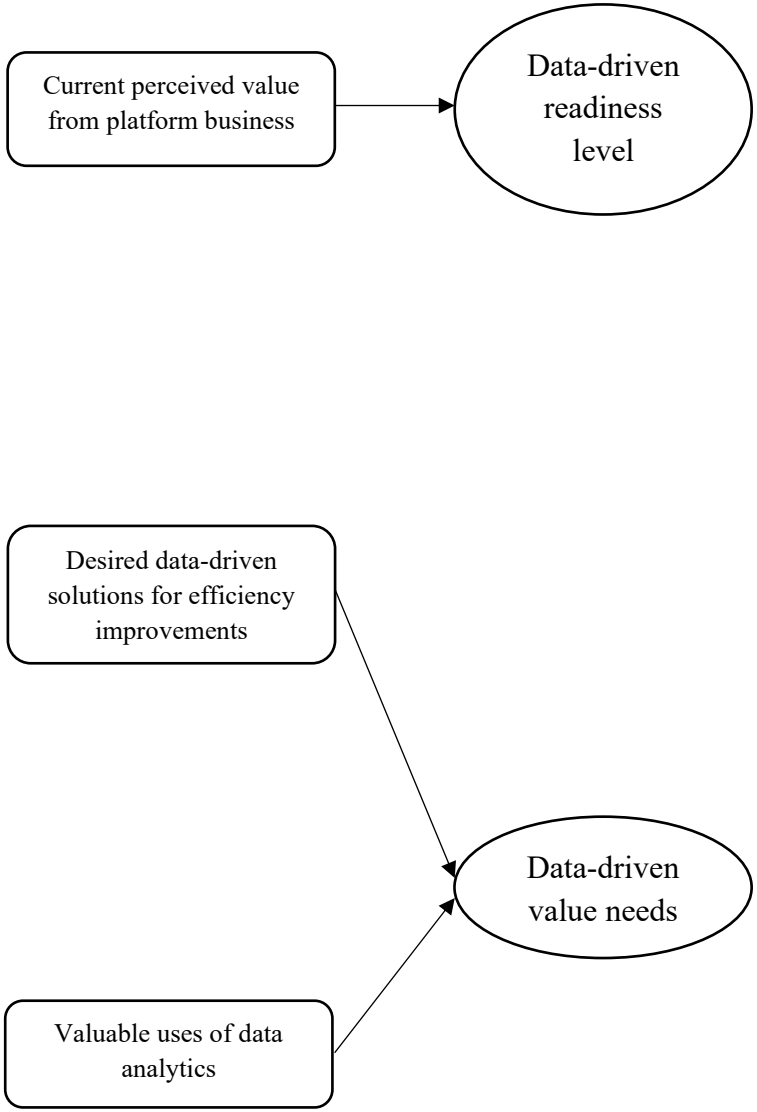
- [MNF_A] “We use a simple system, primarly OneDrive and Excel.”
- [MNF_A] “Toelevering Online also uses an online order portal where we receive all the order data.”
- [MNF_A] “The order portal is for partners like us. We get all the necessary information about active orders there, and we update the status of these orders in the same portal. As soon as we update the status on our side, Toelevering Online can see the change in real time.”
- [MNF_A] “Toelevering Online sends us information in reports or through screenshots of dashboards during meetings.”
- [MNF_D] “Ze worden voornamelijk gedeeld in de vorm van PDF’s of live tijdens vergaderingen. We werken niet in een gedeeld systeem. Het orderportaal is er alleen om de status van de orders bij te houden, maar daar worden geen KPI’s gedeeld.”
- [MNF_D] “We hebben bijvoorbeeld een CRM-systeem waarin we dingen bijhouden…Dus we houden wel wat gegevens bij, maar eigenlijk doen we dat te weinig. Het wordt niet optimaal gebruikt.”
- [MNF_C] “Ja, wij werken met Power BI en Excel, met draaitabellen en dergelijke, om vanuit data informatie te creëren. We hebben hier ook interne dashboards die we gebruiken, dus daar wordt actief mee gewerkt.”
- [MNF_C] “Er zijn minder sensoren, maar de machines worden allemaal door software aangestuurd. Alles wat zo'n machine verwerkt, wordt gelogd. Die informatie kunnen we gebruiken.”
- [MNF_B] “Ja, die komen op tafel [KPIs]. Soms worden ze elke drie of vier weken via de mail gestuurd. Dan kunnen we precies zien of we op schema liggen of dat we wat achterlopen, en of we de gewenste aantallen halen.”
- [MNF_B] “Nee. Enkel Excel. [*Antwoord op vraag over gebruik van tools zoals PowerBI of Tableau*]”
- [MNF_E] “Alles wat met productie en planning te maken heeft, dat wordt bijgehouden in een Excel-document dat [persoon x], die daar verantwoordelijk voor is, heeft gemaakt. Hij weet precies wat erin zit, wat we nog kunnen doen, en plant alles voor de komende weken vooruit. Alles gaat nu nog administratief, het is niet geautomatiseerd via een systeem. Daarom willen we volgend jaar een ERP-systeem, zodat dat ook wordt geautomatiseerd en In2CRM er onderdeel van wordt.”
- [MNF_E] “De data die we nu hebben, gebruiken we al om beslissingen te nemen, en daar sturen we ook wel op. Maar we zouden dieper in de data moeten duiken.”
- [MNF_E] “We doen dus wel veel met data, maar het is nog te beperkt, omdat we geen goede systemen hebben.”



- [MNF_D] “Het levert ons niet alleen omzet op, maar ook de mogelijkheid om met minder mensen meer werk te verzetten. Het maakt ons ook schaalbaarder. We kunnen makkelijker inspelen op schommelingen in de markt, omdat het platform flexibel is”
- [MNF_B] “"Bij Toelevering Online hebben we eigenlijk alleen maar contact bij uitzonderingen. Dus in de basis is alles wat je krijgt duidelijk. Het voordeel daarvan is dat er een wat meer permanente stroom van opdrachten is.”
- [MNF_B] “Bij jullie wordt de prijs automatisch bepaald via de configurator. Bij een aannemer moeten we vaak tientallen tekeningen handmatig invoeren om een prijs te bepalen, en dat kost tijd en geld.”
- [MNF_E] “Het biedt ons een extra verkoopkanaal bij de productie en uiteindelijk ook extra service”
- [MNF_E] “Wij hebben geen verkopers op de weg. We hebben een paar medewerkers op de commerciële binnendienst die onze klanten ontzorgen.”
- [MNF_E] “Toelevering Online streeft er samen met ons naar om de levertijd terug te brengen naar vijf dagen, uiteindelijk zelfs naar drie dagen, en in het ideale geval binnen één werkdag. Traditionele aannemers houden hier misschien nog wat afstand van, maar uiteindelijk zal dit een schokeffect creëren en moeten zij ook mee.”

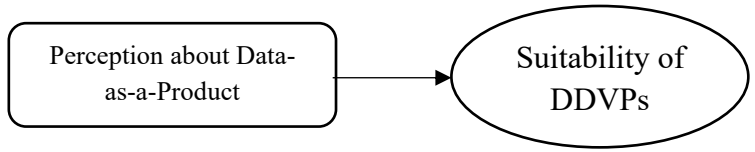
- [MNF_A] “For us, it’s crucial to have predictability in our production load, as it impacts how we plan three to six months in advance.”
- [MNF_D] “Dat helpt ons om onze productielijn efficiënt te houden, ook als er minder bestellingen binnenkomen. Goede data zouden ons zeker helpen om daarop te anticiperen.”
- [MNF_B] “We willen eigenlijk een heel snel productieproces kunnen realiseren. Als de data bij ons binnenkomt op een manier waarbij wij alleen maar een controle hoeven te doen, zou dat ideaal zijn. Hoe sneller we dat voor elkaar krijgen, hoe sneller we de werkvoorbereiding kunnen verminderen en de kostprijs kunnen verlagen.
- [MNF_E] “Maar dat is wel waar we naartoe willen: uiteindelijk een API of een XML-koppeling. Ik denk dat een API het meest logisch is. Die zou ervoor zorgen dat de opdracht direct in ons tekenprogramma terechtkomt, zodat er geen handmatige actie meer nodig is. Het zou ook de machines direct kunnen aansturen, zodat er helemaal geen administratieve handelingen meer tussen zitten.”
- [MNF_E] “Wij bepalen nog deels de planning. Zij [Toelevering Online] komen met een datum waarop ze het willen, omdat ze weten dat het dan waarschijnlijk kan. Wij voeren het dan in. Maar uiteindelijk wil je naar een situatie toe waarin de klant ook de productie aanstuurt. Dus dat er altijd capaciteit beschikbaar is en dat zij kunnen kiezen voor de snelste leverdatum die getoetst en haalbaar is, en dat zij daar dan op kunnen sturen.”

- [MNF_A] “We could compare delivery times or pricing with other companies on the platform.”
- [MNF_A] “If we see that our delivery times are longer or our prices are higher than our competitors, we can work to improve those areas.”
- [MNF_D] “Hoe meer inzicht we krijgen in die seizoensgebonden trends, bijvoorbeeld wanneer de orders van Toelevering Online een dip vertonen, kunnen we ons beter voorbereiden en onze planning daarop afstemmen.”
- [MNF_D] “We zouden bijvoorbeeld graag willen weten wat klanten van onze producten vinden, of waar ze veel klachten over hebben. Daarmee kunnen we onze processen verbeteren”
- [MNF_D] “Als we bijvoorbeeld beter inzicht krijgen in hoe klanten met onze producten omgaan, zouden we onze faalkosten kunnen reduceren. Nu hebben we dat inzicht soms niet volledig. Bijvoorbeeld bij glasbreuk: gebeurt dit tijdens het uitpakken, of bij het plaatsen? Dergelijke informatie zou ons helpen om onze processen te verbeteren…Deze informatie zou je kunnen gebruiken om jezelf qua prijs te positioneren, maar ook om te bekijken of een bepaald probleem vaak voorkomt binnen de kozijnindustrie.”



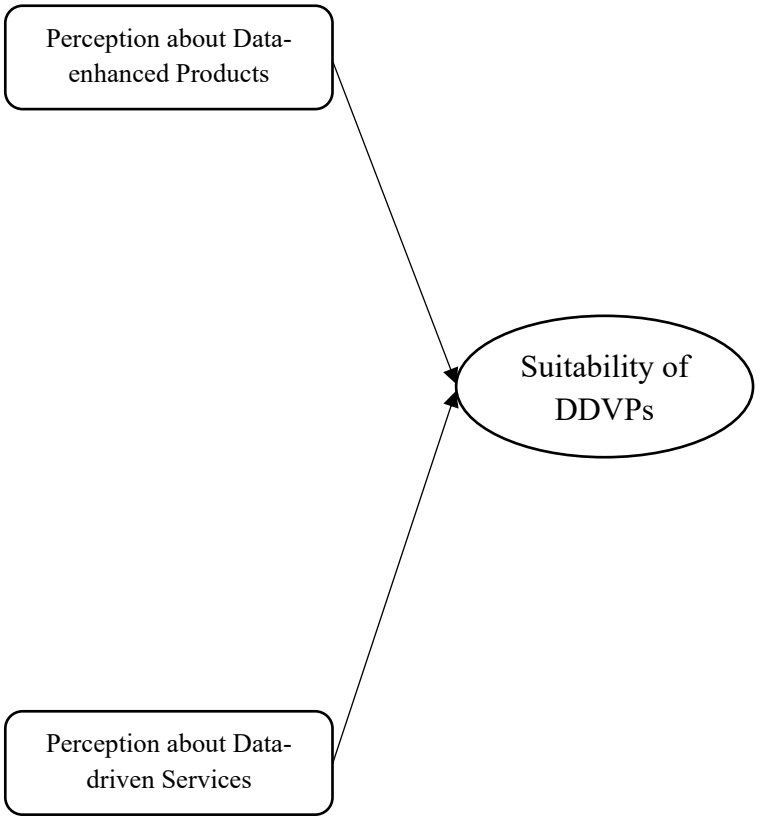
- [MNF_D] “Het zou heel interessant zijn om te weten hoe vaak een ZZP'er of particulier onderhoud uitvoert. Hoe vaak wordt het kozijn geschilderd? Hoe vaak wordt er onderhoud gepleegd? Het zou waardevol zijn om daar uitspraken over te kunnen doen op basis van data.”
- [MNF_C] “Als we bijvoorbeeld terugkoppeling krijgen van eindklanten via Toelevering Online, zou dat ons kunnen helpen… Als we feedback krijgen van eindklanten over hun ervaring, kunnen we dat gebruiken om ons product of onze dienstverlening te verbeteren.”
- [MNF_C] “de vraag is hoe je [het ontvangen van concurrerende inzichten] dat precies moet vormgeven. Maar als een concurrent van ons op het gebied van aluminium de prijs verlaagt, dan weet ik zeker dat dat een directe impact heeft op onze afzet, en dus op onze omzet. Dat is iets wat je vaak pas achteraf vaststelt, maar het zou fijn zijn om bepaalde dingen aan de voorkant te kunnen monitoren. Dat je weet bij welke producten je sterk staat, zonder dat je elke week de website van Toelevering Online hoeft te monitoren.”
- [MNF_C] “Ja, dan zou het handig zijn om te weten wat de productvoorkeuren zijn. Welke producten zijn hardlopers? Kunnen we misschien iets over klantwensen uit de data halen? Wat is bekend over seizoensinvloeden? Zie je bepaalde trends over de jaren heen zich ontwikkelen?”
- [MNF_B] “Bijvoorbeeld een track-and-trace systeem voor waar glasbokken zich bevinden. Als je niet weet waar die zich bevinden, ben je afhankelijk van iemand die actie moet ondernemen of erachteraan moet gaan.”
- [MNF_E] “Hoe zorgen we ervoor dat wanneer het kozijn wordt geleverd, die vragen eigenlijk al zijn beantwoord? Dat zou bijvoorbeeld kunnen door een QR-code op het kozijn te plaatsen. De klant scant die code en krijgt meteen alle informatie over het specifieke kozijn. Bijvoorbeeld: "Dit is een draaikiepraam, hier zijn de instructievideo’s.” Daarnaast zou diezelfde QR-code kunnen worden gebruikt voor servicemeldingen. Bijvoorbeeld: "Ik heb een glasbreuk," scan het kozijn, en de servicemelding wordt direct doorgegeven. Of, als de klant na levering besluit: "Ik wil toch nog een hor erbij," dan kan hij het kozijn scannen en alles wordt automatisch opgemeten, waarna hij de hor erbij kan bestellen.

- [MNF_D] “Ik denk niet dat die expertise echt bij ons als timmerfabriek ligt. We zouden daar waarschijnlijk niet veel mee doen, of misschien zelfs verkeerde conclusies trekken uit die data.”
- [MNF_C] “Als ik gegevens aangeleverd krijg, met bruikbare kolommen en netjes ingevulde informatie, dan zou ik daar zelf met Power BI of draaitabellen iets mee kunnen doen”.
- [MNF_C] "Ik denk dat je dan trends, seizoensinvloeden, klantwensen en voorkeuren voor producten kunt ontdekken. Ja, die kennis en kunde [om informatie uit datapakketjes te halen] hebben we zeker.
- [MNF_C] “Volgens mij is de sleutel daarbij de eerste: data as a product sluit daar het beste bij aan. Zo kunnen we op basis van de aangeleverde ruwe data zelf experimenteren met het vinden van relevante informatie.” Ja, dan zou het handig zijn om te weten wat de productvoorkeuren zijn. Welke producten zijn hardlopers? Kunnen we misschien iets over klantwensen uit de data halen? Wat is bekend over seizoensinvloeden? Zie je bepaalde trends over de jaren heen zich ontwikkelen?
- [MNF_B] “Het gaat om inzicht in prestaties. Dat vinden wij belangrijk, bijvoorbeeld het aantal klachten, het soort klachten, de kosten van de klachten, de doorlooptijd en leverbetrouwbaarheid*…[Dat valt meer onder "data-driven services*].”
- [MNF_B] “Ja, maar die verantwoordelijkheid [het vermogen om data te filteren en informatie eruit te halen] zou in dit geval bij Toelevering Online moeten liggen, zodat wij de juiste data ontvangen.”
- [MNF_E] “Ik vind het lastig om daar een goed antwoord op te geven. Ik denk dat we in ruwe vorm liever geen data ontvangen als we er zelf nog veel werk aan moeten doen.”



- [MNF_A] I don't think that's something we would be interested in. We don't want to have direct contact with the final customer or deal with the product after it's delivered. Our goal is to produce the windows and doors to the specifications set by Toelevering Online. Anything beyond that, such as dealing with insulation issues, would be their responsibility, not ours.
- [MNF_A] "That type of data would be more useful for Toelevering Online to ensure customer satisfaction. For us, it's about producing exactly what they need and meeting their specifications."
- [MNF_D] "Ja, hoe meer data we kunnen krijgen over KPI's, hoe beter. Nu krijgen we wel informatie, zoals over productiefouten of glasbreuk, maar we willen graag weten waar die problemen ontstaan. Is het bij ons in de fabriek, tijdens transport, of misschien bij de klant zelf… Dus ja, daar zie ik wel waarde in. Als die data wordt aangeleverd door de klant en we die in kunnen zien, geeft dat ons waardevolle inzichten."
- [MNF_D] "Ik denk dat zowel Data-Enhanced Products als Data-Driven Services op korte termijn de meeste waarde zouden opleveren…En met Data-Enhanced Products kun je elke dag een stapje beter worden, bijvoorbeeld door betere KPI's en dashboards te gebruiken."
- [MNF_C] "Ja, inmiddels zijn er al wat mogelijkheden om met een QR-code een soort paspoort aan een kozijn te koppelen. Dat kan handig zijn voor een onderhoudsbedrijf of een eindklant om bepaalde prestatiewaarden van het kozijn terug te vinden."
- [MNF_B] "Wij interpreteren het zo dat als je bijvoorbeeld een actieve analyse kunt hebben op klachten, waarbij je een voorspellende factor krijgt. Bijvoorbeeld welk type kozijn meer kans heeft op klachten. Stel je voor, je kunt voorspellen waar de meeste klachten ontstaan"
- [MNF_B] "Stel je hebt een deur die breder is dan normaal, dan zou je kunnen aangeven: "Wil ik dit echt?" Of: "Ja, ik wil het wel, maar let op, hier en hier moet je rekening mee houden…je kunt die data ook naar ons sturen, maar hoe eerder in het proces je die waarschuwingen hebt, hoe beter het is, denk ik."
- [MNF_E] "Een QR-code op een kozijn zou een goed voorbeeld zijn. De klant scant die code en krijgt meteen alle informatie over het specifieke kozijn."

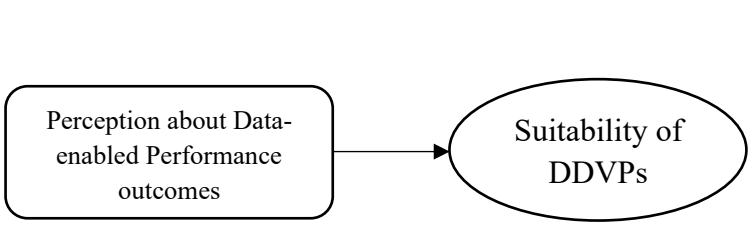
- [MNF_D] "Ik denk dat het voor ons een grote meerwaarde zou hebben als Toelevering Online ons voorspellende analyses kan leveren. Als ze met enige zekerheid kunnen aangeven wat we kunnen verwachten, kunnen we daar heel goed op sturen in onze productieplanning."
- [MNF_D] "Ik denk dat zowel Data-Enhanced Products als Data-Driven Services op korte termijn de meeste waarde zouden opleveren… Met Data-Driven Services krijg je meer inzicht in de planning, wat ons direct zou helpen in de dagelijkse bedrijfsvoering."
- [MNF_C] "Je kunt die informatie natuurlijk gebruiken om je eigen organisatie te versterken, ervan te leren en bij te stellen. Uiteindelijk zorgt dat er ook voor dat, als je het goed doet, je klantrelatie wordt versterkt." Ja [daar zie ik wel waarde in], je krijgt dan een soort digitalisering van je leveranciersbeoordelingen."
- [MNF_C] "Ja, dat kan de samenwerking versterken, omdat data-driven services ervoor kunnen zorgen dat je sneller en gerichter communiceert met partijen. Denk bijvoorbeeld aan een trackingsysteem, zoals bij Domino's, waarbij je kunt zien dat de pizza besteld is, in de oven ligt en klaar is. Zo'n systeem zou voor eindklanten prettig zijn, en als je dat goed inricht, kan dat ook een reden zijn waarom klanten voor je organisatie kiezen.
  Het maakt alles voorspelbaarder en transparanter."
- [MNF_B] "Ik denk het wel. Hoe bruikbaarder de inzichten zijn en hoe minder ruwe gegevens we ontvangen, hoe meer dat ten goede komt van de kostprijs. Er hoeft dan minder handmatig werk verricht te worden."
- [MNF_B] "Bijvoorbeeld een track-and-trace systeem voor waar glasbokken zich bevinden. Als je niet weet waar die zich bevinden, ben je afhankelijk van iemand die actie moet ondernemen of erachteraan moet gaan…. Dat zijn menselijke handelingen. Als je dat door middel van data kunt automatiseren, bijvoorbeeld door een pingetje te krijgen wanneer de bok drie weken bij de klant staat zonder opgehaald te zijn, dan kun je dat direct opvolgen."



- [MNF_B] “Hoe beter de informatiestroom naar ons toe is, hoe minder werk wij zelf hoeven te doen, en hoe lager de kostprijs wordt.”
- [MNF_B] “Ja, dat zou zeker handig zijn! *[Antwoord op vraag of er behoefte is om een overzicht te ontvangen van het hang-en sluitwerk dat besteld moet worden door MNF_B op basis van ontvangen kozijnorders]*.”
- [MNF_B] “Op korte termijn denk ik vooral dat we fijnere, meer gedetailleerde data nodig hebben in plaats van grove data… Ja, hoe sneller we dat [Data-driven Services] voor elkaar krijgen, hoe sneller we de werkvoorbereiding kunnen verminderen en de kostprijs kunnen verlagen.”
- [MNF_E] “Idealiter wil je elke week een rapport hebben waarin je scores staan, met inzicht op welk niveau…Het liefst een real-time dashboard dat je samen met Toelevering Online hebt.”
- [MNF_E] “Ja, maar ook als je bijvoorbeeld in zo'n dashboard je delivery performance gaat bijhouden, dus hoe vaak leveren we op tijd en hoe vaak niet, en als we niet op tijd leveren, waar ligt dat dan aan? Is dat omdat Toelevering Online de bestelling te laat of verkeerd heeft doorgestuurd? Of omdat onze productie op dat moment vol zat? Of misschien omdat een van onze toeleveranciers, zoals de leverancier van panelen of roosters, niet op tijd leverde, waardoor wij de volledige order niet konden uitleveren? Waar zit het probleem precies?
- Als je die data verzamelt, kun je na verloop van tijd verbanden gaan zien. Wat zien we het vaakst gebeuren en waar ligt dat aan? Dan kun je structureel naar verbeteringen kijken en jezelf scherp houden door bijvoorbeeld KPI’s eraan te verbinden.
- Als je zegt: "We streven naar een delivery performance van 98%", dan kun je elke week kijken of we die 98% halen. Als je daaronder zit, kun je op een hoger niveau analyseren waar het probleem zit.”
- [MNF_E] “Dat zou een goed dashboard zijn. Het liefst een real-time dashboard dat je samen met Toelevering Online hebt. Zij doen al veel met data, maar als ik gewoon een dashboard zou hebben waarin ik kan zien hoe Wijnsma presteert – het aantal bestellingen, de delivery performance, het aantal klachten, of die klachten aan ons liggen of niet, maakt niet veel uit – dan kun je gezamenlijk naar die data kijken en elkaar verbeteren.”

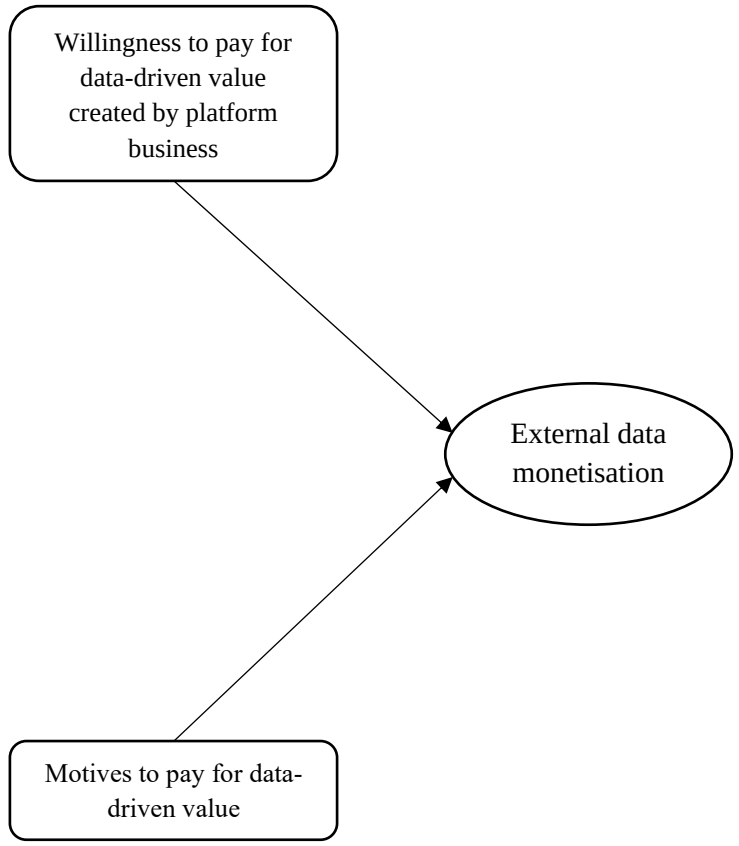
- [MNF_D] “Een voorbeeld van wat we zelf zouden willen doen, is het introduceren van een chip in het kozijn. Daarmee kun je bijvoorbeeld op locatie scannen voor service en nazorg. Ik denk dat dat meer iets is wat vanuit de fabriek zelf moet komen, niet iets dat door Toelevering Online opgezet zou moeten worden.”
- [MNF_D] “Dat is iets waar we nu nog niet ver genoeg voor zijn. Ik kan me voorstellen dat dit soort inzichten voor bepaalde doelgroepen interessant zijn, maar ik weet niet of onze huidige doelgroep daar al mee bezig is.
- [MNF_D] “Als Toelevering Online zelf een chip integreert in het kozijn nadat wij het verkocht hebben, of als ze een sticker plaatsen die data verzamelt over het gebruik, dan zou dat zeker waardevol kunnen zijn.”
- [MNF_C] “In sectoren waar uptime heel belangrijk is, is dat de sleutel en levert het direct geld op. Wanneer je predictive maintenance hebt en bijvoorbeeld sensoren gebruikt die trillingen meten, weet je wanneer onderhoud nodig is. Maar als ik kijk naar een kozijn: als dat goed geplaatst is, functioneert het en heeft het eigenlijk relatief weinig onderhoud nodig.”
- [MNF_C] “In sectoren waar uptime heel belangrijk is, is dat de sleutel en levert het direct geld op. Wanneer je predictive maintenance hebt en bijvoorbeeld sensoren gebruikt die trillingen meten, weet je wanneer onderhoud nodig is. Maar als ik kijk naar een kozijn: als dat goed geplaatst is, functioneert het en heeft het eigenlijk relatief weinig onderhoud nodig.”
- [MNF_C] “Wat natuurlijk het allermooiste zou zijn, is als het uiteindelijk richting data-enabled performance outcomes zou groeien. Daar kun je namelijk direct een verdienmodel aan koppelen. Bijvoorbeeld bij voorspellingen over onderhoud: daar kun je dan onderhoudscontracten aan verbinden. Maar zoals gezegd, is dat in de kozijnenbranche minder van toepassing.”
- [MNF_C] “Ja, ik denk dat de propositie die op dit moment het verst van ons afstaat, inderdaad data-enabled performance outcomes is.” Ja, [omdat het niet realistisch is of minder van toepassing is op de samenwerking tussen producent en platformorganisatie]. Precies.”

- [MNF_B] “Het zou geweldig zijn als de NFC-chip die wij nu hebben, gekoppeld kan worden aan een klachtensysteem van Toelevering Online. We zijn daar al stappen in aan het zetten, maar dat bevindt zich nog in de ontwikkelingsfase.”
- [MNF_B] “Wij zijn bezig met iets dat ons in staat stelt om trillingen, vochtgehalte en temperatuur in het kozijn uit te lezen…Die chip bevat een energiebron die 30 jaar meegaat, en je kunt die inbouwen op de kritische punten in het kozijn. Dan kun je in real-time dagelijks een ping ontvangen met de gegevens van het kozijn, zoals of er een klap op heeft gezeten.”
- [MNF_B] “In principe zouden jullie (Toelevering Online) het eerste aanspreekpunt moeten zijn. Anders gaat iedereen rechtstreeks naar jullie partners bellen, en dat wil je niet. Zo houd je het overzicht. Dus de eerste melding moet bij jullie binnenkomen, waarna jullie kunnen beslissen wat ermee te doen. Gaan we de klant informeren, ja of nee? En als dat het geval is, kunnen jullie terugkoppelen naar de leverancier of een onderhouds- of reparatiebedrijf inschakelen.” [*Antwoord op vraag of platform bedrijf of MNF_B de melding ontvangt?*]
- [MNF_B] “Vaak heeft een kozijn onderhoud nodig door mechanische beschadigingen, zoals verkeerd neerzetten tijdens de bouwfase. Het is zelden de verf zelf die het probleem vormt. Dus de meeste schade ontstaat door externe factoren.
- Als je dat soort dingen kunt tackelen [middels real-time informatievoorziening via NFC-chip], kun je richting de klant zeggen: “U mag een onderhoudscyclus van vijftien jaar hanteren… Daarmee ontzorg je de eindklant en ga je kosten besparen.
- [MNF_B] “Uiteindelijk kun je dan aangeven [door informatie verworven via NFC-chip] wanneer er een verhoogde kans is dat er iets met een kozijn gebeurt. In plaats van alle honderdvijftig kozijnen te inspecteren, omdat er misschien iets aan de hand is, kun je gericht actie ondernemen.”
- [MNF_B] “Op lange termijn zie ik vooral wat ik eerder schetste: dat je de onderhoudsservice richting de klant veel meer datagestuurd kunt maken, in plaats van handmatig alles te controleren. Dat zou uiteindelijk kosten besparen, omdat je dan gericht kunt werken in plaats van zomaar alles te inspecteren.”
- [MNF_E] “Ja, 100%. Uiteindelijk wil je misschien nog meer productinformatie kunnen geven [middels QR-code]. Bijvoorbeeld dat een kozijn zorgt voor een bepaalde isolatiewaarde. Dus niet alleen informatie over het kozijn zelf, maar ook over alles daaromheen. Een klant kan dan zien: "Dit kozijn heeft een isolatiewaarde van x." Dat zijn vaak vragen die wij krijgen, vooral bij verduurzamingssubsidies. Het zou super eenvoudig zijn als je via die QR-code direct een bestand kunt downloaden dat je kunt opsturen voor je subsidieaanvraag.”
- [MNF_E] “Dat zou echt die QR-code zijn, waarmee je vanuit het kozijn veel meer kunt faciliteren…Daarnaast zou de klant van Toelevering Online zijn servicemelding erin kunnen zetten, wat veel communicatie zou schelen. En zoals ik eerder aangaf, zou het nog mooier zijn als we er ook productinformatie in kunnen verwerken. Dus bijvoorbeeld instructievideo’s over hoe je iets monteert of afstelt. Je kozijn heeft verschillende onderdelen, dit zijn ze, en dit kun je ermee doen. Een soort montagehandleiding, maar dan ook met video’s. Verder denk ik dat we in de toekomst meer aandacht zullen besteden aan verduurzaming. Dus het zou handig zijn als klanten via die QR-code gemakkelijk een bestand kunnen downloaden dat ze kunnen gebruiken voor het indienen van een verduurzamingssubsidie.
- [MNF_E] “Ja, dat zou er zeker bij moeten. [Antwoord of preventief onderhoud ook mogelijk is?] Dus in de productinformatie zou ik ook willen zien welke middelen je moet gebruiken om je kozijnen schoon te houden. Welke producten mag je wel of niet gebruiken? Dat soort informatie hoort er ook bij.”
- [MNF_E] “Ik denk dat het kozijn zelf daar niet direct relevant voor is. Dat ligt meer aan het gebouw. Als er bijvoorbeeld na verloop van tijd een lek ontstaat rond het kozijn, dan is er waarschijnlijk iets gebeurd met het gebouw, of iemand heeft in het kozijn geboord. Dat heeft dan meer te maken met bouwkundige zaken, en ik denk niet dat het kozijn daar direct betrekking op heeft…Misschien zou je na 10 of 15 jaar wel een melding kunnen sturen dat de kunststofkozijnen bijna aan vervanging toe zijn.” [Antwoord of predictive maintenance in deze situatie geschikt is om op in te zetten.]



- [MNF_A] “We wouldn’t want to pay extra for such a system, but we could consider offering a discount to Toelevering Online if they implemented it.
- [MNF_A] “But again, we are already receiving this information, so it’s not a new service that we would necessarily need to pay for.”
- [MNF_A] “I think this idea makes more sense for other types of platforms, like Ahrefs or SimilarWeb, where companies pay for data or insights. But in our industry, I don’t think it applies in the same way.”
- [MNF_D] “Uiteindelijk wil je, zoals ik eerder zei, dat het platform Toelevering Online beter wordt. En met behulp van data kun je dat volgens mij bereiken…Maar om dan tegen een bedrijf te zeggen: "Je moet wel verbeteren, en wil je de benodigde data, dan moet je ervoor betalen," dat klinkt natuurlijk vreemd.”
- [MNF_D] “Hoe beter ze de data kunnen aanleveren, hoe beter ze die data kunnen analyseren en verwerken, hoe beter wij ons als fabriek kunnen gaan inrichten en verbeteren. Maar om daar een prijskaartje aan te hangen richting de fabriek, dat voelt vreemd.”
- [MNF_D] “Als Toelevering Online groeit, krijgen wij meer orders, en als wij betere kozijnen fabriceren, krijgen zij weer tevreden klanten. Het is een win-win. Dus uiteindelijk wordt iedereen beter van deze samenwerking. Als wij goed presteren, profiteert Toelevering Online daarvan, en omgekeerd.”
- [MNF_C] “Wat belangrijk is, is dat je businessmodel verbeterd kan worden. Zodra dat mogelijk is, is er ook bereidheid om te betalen.”
- [MNF_B] “Uiteindelijk, als er kosten aan verbonden zijn, dan is dat prima, maar dan moet het ons wel een kostenbesparing opleveren. We staan niet negatief tegenover betalen, zolang het ons voordeel oplevert.”
- [MNF_E] “Ik kan daar heel kort over zijn: het is een gezamenlijke verantwoordelijkheid. Ik zou nooit bereid zijn om hiervoor te betalen aan Toelevering Online. Ik vind dat je dat gezamenlijk doet en daarin samen investeert. Toelevering Online is een platform waar men eenvoudig kozijnen kan bestellen en laten leveren. Wij, als stille producent achter de schermen, moeten daar samen in investeren. Beide partijen steken daar hun uren in.”
- [MNF_E] “Wij hebben ook veel interessante data voor Toelevering Online, want we hebben honderden klanten die bestellingen bij ons plaatsen en daaruit kunnen wij trends zien. Bijvoorbeeld, we zien dat een bepaald type profiel steeds vaker wordt verkocht, of dat een bepaalde kleurencombinatie populairder wordt bij onze aannemers. We kunnen Toelevering Online daarop wijzen: "Hé, dit profiel wint aan populariteit, doe er iets mee." Dus ik vind dat dit een gezamenlijk proces moet zijn.”
- [MNF_E] “Nee, ik denk dat je dit samen moet ontwikkelen [real-time dashboards of inzetten van QR-code]. Eventueel kun je zoiets contractueel vastleggen in de vorm van een bonusregeling, maar ik zou niet maandelijks 50 euro willen betalen voor bepaalde inzichten of data. Dat hoort bij het partnership.”

- [MNF_D] “Ja, misschien wel. Het zou bijvoorbeeld interessant zijn om te weten of andere leveranciers met dezelfde problemen kampen als wij. Hebben ze dezelfde problemen, of hebben ze die juist niet? Dat zou nuttige informatie kunnen zijn.”
- [MNF_D] “Maar op het moment dat een timmerfabriek een heel nieuw concept op het oog heeft en benieuwd is hoe anderen omgaan met het onderhoud van kozijnen, dan zou Toelevering Online daar heel goed data over kunnen leveren. En dan zou je zeggen: "Dat kost je dit bedrag. En daar zouden bedrijven voor willen betalen. In dat opzicht zie ik wel dat Toelevering Online hier extra businessmodel uit zou kunnen halen.”
- [MNF_D] “Wij zouden in ieder geval bereid zijn om te betalen voor concurrentie-inzichten, als klanten bijvoorbeeld fabrieken gaan beoordelen op het platform, zoals je ook bij Bol.com ziet…Maar we willen ons wel goed positioneren binnen onze eigen branche, de houten kozijnen.”
- [MNF_D] “Als je kijkt naar het gedrag van klanten op de website, zou je geld kunnen betalen om ervoor te zorgen dat jouw kozijnen bovenaan staan.” (advertising).



- [MNF_C] “Het belangrijkste is dat het bijdraagt aan het genereren van meer omzet, het vervullen van klantwensen en het verhogen van klanttevredenheid. “Stel hypothetisch dat het me op jaarbasis een rendementsverbetering van 25.000 euro oplevert, dan zou ik bereid zijn om bijvoorbeeld 5.000 euro daarvoor te betalen.”
- [MNF_B] “Als jullie iets verder kunnen automatiseren of digitaliseren waardoor wij tijd of kosten besparen, dan is dat iets waarvoor een vergoeding gevraagd mag worden.”

- [MNF_A] “We pay based on the number of brands we work with on the platform, like different window profile brands. There isn’t a tiered pricing system based on data.”
- [MNF_D] “Ik denk dat als je eenmalig informatie nodig hebt, je zou kiezen voor een *Pay-Per-Use* model (PPU). Bijvoorbeeld, als ik over het afgelopen jaar wil zien waar andere fabrieken hun klachten hebben gehad, dan betaal je per keer voor die informatie…Maar als je seizoensgebonden inzichten wilt of vooruit wil kijken naar trends voor het komende jaar, dan betaal je voor een licentie.”
- [MNF_C] “Vanuit ons perspectief zou pay-per-use het meest voor de hand liggend zijn, omdat je dan betaalt voor wat je gebruikt.” [En daarmee bedoel je dan data as a product?] Precies. Je zou het ook in een abonnementsvorm kunnen gieten, wat dan meer richting licensing gaat.
- [MNF_C] “Ja, ik denk dat dat wel de modellen zijn (pay-per-use / licensing / subscription) die het beste passen.”
- [MNF_B] “Ja, precies. Wat betreft het prijsmodel, zou een licentiemodel prima zijn.”

Preferred pricing models when monetising data externally → External data monetisation

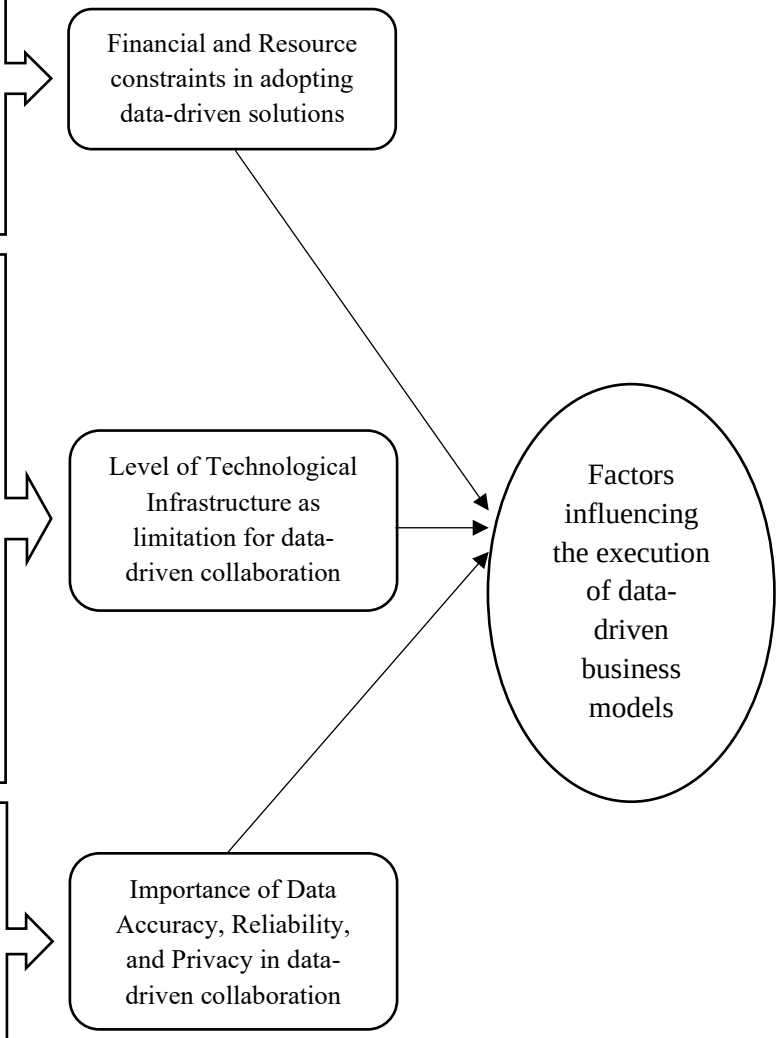
- [MNF_D] “We zijn nu nog te veel bezig met de dagelijkse gang van zaken en kijken niet genoeg vooruit naar de toekomst. Maar dat zal de komende jaren wel een belangrijk punt worden…We zullen daar zeker mee aan de slag gaan, en daarin kan Toelevering Online zeker een rol spelen door aanvullende inzichten te bieden.”
- [MNF_D] “Ik denk juist dat we dankzij de goede verstandhouding tussen ons en Toelevering Online dit soort zaken snel voor elkaar zouden kunnen krijgen. Je moet die synergie opzoeken.”
- [MNF_C] “We hebben nog niet alle KPI's 100% goed ingericht en we verzamelen nog niet op alle vlakken data zoals we dat zouden willen, maar we zijn er wel bewust mee bezig om onze dagelijkse operaties te versterken.”
- [MNF_C] “We zijn daar volop mee bezig, vooral met data, om te kijken hoe we onze bedrijfsvoering kunnen verbeteren. We omarmen dit soort dingen graag als we ermee aan de slag kunnen. ”
- [MNF_B] “We zouden ook graag een betere koppeling hebben voor de aanlevering van orders. Nu werken we nog met CSV-bestanden, maar vanuit onze ICT-afdeling willen ze veel liever een API-koppeling.”
- [MNF_B] “Wij zijn bezig met iets dat ons in staat stelt om trillingen, vochtgehalte en temperatuur in het kozijn uit te lezen.”
- [MNF_B] “Hoe beter je met data de juiste informatie kunt uitwisselen en fouten kunt minimaliseren, hoe meer beide partijen ervan profiteren.”
- [MNF_B] “Ja, omdat we het simpelweg al omarmen. We maken hiervan gebruik om ons eigen processen te optimaliseren. *[Antwoord op vraag of de structuur en middelen van MNF_B de adoptie van dataa-gedreven producten en diensten ondersteunen].”*
- [MNF_E] “Op 1 januari start een nieuwe medewerker met het implementeren van ons nieuwe ERP-systeem.”
- [MNF_E] “Ja, ik ken Power BI nu een paar jaar, en misschien kan dat wel gekoppeld worden, bijvoorbeeld via een converter die de gegevens van Tableau naar Power BI vertaalt. Of we werken samen in het Tableau-dashboard van Toelevering Online, en gebruiken ons eigen Power BI-dashboard voor het algehele bedrijf. Beide opties zijn denkbaar.”
- [MNF_E] “Wat betreft datagedreven waardecreatie: als Toelevering Online een goed dashboard heeft, bijvoorbeeld vanuit Tableau, en dat met ons kan delen zodat we realtime elke dag kunnen zien wat er speelt, dan is dat geen probleem. Als je zo’n dashboard gewoon op een tablet kunt openen, zoals deze Teams-vergadering, dan kunnen we daar eenvoudig mee werken.”

Willingness to invest in (digital) innovations → Factors influencing the execution of data-driven

- [MNF_A] "The main challenge would be financial. If the costs are too high, we might not be able to implement certain technologies or services.“
- [MNF_A] “We need to ensure that any data-driven products we adopt save time or money and help increase turnover.”
- [MNF_D] “Maar we zijn er nu nog niet mee bezig, en dat moet dan wel de focus krijgen…Er moet tijd voor worden vrijgemaakt, en intern moet de meerwaarde hiervan ook echt gezien worden.”
- [MNF_E] “Ik denk dat het 50-50 is, of misschien 60-40. Uiteindelijk zijn er twee informatiebehoeftes. Als producent wil je zoveel mogelijk technische informatie verstrekken, want het kozijn komt uiteindelijk bij ons vandaan. Dus als er iets met een QR-code of chip moet gebeuren, is dat onze verantwoordelijkheid. Maar de communicatie naar de klant verloopt via Toelevering Online. Dus ik denk dat beide partijen daar een stukje commitment in moeten tonen, en dat ieder zijn eigen deel oppakt.”

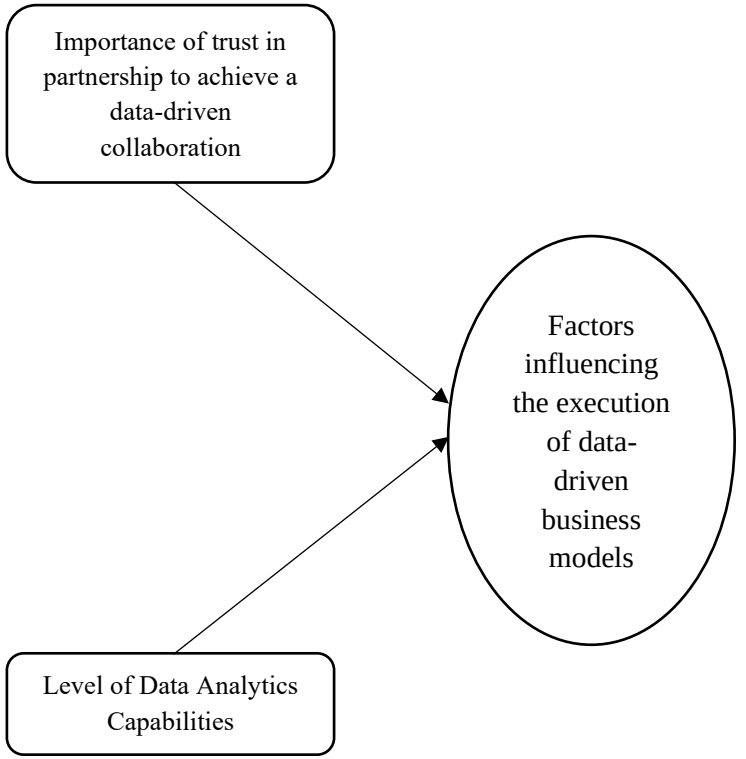
- [MNF_D] “ Op dit moment nog niet. Het ERP-systeem moet eerst goed staan voordat we onze organisatie klaar is voor de adoptie van datagedreven producten en/of diensten”.
- [MNF_D] “Als je op een hoog niveau van techniek wilt samenwerken en informatie real-time binnen wilt krijgen, moeten daar zeker stappen in worden gezet. Maar ik zie daar geen directe belemmeringen.”
- [MNF_C] “Het gaat er vooral om dat de data in de juiste taal wordt aangeleverd, bijvoorbeeld via XML of een ander bruikbaar formaat. Als de taal waarin het wordt aangeleverd bruikbaar is, kunnen we er veel mee doen.”
- [MNF_E] “Nee, het is meer een kwestie van tijd, bereidheid, de juiste mensen, en de juiste systemen aan onze kant. Maar ook aan de kant van Toelevering Online, want zij geven ook aan dat hun systemen nog niet 100% perfect zijn. Dus het komt neer op tijd, kennis en het investeren in de juiste middelen.”
- [MNF_E] “Nee, nog niet helemaal. Dat is nu een uitdaging waaraan we eerst moeten werken voordat we het volledig kunnen benutten. Maar als we volgend jaar de juiste stappen hebben gezet met een nieuw ERP-systeem en alles wat daarbij hoort, kunnen we ook samen met Toelevering Online verdergaan met het automatiseren van bestellingen.
- [MNF_B] “"Nee, ik denk het niet." *[Antwoord op vraag over factoren die in de weg staan voor het ontvangen van data-gedreven waarde creatie van Toelevering Online]”*

- [MNF_A] ""“We follow GDPR rules, so if there’s any sensitive data, it needs to be handled according to those regulations.
- [MNF_A] “Incorrect data would definitely cause problems. If the data is wrong, we could end up with production delays, losses, or incorrect orders “That would affect our relationship, so it’s very important that we receive accurate data.”
- [MNF_C] “Toelevering Online werkt natuurlijk met meerdere leveranciers. Op het moment dat data wordt gedeeld met onze concurrenten, moet je wel goed kijken hoe je dat aanpakt. Uiteindelijk wil je je bedrijfsvoering versterken, niet verzwakken.”
- [MNF_C] “Precies, in elk onderzoek dat je doet, is het essentieel dat je dataset correct is. Dat is de belangrijkste basis. Je moet erop kunnen vertrouwen dat je met een correcte dataset werkt. Dat is vaak ook het lastige, want datasets zijn niet altijd betrouwbaar.”

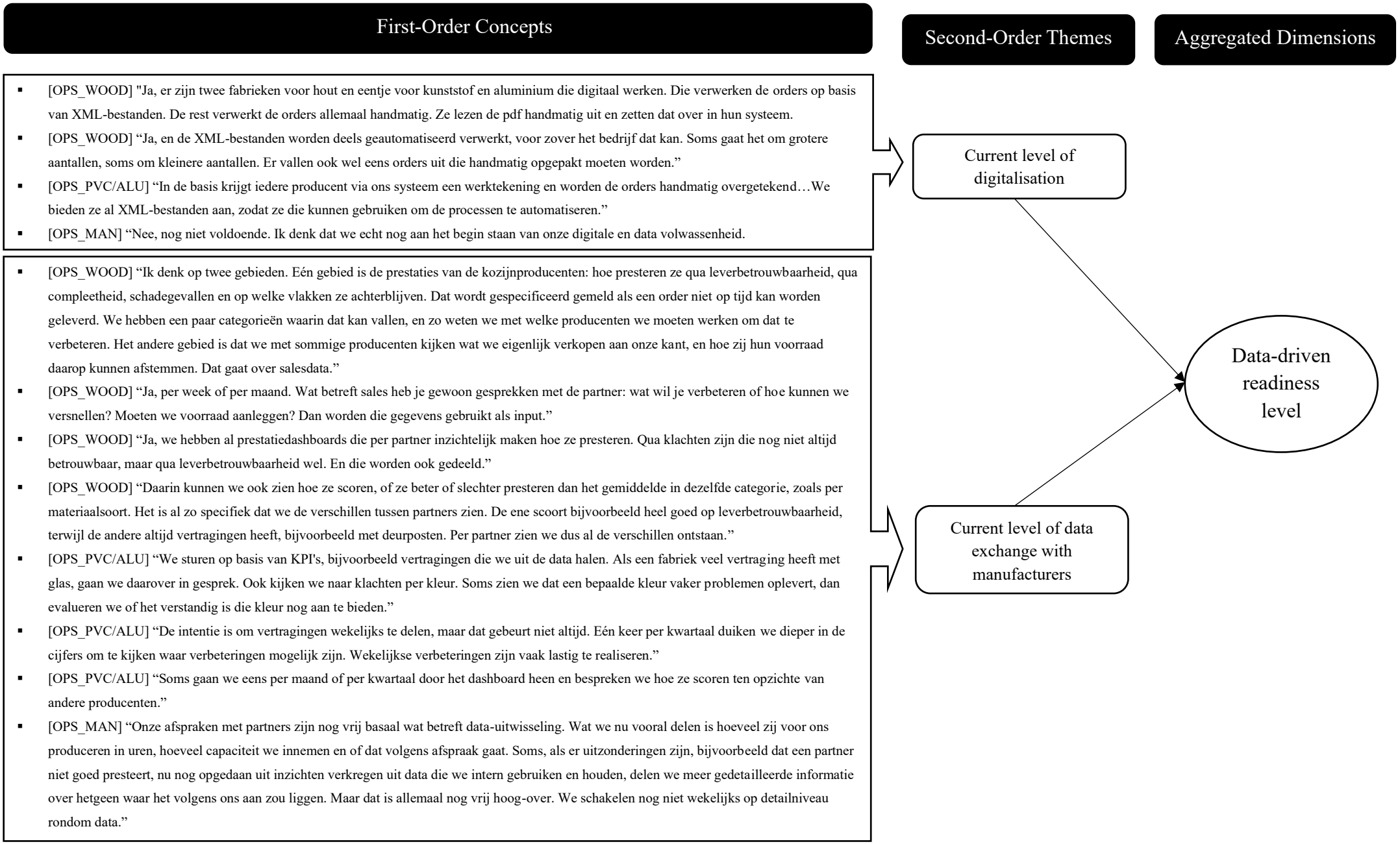


- [[MNF_A] "Trust isn't an issue; we have agreements in place that cover everything."
- [MNF_D] "Op dit moment speelt [vertrouwen] nog niet, maar voor de toekomst is dat zeker heel belangrijk. Vertrouwen moet er van beide kanten zijn…Uiteindelijk vallen we allemaal onder dezelfde paraplu. Dus als jij met onze data aan de haal gaat en die aan anderen geeft, of vice versa, dan gaat het mis. We moeten echt volledig op elkaar kunnen vertrouwen."
- [MNF_C] "Het is heel belangrijk dat je weet dat je data op een veilige plek is."
- [MNF_B] "Belangrijk is dat er wederzijds vertrouwen is om langjarig samen te (blijven) samenwerken. Wellicht een goed idee om een soort van geheimhoudingsverklaring over en weer opstellen voor proces/bedrijf kritische informatie. "
- [MNF_B] "Groot. We sturen op een manloos kantoor. Dus dan zorgt het ontvangen van incorrecte data voor vele problemen. *[Antwoord op vraag over het ontvangen van incorrecte data door het platform bedrijf.]*"
- [MNF_E] "We zijn nu bezig met een nieuw contract voor dit jaar, dus daarin zouden we dit soort dingen opnieuw verwerken. Het draait uiteindelijk om vertrouwen in elkaar en zorgvuldigheid bij het omgaan met informatiestromen."
- [MNF_E] "In principe zou dat geen invloed moeten hebben op de samenwerking. Incorrecte data zou eerder een probleem zijn als de binnenkomende bestellingen niet kloppen, bijvoorbeeld als we kozijnen moeten maken maar er een fout in de specificaties zit. Maar zelfs dan is het niet zo dat je de samenwerking meteen stopt. Zolang het maar bespreekbaar wordt gemaakt, is dat geen groot probleem."

- [MNF_A] "No, we don't have a dedicated department for data analytics. We're not a large enough company for that
- [MNF_A] "We mostly work with Excel, and we receive some data from external platforms, but nothing as advanced as Power BI."
- [MNF_D] "Nee we hebben geen eigen analytics afdeling... Collega's zijn er destijds mee bezig geweest. Ze hebben iets opgezet met Power BI. Dat wordt vooral gebruikt voor verkoop, maar niet veel meer dan dat."
- [MNF_C] "Ja, dat klopt. We zijn ons er bewust van dat sterke data-analysevaardigheden essentieel zijn om waarde uit data te halen."
- [MNF_C] "We doen daar best veel aan. We verzamelen veel data en maken van die data stuurinformatie. Op basis daarvan nemen we beslissingen."
- [MNF_B] "We hebben een vast team dat 1 dag in de week met het analyseren van data, het tweaken van de NFC-chip en zorgen dat we stappen maken op het gebied van data analytics binnen [MNF_B]. Dus ik kan stellen dat we redelijk comfortabel zijn in het interpreteren en gebruiken van data. Echter, het nemen van bedrijfsbeslissingen wordt nog niet altijd gedaan op basis van data."
- [MNF_E] "Ja, als het nodig is, kunnen we dat doen" [Antwoord op vraag of de kennis en kunde in huis is om inzichten uit ruwe datasets te halen].
- [MNF_E] "Nee, we doen daar op dit moment te weinig mee"[Antwoord of er data-gedreven beslissingen genomen worden op basis van de beschikbare (productie)data van orders van Toelevering Online].
- [MNF_E] "Nee, maar dat komt wel. Dat staat allemaal gepland voor volgend jaar. We gaan dan ook met Power BI werken, en ik ben daar zelf ook in thuis, dus dat komt wel goed." [Antwoord of MNF_E capabel genoeg is om verkregen inzichten te visualiseren middels data visualisatie programma's.]



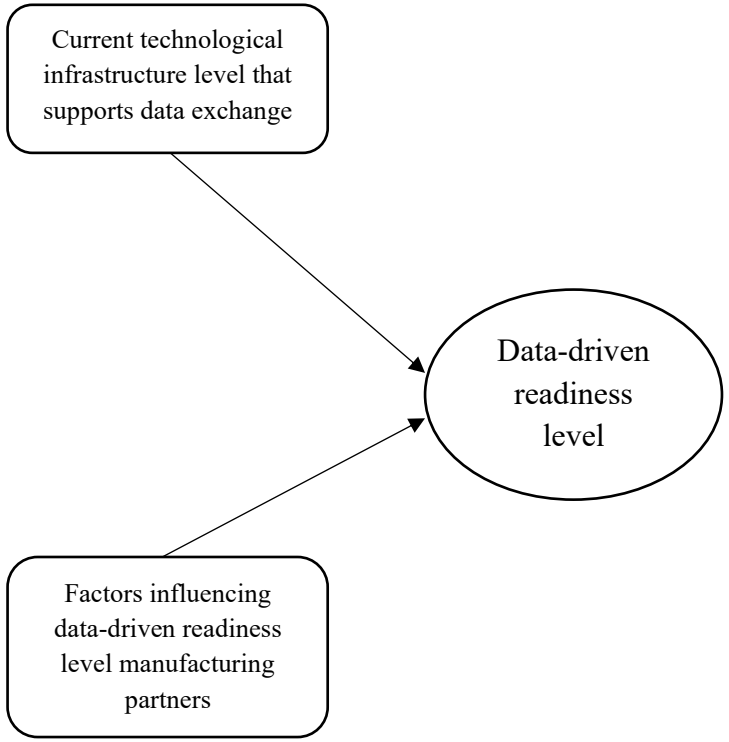
Appendix M: Data Structure Operations department



- [OPS_MAN] “Het gaat vooral om vertragingsoverzichten van de afgelopen week, met de vraag waarom het zo gelopen is. Het is nog niet zo dat we echt sturen op basis van gedetailleerde data. ”

- [OPS_WOOD] “Het meeste gaat via mailcontact. We hebben een intern dashboard voor de partnerprestaties. Daar gaat dan een overzicht van naar de partners, of een pdf van een dashboard, of een lijstje in Excel met hun prestaties. Er is geen actieve uitwisseling of real-time inzage in die data.”
- [OPS_PVC/ALU] “Vertragingen delen we wekelijks via een Excel-overzicht. Maar echt werken in een gedeeld dashboard met externe partijen kan op dit moment nog niet.”
- [OPS_PVC/ALU] “Sommige producenten, zoals MNF_B en MNF_D, verschillen hierin sterk. Bij MNF_B gebeurt alles nog handmatig, terwijl MNF_D al met robots werkt.”
- [OPS_PVC/ALU] “Andere fabrieken werken met geavanceerde planningssoftware [in plaats van handmatig via Excel]. Ze weten hoeveel capaciteit ze die dag hebben en plannen de productie zo efficiënt mogelijk in.”
- [OPS_MAN] “Veel afstemming over waarom dingen niet lopen, gebeurt nu nog manueel. Ons platform faciliteert dat ook momenteel nog niet voldoende. “
- [OPS_MAN] “Ja, dat klopt. Het gaat om plaatjes, Excel-sheets, e-mails op dat niveau” [*Antwoord op op welke manier de data wordt uitgewisseld.*]
- [OPS_MAN] “Ja, tijdens die kwartaalmeetings gebruiken we soms een dashboard om dieper in te gaan op bepaalde onderwerpen. Maar de partners hebben geen directe toegang tot dat dashboard.”

- [OPS_WOOD] “Ja, er zijn hele traditionele producenten die wel willen digitaliseren, maar nog niet kunnen of willen, omdat ze denken dat het voor hen nog niets toevoegt. Ze vinden hun aantallen bijvoorbeeld te klein om te automatiseren”
- [OPS_WOOD] “Er zijn ook fabrieken die de toekomst van digitalisering niet zien. Ze denken: "Ik kan wel automatiseren, maar ik heb ook nog twee of drie mensen zitten die dat werk doen." Voor die producenten is dat de manier waarop ze het voor zich zien.”
- [OPS_WOOD] “Ja, veel producenten willen wel, maar het vraagt om een grote investering.”
- [OPS_PVC/ALU] “Het heeft ook te maken met de volumes. Als je dagelijks vier orders hebt, is het niet zo nodig om te digitaliseren. Maar als je veertig orders per dag krijgt, ga je vanzelf manieren zoeken om je werk makkelijker te maken.”
- [OPS_PVC/ALU] “Ja, technologische volwassenheid speelt zeker een rol. We hebben fabrieken die hun werkvoorbereiding en planning nog in Excel doen en dat dagelijks handmatig invullen. Die informatie wordt dan op schermen in de fabriek getoond.
  Andere fabrieken werken met geavanceerde planningssoftware. Ze weten hoeveel capaciteit ze die dag hebben en plannen de productie zo efficiënt mogelijk in. Je ziet daar grote verschillen. De fabrieken die dat met een tool doen, zijn vaak efficiënter.”
- [OPS_PVC/ALU] “Ja, de partners die serieus naar hun processen kijken en verspilling zoveel mogelijk elimineren, kunnen kortere levertijden aanbieden. Het begint allemaal met het in kaart brengen van je proces en het zo efficiënt mogelijk inrichten. Daarna kun je kijken hoe je dat verder kunt digitaliseren.

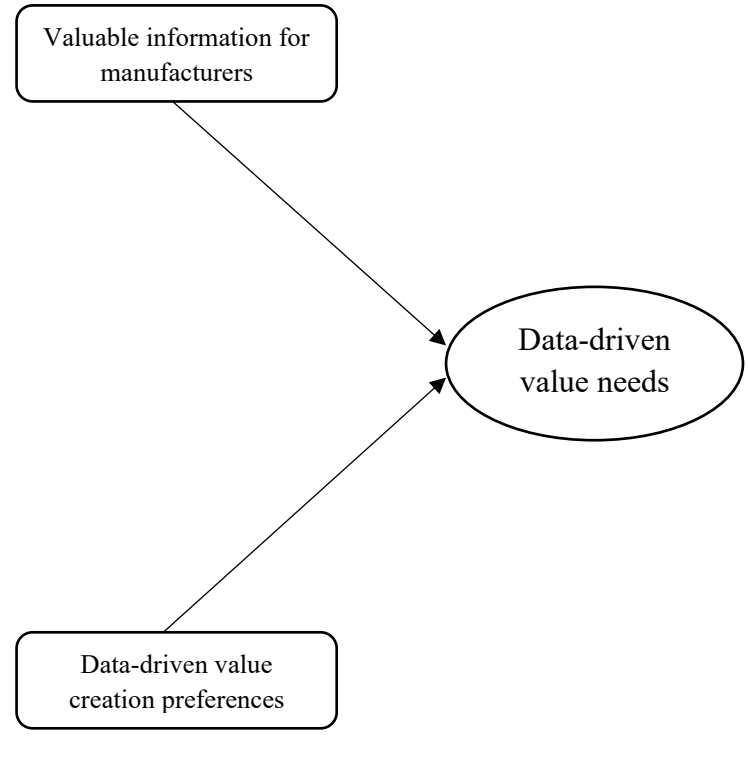


- [OPS_PVC/ALU] “Geografische locatie speelt wat minder mee, maar ik weet dat MNF_A bijvoorbeeld subsidies heeft gekregen om te digitaliseren. Ze hebben daar voor een flinke vergoeding voor ontvangen, wat hen in staat stelde om een digitaal systeem te bouwen dat we nu ook gebruiken voor onze XML-bestanden. Zonder die subsidie hadden ze die stap waarschijnlijk niet kunnen zetten. In Nederland is zo'n subsidie vaak niet beschikbaar. Ze zouden financieel misschien niet in staat zijn geweest om die transitie te maken zonder die steun.”
- [OPS_PVC/ALU] “De kozijnindustrie is enorm traditioneel. Niemand is gewend om echt met data te werken zoals wij dat doen. Als je een dashboard laat zien aan een partner, dan kijken ze hun ogen uit naar wat wij hebben en wat we kunnen. Er zit echt een generatiekloof in die wereld. ”
- [OPS_PVC/ALU] “Grote timmerfabrieken werken vaak op projectbasis, waarbij elk project uniek is. Als je wilt digitaliseren, heb je veel repetitiewerk nodig. Maar in de kozijnwereld blijft het vaak maatwerk. Dat maakt automatiseren en digitaliseren lastiger, maar niet onmogelijk.”
- [OPS_PVC/ALU] “Hoe lang werken ze bijvoorbeeld al samen met ons? Is ook een belangrijke factor…Als je net samen begint te werken en je biedt ze een datagedreven dienst aan, dan moeten ze hun eigen organisatie daarop aanpassen. Dat vraagt een investering in mensen, geld en tijd. Het is begrijpelijk dat ze eerst willen zien hoe alles loopt voordat ze die investering maken.”
- [OPS_MAN] “Dat hangt zowel af van hoe ze erover denken als van hoe ver ze technisch zijn. Wat ze willen bereiken speelt ook mee”
- [OPS_MAN] “Ja, het ligt vaak aan de achtergrond van de eigenaren van zo'n fabriek. Bij MNF_A zit er bijvoorbeeld een investeerder achter die alles draait om efficiëntie, geld, marktaandeel en zoveel mogelijk winst. Voor hen zijn KPI's en meetbaarheid cruciaal om groei te faciliteren. Dat is anders dan bij een lokale houtkozijnenfabriek, die vaak onderdeel is van een timmerbedrijf. Daar zit een andere mindset, omdat het in het DNA van die organisatie zit om anders te werken. Het verschil ontstaat dus vooral door het inzicht en de doelen van de eigenaren.”
- [OPS_MAN] “Vooral de grootte speelt een rol. Bij grotere partijen, zoals MNF_D, waar investeerders miljoenen steken in hun machineparken, moet dat natuurlijk rendement opleveren. Dan komen dit soort vraagstukken vanzelf naar boven.”
- [OPS_MAN] “Bij kleinere kozijnfabrieken, waar veel handmatig gebeurt en ze meer van maand tot maand kijken of ze voldoende verdiend hebben, zit een andere druk achter. Ze werken ook met andere informatie en hebben andere ideeën over wat belangrijk is. Dus het heeft zeker te maken met de schaalgrootte van de partners waarmee we samenwerken.”
- [OPS_MAN] “Wat we ook zien, is dat de partners waarmee Toelevering Online ooit begon, soms niet meer kunnen voldoen aan onze ambities. Is de match die in het verleden wel aanwezig was nog steeds actueel.”

- [OPS_WOOD] “Het gaat erom dat we weten wat er veel verkocht wordt, waar de klant voor kiest, of waar ze afhaken en waarom. Als we bijvoorbeeld weten waarom een klant afhaakt bij een bepaald kozijn, omdat hij misschien niet de juiste kleuren kan vinden, dan moeten we dat registreren en richting onze partners aangeven: "Klanten hebben behoefte aan meer kleuren." We zien dat het vaak misgaat bij de keuze van kleuren, en dan moeten we met onze partners bespreken welke kleuren zij veel meer verkopen dan wij aanbieden. Of als we klachten hebben over bepaalde productlijnen, dan registreren we die klachten en informeren we de partners: "Dit gaat mis, pas je systeem aan, of laten we hierover in gesprek gaan… We hebben het nog niet volledig inzichtelijk.”.
- [OPS_WOOD] “Ja, er is zeker grote behoefte aan. Ze [productie partners] willen graag weten hoe ze het doen en ook hoe ze het doen ten opzichte van anderen.”
- [OPS_WOOD] “Die gaan over bijvoorbeeld leverbetrouwbaarheid. Waar gaat het mis? Waarom zijn die orders vertraagd? Op welke aspecten in je proces gaat het mis? Die inzichten moeten diep genoeg zijn zodat je echt de oorzaak kunt achterhalen: waarom was de order niet op tijd bij de klant, zoals afgesproken? Was het glas te laat? Zat er schade op het profiel? Heeft de transporteur het niet afgehaald? Was er een logistiek probleem? Of is er iets in de inkoop veranderd? Dat soort inzichten zijn heel waardevol omdat je dan direct actie kunt ondernemen en het proces kunt verbeteren.”

- [OPS_PVC/ALU] “Dus weten wanneer we welk product kunnen gaan verwachten. Zijn dat bijvoorbeeld schuifpuien? Dan moeten we gaan bekijken of er een kozijnproducent binnen ons partnerplatform graag schuifpuien maakt en op dat moment een gaatje vrij heeft in hun productiecapaciteit. Daarnaast weten we dat in bepaalde periodes van het jaar minder kozijnen worden verkocht omdat mensen meer binnen werken. Dus dan kijken we hoe we binnendeurkozijnen zo goed mogelijk bij de klant kunnen verkopen, en aan de partnerkant hoe we die zo efficiënt mogelijk kunnen verdelen en in productie kunnen laten nemen. Zo doet iedereen waar hij goed in is.”
- [OPS_MAN] ‘We hebben nog niet de mogelijkheid om automatisch te registreren wanneer iets in de productiezone is afgerond. Daar moet nog steeds iemand handmatig aangeven dat het klaar is.”

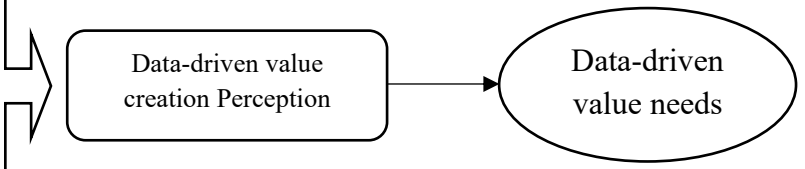
- [OPS_WOOD] “Aan de ene kant hebben wij natuurlijk verkoopcijfers waarmee we zien wat er gekocht wordt en of die verkooppatronen stabiel blijven of veranderen. Onze kozijnproducent kan daar wat mee doen door bijvoorbeeld voorraden aan te leggen, de productie te versnellen of juist voorraden af te bouwen als er minder wordt verkocht. Ze kunnen die data ook voor hun eigen werkzaamheden gebruiken”
- [OPS_WOOD] “Ja, en ik denk ook dat zij waardevolle data voor ons hebben. Zij kunnen ons bijvoorbeeld laten zien waar de markt naartoe gaat, wat nu populair is in nieuwbouw. Dan weten wij over vijf of tien jaar, wanneer die woningen worden verbouwd of uitgebouwd, wat voor producten er gevraagd zullen worden. ”
- [OPS_WOOD] “Ja, zeker. Als zij waardevolle data hebben, kunnen wij daar gebruik van maken. Als zij in de nieuwbouw bepaalde producten verkopen, zien wij die later terugkomen in de verbouwingsmarkt. Aan de andere kant kunnen zij veel leren van ons: hoe hun producten presteren, hoe klanten hun producten ervaren. Als wij die feedback goed registreren, kunnen zij profiteren van productverbeteringen.” [*Antwoord op de vraag of OPS_WOOD het breder ziet dan alleen het platform dat data en inzichten levert aan de productiepartner.*]
- [OPS_WOOD] “Nee, wij sturen geen machines aan. Een softwareplatform zoals wij kan geen machinedata genereren. Dat is allemaal zo specifiek voor die machine, afhankelijk van de afstellingen. Dat moet echt door gespecialiseerde software worden gedaan die die machine kent. Dat moeten wij helemaal niet willen. Wij moeten zoveel mogelijk algemene gegevens over het hele kozijn verzamelen, waarmee we van alles kunnen inrichten in onze eigen software.”
- [OPS_PVC/ALU] “De meeste waarde zit denk ik in het zo efficiënt mogelijk laten draaien van een fabriek door middel van voorspellende data. Dus als we die fabriek consistent kunnen voorzien van voorspelbare toewijzingen, gaat de efficiëntie omhoog en wordt de prijs aan beide kanten beter. Het is niet zo dat een fabriek daardoor een betere prijs kan geven voor een enkel kozijn,maar de hele fabriek draait efficiënter. Misschien komt er wel meer productiecapaciteit vrij, en daar zit de echte winst in. ”
- [OPS_MAN] “Maar als je breder kijkt naar ons speelveld, als een tweezijdig platform, dan zou je kunnen zeggen dat de klantdata die we hebben —wat ze bestellen, de producten, kleuren, enzovoort—heel waardevol kan zijn voor onze producenten. Zij zouden die informatie kunnen gebruiken om hun assortimenten en fabriek beter af te stemmen. Die brug hebben we echter nog niet gelegd. ”
- [OPS_MAN] “Maar het zou wel interessant zijn om inzichtelijk te maken hoe de ene producent presteert ten opzichte van een ander, of ten opzichte van de benchmark. Daar kunnen we zeker waarde leveren, omdat het hen motiveert om te verbeteren. Als bijvoorbeeld de gemiddelde levertijd 7 dagen is, en een producent zit op 4,5 dagen, dan kun je die delta inzichtelijk maken. Dat soort inzichten kunnen we zeker toevoegen.”



- [OPS_MAN] “We zijn op dit moment niet zo georganiseerd, maar het is een interessante gedachte. Waar ik wel een waarde zie, is bijvoorbeeld in duurzaamheid. Stel dat we gegevens hebben over de CO2-footprint van een producent, dan zou je dat inzichtelijk kunnen maken voor klanten die duurzaamheid belangrijk vinden. Dan zou je bijvoorbeeld kunnen laten zien welke impact hun aankoop heeft in de keten, en wat de meest verstandige keuze is voor het milieu. Een partner zou dan kunnen zeggen: "Ik produceer 100% energie-neutraal," en dat zou dan de meest bewuste keuze zijn en projecteren we op ons platform, zodat deze informatie inzichtelijk is voor de eindklant. Hierdoor kunnen eindklanten die duurzaamheid hoog in het vaandel hebben een bewuste keuze maken, en levert dit mogelijk extra orders op voor de producent die 100% energie neutraal produceert. Zo zou je die brug kunnen slaan tussen producent en klant.”[*Antwoord op de vraag of prestaties van producenten zichtbaar moeten zijn op het platform voor de eindklant*.]
- [OPS_MAN] “Ja, zeker. Ze zitten vaak in hun eigen productiecocon te wachten tot de klant komt, maar weten niet goed wat er in de markt speelt. Daar kunnen wij waarde bieden door hen te laten zien wat de trends zijn in kleuren, materialen, of bijvoorbeeld de verschuiving van PVC naar aluminium. Dat soort inzichten kan voor hen heel waardevol zijn.’

- [[OPS_MAN] “We zijn geen open platform, dus er is wel concurrentie tussen de partners, maar het is niet zo dat als iemand zijn prijs verlaagt, wij dat automatisch doorvertalen naar de voorkant en dus de klant. We hebben op dit moment niet veel knoppen om aan te draaien die direct impact hebben op hun fabriek of productie. Want anders zou je kunnen zeggen: als producent X de prijs met 10% laat zakken, zou je dat naar verwachting x procent aan extra omzet opleveren. ”
- [OPS_MAN] “De meeste waarde zit in het verbeteren van processen en efficiëntie, niet in het slimmer maken van het product zelf.”
- [OPS_MAN] “Ja, vooral omdat veel producenten in hun eigen wereld opereren. Door hen te voorzien van die inzichten kunnen ze zich beter positioneren ten opzichte van hun concurrenten, wat voor hen veel waardevoller is.”
- [OPS_MAN] “Ja, dat is precies wat ik bedoel. *[Antwoord of de waardecreatie breder moet zijn dan enkel toegespitst op de samenwerking platform & productiepartner, bijvoorbeeld door ook toeleveranciers erbij te betrekken wanneer data inzichtelijk maakt dat bepaalde hang- en sluitwerk slecht presteert.]* Stel dat je over tienduizenden producten ziet dat een bepaald percentage het hang-en sluitwerk na twee jaar kapot gaat, dan kun je dat inzicht delen met de toeleverancier zodat ze daar iets aan kunnen doen. Dat helpt hen veel meer. Want de fabriek verwerkt het hang- en sluitwerk in het kozijn, maar wij als platform moeten in gesprek gaan met de toeleverancier van het hang- en sluitwerk om daadwerkelijk dit product te gaan verbeteren. Hierover de kozijnproducent op het matje roepen heeft geen toegevoegde waarde. ”

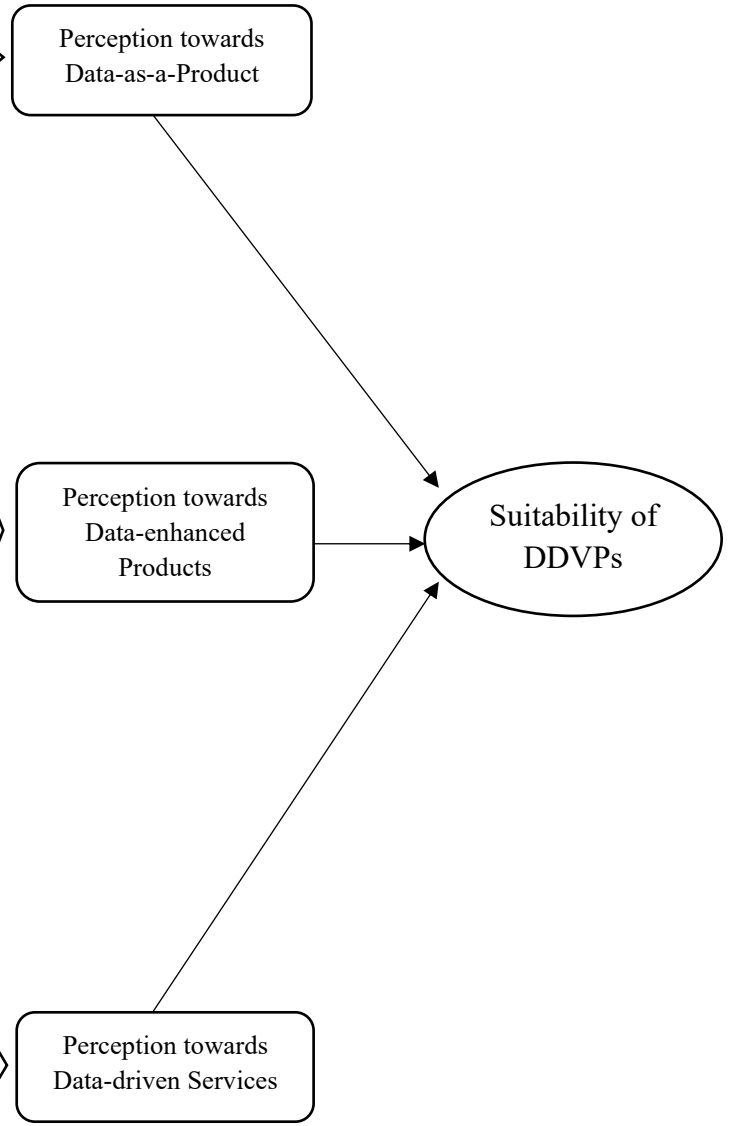
- [OPS_WOOD] “Ik zie daar niet echt een toegevoegde waarde in. Dat ze zelf een hele bak informatie krijgen waar ze nog van alles mee moeten doen. Ik denk dat ze de data niet kunnen verwerken. De bedrijven zijn daar niet op ingericht. Het zijn kozijnproducenten; ze kunnen heel goed kozijnen maken. Misschien weten ze zelf wel een beetje hoe ze presteren, met hun eigen dashboarding, zoals hoeveel er uit de fabriek moet komen en hoeveel er daadwerkelijk uitkomt. Maar om dan ook nog eens onze data te gaan analyseren, dat is een stap die in hun productieproces nog niet is gemaakt. Dat zien we echt niet gebeuren.”
- [OPS_PVC/ALU] “Op het moment dat je nu nog niets doet en je gaat straks iets doen, dan heeft dat natuurlijk al toegevoegde waarde. Maar je verplicht de klant dan wel om zelf iets met de data te doen. Dat is de minimale meerwaarde die je daarmee creëert. Ik denk eigenlijk dat je daarmee geen echte meerwaarde voor hen creëert.”
- [OPS_PVC/ALU] “Ze zijn erg traditioneel ingesteld. Ik denk ook niet dat je op die manier data aan partners zou moeten aanbieden.”
- [OPS_PVC/ALU] “Als je gewoon ruwe, onbewerkte data over de schutting gooit, kun je niet verwachten dat ze er iets mee doen.”



- [OPS_PVC/ALU] “Wat maakt Toelevering Online op dat moment bijzonder om mee samen te werken? Dat je inzicht krijgt in je eigen data, en niet gewoon een pakketje data over de schutting krijgt gegooid met een 'succes ermee'-mentaliteit. Als je daar een analist drie weken op zet, dan krijg je ook een dashboard, maar wij willen die stap voor hen nemen.”
- [OPS_MAN] “Ja, bij data as a product ga je ervan uit dat degene aan de andere kant genoeg kennis en wil heeft om met die data aan de slag te gaan. Bij een partij als MNF_A, waar iemand echt bezig is met data-analyse, zou dat werken. Maar bij veel andere partijen denk ik, "mwa".”
- [OPS_MAN] “Ja, het is een combinatie van kennis, kunde en de wil om ermee te werken.”

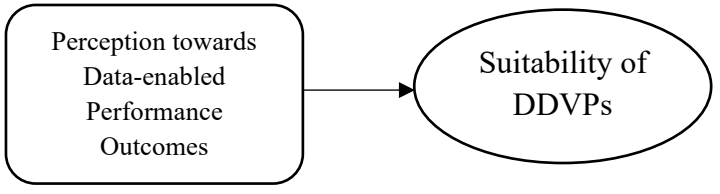
- [OPS_WOOD] “Wat betreft het kozijn zelf zie ik daar niet veel in, maar wel in het proces van hoe ze gepresteerd hebben en wat we samen hebben gedaan in de verkoop.”
- [OPS_WOOD] “Ja, precies. Het toevoegen van data aan een bestaand product, dat zie ik niet zo in de context van het kozijn zelf. “[*Antwoord op of OPS_WOOD het koppelen van data meer als een losstaand product ziet, dan de koppeling aan het product (het kozijn)*]
- [OPS_PVC/ALU] “Ik denk minimaal. Ik zou er nu niet iets zinnigs over kunnen zeggen. Nee.”
- [OPS_MAN] “Ja, kijk, we zitten nu nog in de fase waarin we vooral kozijnen verkopen, ze bestellen, produceren en leveren. Maar we gaan steeds meer te maken krijgen met de levenscyclus van het product. Bijvoorbeeld onderhoud, schade, of vervangingen. Wat er dan gebeurt, is dat die servicevragen uiteindelijk terugkomen bij de producent, omdat er een onderdeel kapot is of iets nageleverd moet worden. In die situatie zou het handig zijn om te weten welke materialen er zijn gebruikt en waar het product vandaan komt (bill of materials). Een QR-code kan daarbij helpen. Als je op die manier snel onderdelen kunt identificeren en bestellen, bespaart dat veel tijd bij de werkvoorbereiding en het afhandelen van servicevragen. Ook zou je kunnen analyseren hoeveel schade er gemiddeld is opgetreden bij de kozijnen en op welk moment in de levenscyclus dat gebeurt. Dat zou nuttige informatie kunnen zijn voor de producent.”
- [OPS_MAN] “Ja, uiteindelijk zijn wij altijd de verkopende partij, dus de klant zou in de basis in eerste instantie naar ons toe komen. Wij moeten het dan verder regelen met de producent. Wij zijn dus de partij waar alle informatie samenkomt, en we communiceren die vervolgens naar de producent.”
- [OPS_MAN] “Ja, zeker. Dat zou heel nuttig zijn” [*Antwoord op vraag of QR-code een rol gaat spelen, waarbij de producen weer wordt aangestuurd op basis van de beschikbare informatie die jullie ontvangen via QR-codes die gescand zijn door de eindklant.*]

- [OPS_WOOD] “Ja, absoluut. [*Op de vraag of deze DDVP waarde oplevert voor kozijnpartners*]. Aan de ene kant willen wij natuurlijk het beste voor onze klant, omdat wij rechtstreeks contact met onze klant hebben. Ik kan me voorstellen dat als je echt een platform bent met meer afstand tot je klant, zoals een bol.com met veel aanbieders, je minder belang hecht aan de prestaties van individuele aanbieders. Als er maar één of twee goed presteren, kiest de klant daarvoor. In zo’n geval kun je inzichten gaan verkopen aan aanbieders die willen verbeteren om meer te verkopen.”
- [OPS_WOOD] “Bij ons werkt het anders. Niet iedereen mag kozijnen op ons platform aanbieden; we selecteren wie onze partners zijn. We hebben een samenwerking, en samen willen we het heel goed doen. Dus wij bieden waarde door die inzichten aan te bieden of vrij te geven, maar niet om daar geld voor te vragen.”



- [[OPS_WOOD] “Wij hebben een andere insteek. Wij bieden die inzichten juist aan zodat de kozijnen die wij leveren altijd van goede kwaliteit zijn, op tijd worden geleverd, en klachtenvrij zijn. Een kozijn is niet iets wat je zomaar koopt en denkt: "Volgende week bestel ik wel ergens anders." Wij willen graag die klant behouden, en daarom zijn we heel selectief met de partners waarmee we samenwerken. We willen hen juist verbeteren.”
- [OPS_WOOD] “Dus kort gezegd...Data Driven Services is een hele mooie waardepropositie waar je jezelf echt in kunt ontwikkelen en waarde kunt leveren voor de partner, maar in die samenwerking moet het een win-winsituatie zijn”
- [OPS_PVC/ALU] “Ja, tuurlijk. Dit is eigenlijk wat we nu al doen, zij het op een kleine schaal. Ik laat ieder kwartaal dashboards zien, en dat vinden ze al heel waardevol.”
- [OPS_PVC/ALU] “Maar als je het in een dashboard presenteert en laat zien dat het interactief is, zodat ze er mee kunnen spelen en inzichten kunnen halen, dan heeft dat veel meer waarde voor hen.”
- [OPS_PVC/ALU] “Ja, precies. We beschrijven nu vooral wat er in het verleden is gebeurd en hoe we dat kunnen verbeteren. Maar je wilt juist ook vooruitkijken: wat gaat er gebeuren? *“[Antwoord op de vraag of predictive analytics waardevol zou zijn binnen de samenwerking platform & productiepartner*.]”
- [OPS_MAN] “Ja, als ik het concreet maak, dan zou een producent bijvoorbeeld een portaal hebben waarin hij kan zien hoe zijn fabriek presteert. Wij verrijken de data, presenteren het, en hij heeft dan inzichten in zijn productieprocessen.”
- [OPS_MAN] “Ja, als we de hele keten aan elkaar knopen, ga je meer richting het managen van uitzonderingen en niet meer zo zeer het proces op gang helpen en houden. Als we dat gaan doen hebben wij zelf die data nodig, en het zou nuttig zijn om die ook met de fabriek te delen. Bijvoorbeeld, als je ziet dat een kozijnpartner de maximale capaciteit hebben bereikt bij *glasleverancier* voor de productie van ruiten op de snelle lijn, dan hebben wij die inzichten en kunnen we de kozijnpartner informeren. En daarnaast in gesprek gaan om nieuwe afspraken te gaan opstellen met kozijnpartner X (bijvoorbeeld MNF_A) en toeleverancier Y (bijvoorbeeld glasleverancier). Dan gaan we de actoren in onze keten helpen met keuzes maken in de toekomst. En datgeen zie ik zeker voor me”
- [OPS_PVC/ALU] “Je kunt die KPI's gebruiken, zoals vertragingen en klachten. Een overzicht van de meest voorkomende vertragingen en de meest gemelde klachten per product is heel waardevol voor hen. Daarnaast is het belangrijk om forecastings aan te bieden, zoals: Dit heb je van ons gekregen, dit staat eraan te komen, en dit is wat we hebben afgesproken en aan het einde van het jaar komen we waarschijnlijk hierop uit.”
- [OPS_PVC/ALU] “Ook kunnen we bijvoorbeeld aangeven: Dit jaar verwachten we deze resultaten, let op, hier zit een stijging van 10% aan te komen. Houd daar rekening mee voor de komende periode. Dus het gaat echt om meer inzicht in wat ze hebben ontvangen en wat ze nog kunnen verwachten.”
- [OPS_MAN] “Ja, daar zie ik wel wat in.” *[Antwoord op de vraag of real-time dashboards een uitkomst kunnen bieden om problemen te voorkomen in plaats van overkomen].*

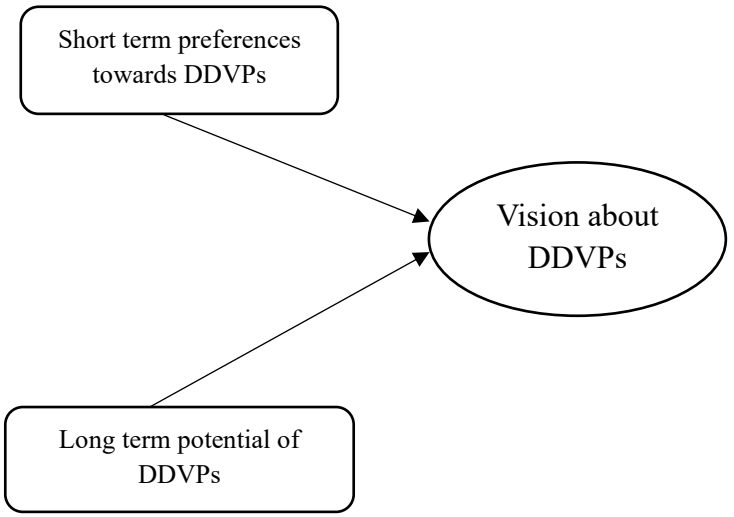
- [OPS_WOOD] “Wat je hier omschrijft, zou toch supergaaf zijn. Stel je hebt een houten kozijn, en dat kozijn informeert je proactief dat het tijd is om te schilderen omdat er vocht is gedetecteerd en de laklaag niet meer goed is.”
- [OPS_WOOD] “Ik zie wel waarde in de samenwerking tussen het platform en de kozijnproducent. Een klant kan bijvoorbeeld door middel van het scannen van het kozijn eenvoudig informatie ophalen. Dat is heel simpel. Maar ga je verder dan dat, dan vraag ik me af wat je er echt mee doet in de samenwerking. Behalve dat je bijvoorbeeld eerder aangeeft dat er geschilderd moet worden, zie ik op dit moment nog niet echt wat we ermee zouden doen. Het is lastig om dit voor elk kozijn te doen, zeker als je op kleine details zoals een hoekje dat altijd rot moet letten.”
- [OPS_WOOD] “Ja, absoluut.” [*Antwoord op of OPS_WOOD waarde ziet in het werken met een QR-code met daarop informatie om de eindklant te ontzorgen door uitgebreide informatievoorziening te faciliteren.*]
- [OPS_PVC/ALU] “We hebben een partner die al met chips in kozijnen werken…In de praktijk zie je dat particulieren daar geen gebruik van maken, omdat ze het niet nodig vinden. Dus of de technologie is verder ontwikkeld dan waar vraag naar is, of er is simpelweg iets ontwikkeld zonder dat er daadwerkelijk vraag naar was. Daar komen we misschien over tien jaar achter.”
- [OPS_PVC/ALU] “Maar dit is wel het verschil: waar we voorheen actief zelf data moesten verzamelen, zoals klachten, vertragingen en prestaties van de partners, wordt het hier al automatisch verzameld door de chips en gegoten in data. *[Dus je ziet wel de waarde hiervan in*?] Ja, zeker.”
- [OPS_PVC/ALU] “Uiteindelijk levert dat zeker waarde op voor de eindconsument. Het is een veel eenvoudigere en makkelijkere manier om toegang te krijgen tot de informatie.”
- [OPS_MAN] “In de utiliteitsbouw, waar je grote kantoorgebouwen neerzet, kan dat heel interessant zijn. Vooral voor building maintenance en dergelijke partijen, omdat ze inzicht willen hebben in de staat van onderhoud. Ja, en bij bijvoorbeeld bij profielhuizen annex profielleveranciers zoals Schüco en Gealan willen ze misschien ook weten hoe hun kunststofprofielen presteren. Hoe lang gaan ze mee, wat zijn de prestaties onder verschillende weersomstandigheden? Maar als we kijken naar deze case; in de praktijk bij kozijnproducenten, denk ik niet dat zij daar veel interesse in hebben. Zij gaan ervan uit dat als ze de profielen verwerken volgens de specificaties van hun leverancier, alles wel goed zit.” *[Antwoord op de vraag of het werken met geavanceerde technologieën als sensoren en chips in het kozijn waardevol is binnen de relatie platform & productiepartner.]*
- [OPS_MAN] “Maar als je het groter bekijkt, zoals wij met Toelevering Online verder willen groeien, dan kan het wel nuttig zijn. Stel dat wij een gigantisch platform worden waar we allerlei producten, waaronder kozijnen, leveren. Dan kunnen we die data, zoals die van sensoren, gebruiken om verder de keten in te gaan. We zouden bijvoorbeeld naar Schüco en Gealan kunnen gaan en zeggen: "Dit zijn de tevredenheidscijfers en hier zijn de klachten." Zo kunnen we samen aan verbeteringen werken. Maar dat zou meer richting onze leveranciers zijn, en niet direct voor de producenten.”
- [OPS_MAN] “Expliciet de link tussen platform en kozijnproducent zie ik niet per direct voor me.”
- [OPS_WOOD] “Dat is onderdeel van de samenwerking. Hoe de producent het kozijn produceert en hoe het eindproduct wordt samengesteld, bepaalt bijvoorbeeld de isolatiewaarde van het geheel. Zij moeten die informatie echt aanleveren, kozijn-specifiek, en dat moet in de toekomst digitaal gebeuren. Vanuit hun systemen moet dat net zo makkelijk kunnen worden geïntegreerd via API’s in ons klantportaal, waar het voor onze zakelijke klant beschikbaar is. En dan via een QR-code of scan op het kozijn, zodat de eindklant ook toegang heeft tot de gegevens. ”
- [OPS_PVC/ALU] “Het idee van een chip in een kozijn is leuk, maar hoe zorg je ervoor dat je er ook bruikbare informatie uit haalt? Het is zeker iets dat je zou kunnen gebruiken, maar het vereist veel meer samenwerking binnen de hele keten om succesvol te zijn.”



- [OPS_WOOD] “Die derde: dashboarding. Zo goed mogelijk inzicht bieden in hoe we presteren, waar het misgaat, en wat we kunnen verbeteren. Het gaat erom dat we elk kozijn op het juiste moment bij de klant krijgen, zodat het perfect geïnstalleerd kan worden en geen klachten veroorzaakt of tot zorgen leidt.”
- [OPS_PVC/ALU] “Nou, om eerlijk te zijn, denk ik dat we al op een minimale manier bezig zijn met data-driven services…Ja, daar moeten we nog veel meer uit halen dan we nu doen.”
- [OPS_MAN] “Ik denk dat we het langst stilgestaan hebben bij data-driven services. Ik denk dat dat de eerste stap is, omdat het echt gaat over samenwerking. Het biedt inzichten in hoe producenten zich verhouden tot hun partners en de markt, en hoe we hen kunnen helpen om beter werk te leveren. Dat betekent dat ze beter weten wat er speelt in hun fabriek, in combinatie met marktinzichten en kennis over klantproducten. Als je die inzichten in een dashboard beschikbaar stelt in het leverancierssportaal, wat momenteel al live is en waar al mee wordt gewerkt, dan zie ik dat als een dienst die door het platform ontwikkeld is. Die kun je dan verder uitbreiden met aanvullende functies.”

- [OPS_WOOD] “Ja, op de lange termijn kun je die stap verder zetten: hoe toon je aan wat de prestatie van het kozijn is en waar het in de keten blijft hangen? Bijvoorbeeld dat de zzp'er of aannemer al de gegevens krijgt en hoe je dat ook bij de eindklant krijgt… kun je het verder uitbreiden met de data die de producent heeft over het kozijn, zodat die ontsloten kan worden richting het platform, de koper, en de eindklant.”
- [OPS_PVC/ALU] “Ik denk dat je ambitie zeker moet zijn om richting data-enabled performance outcomes te gaan. Maar dat is een behoorlijke uitdaging. De techniek moet daarvoor ver genoeg ontwikkeld zijn.”
- [OPS_MAN] “Ik denk dat we meer waarde toevoegen door de fabrikanten te helpen slimmer, makkelijker en efficiënter te werken, dan door te focussen op de kwaliteit van het product zelf. Dus als we alle data kunnen verbinden en hun laten zien hoeveel klachten er zijn, waar de problemen liggen, hoe ze die kunnen oplossen en hoe zij het doen ten opzichte van hun concurrenten, leveren wij denk ik de meeste waarde voor hen. Ze kunnen zich dan sneller verbeteren en zien waar ze achterlopen op de markt of waar hun concurrenten beter presteren.”

- [OPS_WOOD] “Als je geld gaat vragen voor de data die wij hebben, zoals hoe ze hun product kunnen verbeteren waardoor wij mogelijk meer gaan verkopen, maar zij eerst moeten betalen voor die informatie, dan botst dat met hoe wij willen samenwerken met onze partners op dit moment.”
- [OPS_WOOD] “…, maar in die samenwerking moet het een win-winsituatie zijn. Daar hoeft geen prijskaartje aan te hangen, want dat zou alleen maar de samenwerking en de optimalisatie daarvan blokkeren. “
- [OPS_WOOD] “Met bestaande partners hebben we een samenwerking waarin we elkaar beter willen maken. Het is dan moeilijk om te zeggen: "Wij hebben de gegevens, maar jullie moeten ervoor betalen." Wij hebben er namelijk ook baat bij dat zij continu verbeteren”.”
- [OPS_WOOD] “Aan de andere kant, als je nieuwe partners aansluit en hen een tool biedt waarmee ze hun bedrijf of productieproces kunnen verbeteren, dan moet je wel nadenken of je daar iets voor wilt vragen. Of je kunt zeggen: "Wij kopen kozijnen scherper in omdat je gebruikmaakt van onze functionaliteiten." Daarmee betaal je indirect voor de inzet die wij doen om je beter te maken. Het heeft dus waarde, maar de vraag is hoe je dat precies moet verrekenen.”
- [OPS_WOOD] “Als je bijvoorbeeld zou vragen of ze periodiek, of een keer per jaar, een bedrag willen betalen om hun dashboards te mogen inzien, dan denk ik dat het antwoord zal zijn: "Dat is leuk, maar daar gaan wij niet voor betalen.”
- [OPS_WOOD] “Het moet een gestroomlijnde wisselwerking zijn; als je met ons samenwerkt, krijg je orders, maar doe het wel op onze manier. Daartegenover staat dat je heel veel waardevolle inzichten kunt krijgen over je prestaties.



- [OPS_PVC/ALU] “Daar mag zeker een prijskaartje aan hangen. We hebben wel eens gekscherend gezegd: waarom geven we die fabriek een XML gratis? Ze kunnen die krijgen, geen probleem, maar lever daar dan bijvoorbeeld één procent marge voor in.”
- [OPS_MAN] “Ik zie dat als een kans. Waarbij ik wel denk dat als je kijkt naar de schaalgrootte van Toelevering Online, en waar we naartoe willen. Stel dat we groeien naar 100 miljoen euro omzet, dan vraag ik me af hoeveel dat ons zou opleveren als we puur zouden werken met abonnementsmodellen, ten opzichte van onze huidige inkomstenstromen. Heeft het dan voldoende waarde om aan ‘direct’ data te gelde te maken, of is het beter om de data beschikbaar te stellen om tevredenere klanten te hebben, een gunstigere inkoopprijs kunnen hanteren of in het algemeen concurrentievoordeel te behalen? Waardoor we uiteindelijk sneller onze missie kunnen realiseren, zoals een kozijn binnen 24 uur bij de klant leveren met tevreden klanten. Ik sta er dus dubbel in.”
- [OPS_MAN] “Ja, het zou een verdienmodel kunnen zijn, maar op dit moment vind ik het interessanter om te onderzoeken hoe we door middel van data gezamenlijk beter kunnen presteren, zodat we onze omzetgroei verhogen.”
- [OPS_MAN] “Wij hebben een partnerlandschape met binnen Toelevering Online enkele partner managers die tegen hun producenten zeggen: “Zo willen wij het graag hebben” en dan pas je in de ‘eenheidsworst’ die wij gecreëerd hebben. Dan moeten we het juist vanuit een andere kant benaderen en onze productiepartners adviseren met behulp van onze data om binnen die ‘eenheidsworst’ de beste te zijn. Zodat we gezamenlijk excelleren en groeien naar een hoger doel. “

Perspective towards monetising data within partnership manufacturer – platform

- [OPS_WOOD] “Op die manier denk ik dat wij die samenwerking echt willen vormgeven.”[*Antwoord op de vraag of indirect data monetisation geschikt is in de samenwerking met platform en productiepartner.*]
- [OPS_WOOD] “Ja, dat sluit echt aan bij hoe wij willen opereren. Ik zeg altijd: een kozijn dat je bij ons koopt, moet van hoge kwaliteit zijn. Wij rekenen onze partners daar ook streng op af. Het is niet zo dat een klant kan aangeven: "Ik heb dat kozijn van die producent gehad, dus ik kies liever een andere." Wij willen juist dat de klant tevreden is en dat de kwaliteit consistent is.”
- [OPS_WOOD] “Ja, zeker als het puur om het verkopen van data gaat, denk ik dat dat helemaal niet van toepassing is. Selling analysis zie ik ook niet echt gebeuren. Je zou kunnen kijken hoe ver je de dashboarding wilt specificeren. Wil je bijvoorbeeld dieper gaan dan wat wij standaard aanbieden? Wil je echt precies weten hoeveel schuifpuien je hebt verkocht in een week, met gegevens die ze eigenlijk zelf ook al hebben? Als ze zeggen: "Ik wil volledig gebruikmaken van jullie dashboarding," dan zou je een stap kunnen maken en echt een service gaan verkopen. Maar dan word je een datagedreven bedrijf dat klant-specifieke dashboards bouwt en toegankelijk maakt. Dan ben je niet meer een webshop of een platform dat kozijnen verkoopt. Dat zou in de toekomst misschien kunnen, maar voor nu denk ik niet dat dat een stap is die we moeten zetten.”
- [OPS_PVC/ALU] *“[Je zou het dus op andere manieren kunnen monetariseren? Het hoeft niet per se een directe vergoeding in euro's te zijn, maar je kunt het binnen de samenwerking op andere manieren oplossen?]* Ja. Je maakt data beschikbaar over de prestaties van de fabrieken. Bijvoorbeeld: Al je ruiten hebben vertraging, of Je hebt veel klachten over glas. Verbeter dat, en onze betrouwbaarheid gaat omhoog, waardoor wij meer orders kunnen verkopen.
- [OPS_PVC/ALU] “Ik denk dat we data nooit gratis zouden moeten weggeven. Dus indirecte data monetisation is volgens mij niet de juiste weg. Het zal uiteindelijk wel een mix worden, maar ik denk dat directe data monetisation beter past bij de visie van Toelevering Online.”
- [OPS_PVC/ALU] “Die laatste, data-based performance outcomes, is het meest geschikt. Maar zover zijn we nu nog niet. Dat moet eerst allemaal verder ontwikkeld worden.”

Prefered external data monetisation strategy

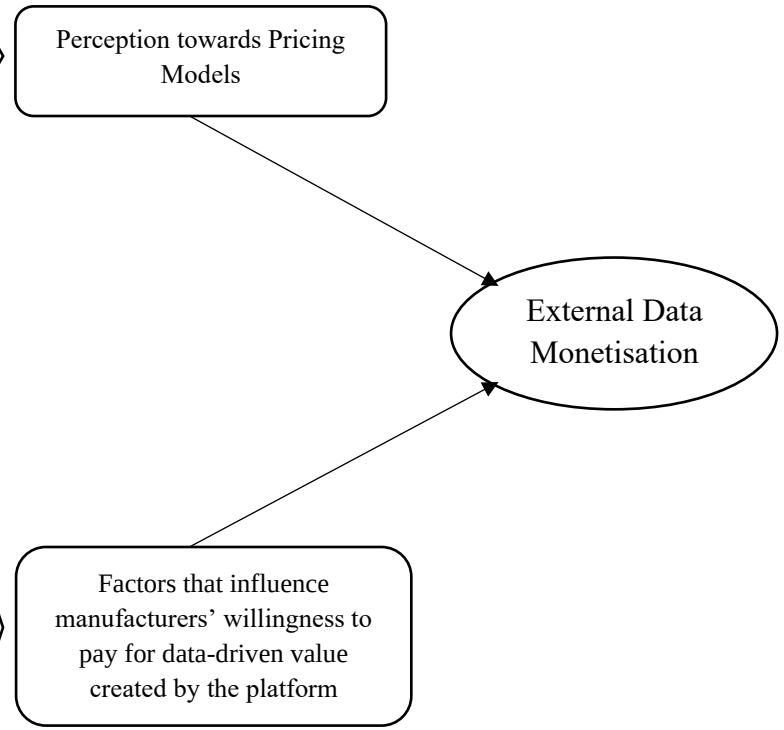
External Data Monetisation

- [OPS_MAN] “Ja, precies. In deze fase zou ik eerder kiezen voor de indirecte variant. Als wij data kunnen gebruiken om producenten te stimuleren en te helpen slimmer te werken en betere keuzes te maken doordat ze zelf inzicht hebben waar de dingen scheef lopen, dan heeft dat een positieve impact op hoe wij als organisatie presteren. Dat zorgt ervoor dat we sneller groeien, meer tevreden klanten hebben, en uiteindelijk meer waarde creëren. Ik zie daar meer in dan direct diensten te verkopen aan onze top partners.”
- [OPS_MAN] “Ik denk dat het zeker relevant kan worden als je kijkt naar Toelevering Online en het bredere platform Provix, vooral als we in meerdere landen actief zijn en meer data verzamelen. Dan kun je prima een verdienmodel opzetten in bijvoorbeeld de kozijnrenovatiebranche, waarbij je de data ook breder verkoopt aan andere partijen, los van onze directe partners.” [*Antwoord op vraag of OPS_MAN direct data monetisation als optie ziet, eventueel in de toekomst?*]
- OPS_MAN] “We zijn geen open platform waar iedereen zomaar zijn product kan aanbieden. Wij maken vooraf veel afspraken met onze partners over productstandaardisatie en prijzen. In zo’n geval is het direct vermarkten van data minder interessant, omdat wat zij aanpassen niet direct leidt tot marktkansen op ons platform. Maar als we een open platform zouden zijn, dan zou het vermarkten van die data wel interessant zijn, omdat ze er direct hun voordeel mee kunnen doen.”
- [OPS_MAN] “Ja, dat zie ik zeker als een mogelijkheid. [*Antwoord of direct data monetisation interessant wordt zodra real-time dashboards geïntegreerd zijn en nieuwe partners naast het hebben van een extra verkoopkanaal, zij nu ook in een handomdraai hun productie(processen) kunnen verbeteren, door verkregen inzichten voortkomend uit de aanvullende data-gedreven diensten/producten die de samenwerking met het platform oplevert.*] Wanneer nieuwe partners zich aansluiten bij Toelevering Online, brengen we naast de sales en de klantenservice, ook het voordeel van die data-integraties mee. Je zou dan kunnen zeggen: "Wij leveren de koppelingen voor jullie, zodat jullie dat zelf niet meer hoeven te doen," en daar hangt dan een prijskaartje aan. Dat is een waardevol aanbod, en je kunt daar bijvoorbeeld een percentage van de opbrengst voor vragen bijvoorbeeld”

- [OPS_WOOD] “Nee, dat klopt. Eigenlijk denk ik dat we dat op een andere manier [zonder gebruik van prijsmodellen] moeten afvangen.”
- [OPS_WOOD] “Ik heb wel eens nagedacht over een soort productielicentie. Wil je kozijnen voor ons produceren, dan houden we een bepaalde fee in voor je inkoop. Dat betekent dat je gratis orders van ons krijgt, zonder verkoopinspanningen. Maar daarnaast, wat zijn de voordelen? Waarom houden we 1, 2, 4 of 10 procent van de inkoopprijs in? Wat bieden wij daarvoor? Standaard orders en inzichten bijvoorbeeld. Je zou dus kunnen zeggen dat dit niet alleen voor de data is, maar ook om met ons te mogen samenwerken. Een onderdeel daarvan zou kunnen zijn dat het afgerekend moet worden”
  [OPS_WOOD] “Ja, dat vind ik wel een leuke manier van samenwerken.” [*Antwoord of zijn idee over productlicentie geschaald kan worden onder ‘licensing’.*] Om onderdeel te zijn van het platform, en data is dan een van de onderdelen die je erbij krijgt.
- [OPS_PVC/ALU] “Het is lastig om meteen naar een fabriek te gaan en te zeggen: "Wil je inzicht in je prestaties, klachten of productkwaliteit? Dat kan, maar dat kost je 5.000 euro per maand." Het werkt beter als je zegt: "Hier is een pakket waarmee je dit en dat kunt doen. Je krijgt een jaar op proef om te zien of het werkt." Laat ze het ervaren, laat ze zien dat het werkt en dat ze verbeteren zodra ze er actief mee bezig gaan.”

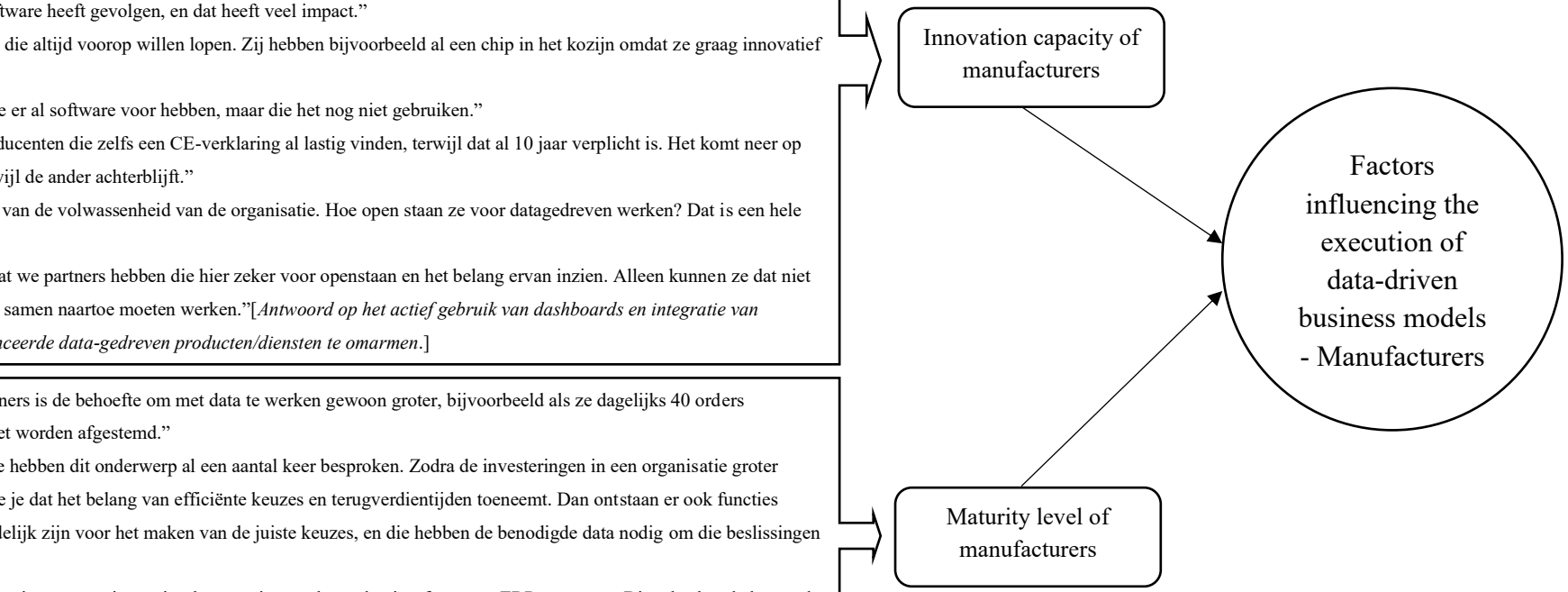
- [[OPS_PVC/ALU] “We gaan met hen testen, en als dat goed gaat, dan treedt onze kickback fee in werking. Aan de hand van de prestaties die ze leveren, gebaseerd op de data die wij verstrekken, kunnen ze zichzelf verbeteren. Ze kunnen in verschillende niveaus komen. In de basistrede krijgen ze altijd 2% van die ingehouden marge terug. Presteren ze goed, dan kunnen ze 3,5% van de marge terugkrijgen, waardoor ze slechts 0,5% betalen om via ons kozijnen te verkopen. Dus op basis van die data kunnen ze zichzelf verbeteren en indirect geld verdienen. En wij verdienen uiteindelijk meer, omdat die 0,5% over de totale omzet veel meer oplevert dan die 5.000 euro per profiel per jaar.”
- [OPS_PVC/ALU] “Ik denk dat de meest simpele vorm op dit moment inderdaad een subscription is. Een abonnementsvorm op basis van het aantal gebruikers, waarmee ze toegang krijgen tot dashboards…Ja, je hebt de basis, zoals het plaatsen van orders. Maar als je meer informatie wilt over je prestaties, dan zou je daar een abonnement op kunnen nemen. Dan verkopen wij die data aan jou in de vorm van een dashboard, waar je weer verdere inzichten uit kunt halen. Ik denk dat dat een hele goede manier is.”
- [OPS_PVC/ALU] “Nee, dan maken we onszelf helemaal gek.” [*Antwoord op de vraag op pay-per-use model geschikt is om te hanteren binnen de samenwerking platform & productiepartner.*]
- [OPS_MAN] “Wat we nu al doen is dat we onze partners laten betalen om aan ons platform gekoppeld te zijn. Dat is een vaste vergoeding, een soort fixed fee. Maar je zou ook kunnen zeggen: voor een extra vergoeding, een premium-abonnement, krijg je ook toegang tot alle data die we hebben. Dat zie ik zeker voor me.

- [OPS_WOOD] “Wij vragen al veel van onze producenten. We vragen hen bijvoorbeeld om capaciteit te reserveren waar we niet voor betalen. We vragen al om scherpe inkoopprijzen, om snelle levertijden, en om kozijnen op onze manier aan te leveren. En dan willen we ook nog laten zien hoe ze bij ons presteren en waar ze beter op kunnen worden, en daar moeten ze dan ook nog voor betalen? Dat zou een beetje misplaatst zijn.
- [OPS_PVC/ALU] “Producenten accepteren vaak dat ze 5.000 euro betalen voor een omzet van 7 miljoen, zonder daar verder bij stil te staan. Maar zodra wij zouden besluiten om daar bijvoorbeeld 7.500 of 10.000 euro voor te vragen, worden ze opeens kritisch.”
- [OPS_PVC/ALU] “Er ontbreekt een stukje bewustwording bij de kozijnproducenten.”
- [OPS_MAN] “Een van de barrières is dat we een gezamenlijke doelstelling hebben, namelijk dat we allemaal zo goed mogelijk presteren. Dan kunnen partners zeggen: "Waarom zou ik betalen voor iets waarvan jij ook profiteert, zoals het feit dat ik sneller of beter werk?" Het creëert een situatie waarin men zich afvraagt waarom ze voor iets zouden betalen als dat ook in jouw voordeel werkt. Dat kan een beetje een ongemakkelijke situatie zijn.”
- [OPS_MAN] “Daarnaast speelt de vraag hoe belangrijk ze die data vinden en wat ze ermee kunnen. Ze willen misschien weten hoe de data daadwerkelijk wordt toegepast. Hoe kan die data hen helpen om sneller of beter te werken? Het gaat erom dat ze niet alleen de data zien, maar ook begrijpen wat die data voor hen betekent. Bijvoorbeeld als een andere partner, zoals FEMA, een dag sneller werkt, dan is dat interessant, maar hoe pas je dat zelf toe? Die verdiepingsslag is ook van belang, om daadwerkelijk acties te kunnen gaan hangen aan de inzichten opgedaan uit data. ”



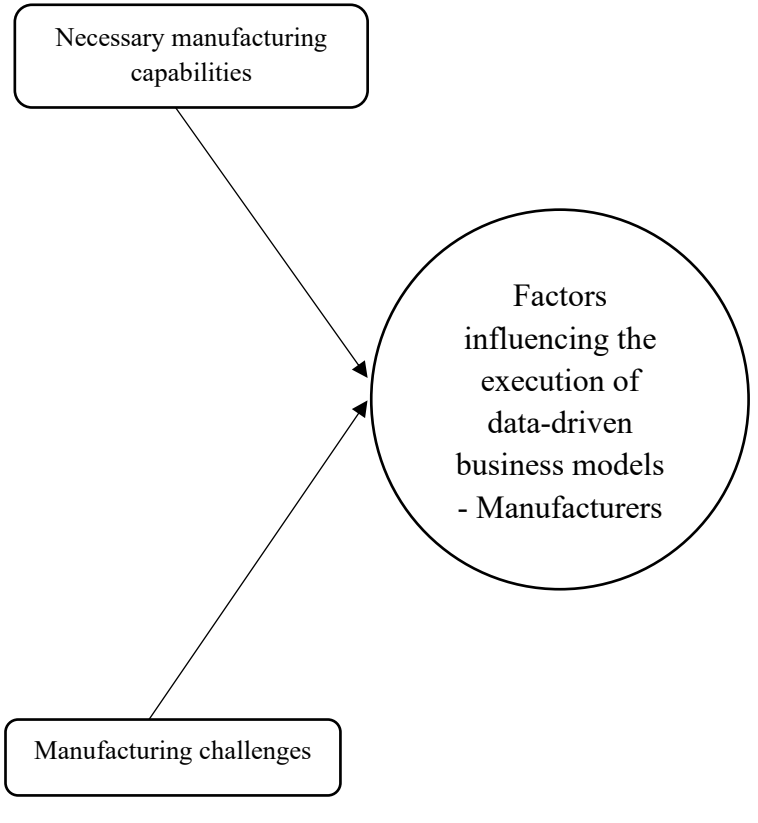
- [OPS_WOOD] “Ja, dat zijn vooral de fabrieken die al die XML-bestanden voor ons verwerken. Zij hebben al een integratie met een tekenpakket gemaakt, zodat ze die XML-bestanden kunnen verwerken. In sommige gevallen ontwikkelen ze zelf een oplossing om onze XML-bestanden om te zetten naar een leesbare versie voor hun eigen systeem. Dat zorgt ervoor dat de werkvoorbereiding minder dan de helft van de tijd kost in vergelijking met handmatige verwerking.”
- [OPS_WOOD] “Ja, dat zijn eigenlijk alle andere houtfabrieken, zoals *MNF_X*, *MNF_B* of *MNF_X.* Zij printen nog de pdf'jes uit en klokken de gegevens handmatig over.”
- [OPS_WOOD] “Ze moeten vaak hun hele proces omgooien, soms naar andere software. En hoe zit het dan met de aansturing van hun machines? Kan dat allemaal? Elke wijziging in software heeft gevolgen, en dat heeft veel impact.”
- [OPS_WOOD] “Ja, er zijn producenten die altijd voorop willen lopen. Zij hebben bijvoorbeeld al een chip in het kozijn omdat ze graag innovatief willen zijn. ”
- [OPS_WOOD] “Er zijn ook partners die er al software voor hebben, maar die het nog niet gebruiken.”
- [OPS_WOOD] “En dan heb je ook producenten die zelfs een CE-verklaring al lastig vinden, terwijl dat al 10 jaar verplicht is. Het komt neer op gradaties: de één wil voorop lopen, terwijl de ander achterblijft.”
- [OPS_PVC/ALU] “Dat hangt vooral af van de volwassenheid van de organisatie. Hoe open staan ze voor datagedreven werken? Dat is een hele belangrijke factor.”
- [OPS_PVC/ALU] “Maar ik denk wel dat we partners hebben die hier zeker voor openstaan en het belang ervan inzien. Alleen kunnen ze dat niet alleen bereiken. Dus dat is iets waar we samen naartoe moeten werken.”[*Antwoord op het actief gebruik van dashboards en integratie van geavanceerde technologieën om geavanceerde data-gedreven producten/diensten te omarmen*.]

- [OPS_PVC/ALU] “Voor sommige partners is de behoefte om met data te werken gewoon groter, bijvoorbeeld als ze dagelijks 40 orders verwerken en hun productie daarop moet worden afgestemd.”
- [OPS_MAN] “Ja, dat denk ik zeker. We hebben dit onderwerp al een aantal keer besproken. Zodra de investeringen in een organisatie groter worden en ze professioneler worden, zie je dat het belang van efficiënte keuzes en terugverdientijden toeneemt. Dan ontstaan er ook functies binnen die organisaties die verantwoordelijk zijn voor het maken van de juiste keuzes, en die hebben de benodigde data nodig om die beslissingen te kunnen nemen.”
- [OPS_MAN] “Ja, je ziet dat bedrijven beginnen met nieuwe implementaties, zoals productiesoftware en ERP-systemen. Dit zal zeker de komende jaren doorzetten. We moeten kijken naar welke softwarepakketten die partijen gebruiken en hoe wij eenvoudig kunnen integreren, zodat we de technologische last niet volledig bij hen leggen”

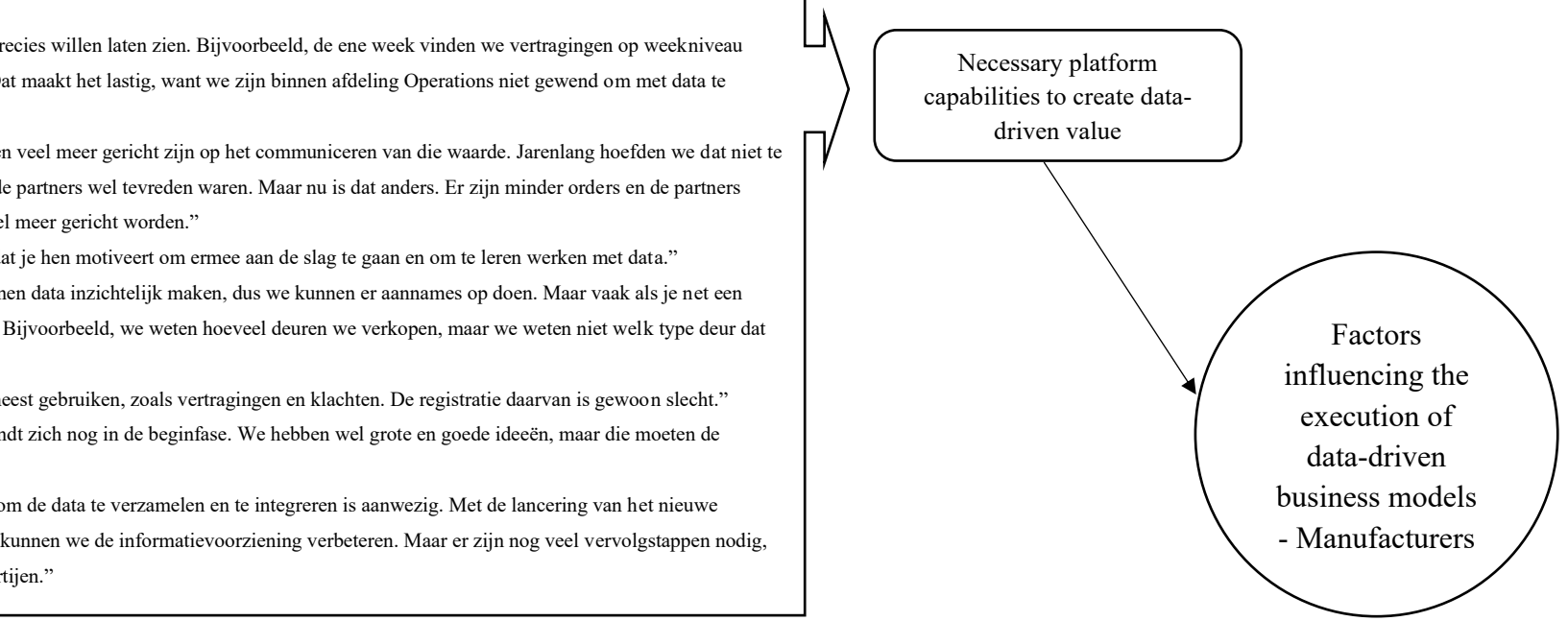


- [OPS_WOOD] “Ja, precies. Ze moeten er naar kijken en bedenken wat ze ermee kunnen doen. Gaan ze echt acties uitzetten op basis van onze dashboarding, of laten ze het gewoon een onderdeel zijn van hun algemene verbetercijfers, als ze die al hebben in de fabriek.” [*Antwoord op of acceptatievermogen van partners een rol speelt in het effectief uitrollen van data-gedreven initiatieven door platform aan partner.*]
- [OPS_PVC/ALU] “Fabrieken vinden het mooi om te zien [dashboards met informatie], maar de stap naar daadwerkelijk gebruik ervan vinden ze nog lastig.”
- [OPS_PVC/ALU] “Ze halen er zeker belangrijke inzichten uit, hoewel de ene partij daar meer mee doet dan de andere.”
- [OPS_PVC/ALU] “Je kunt hen natuurlijk niet dwingen om met die data te werken, maar als je voordelen tegenover die data zet, zullen ze wel moeten om zich te verbeteren. ”
- [OPS_PVC/ALU] “Op dit moment zijn ze daar nog niet toe in staat” [*Antwoord op de integratie van dashboards en het gebruik van geavanceerde technologieën door de productiepartner*]
- [OPS_MAN] “Nee, de grotere spelers zoals MNF_A hebben dat wel. Daar is iemand die alle dashboards maakt en actief bezig is met data. Maar bij een partij als MNF_X hebben ze hun werkvoorbereiding wel op orde, maar er is geen aandacht voor data-analyse. Wij moeten hen dan vaak vertellen wat ze ermee kunnen doen.”

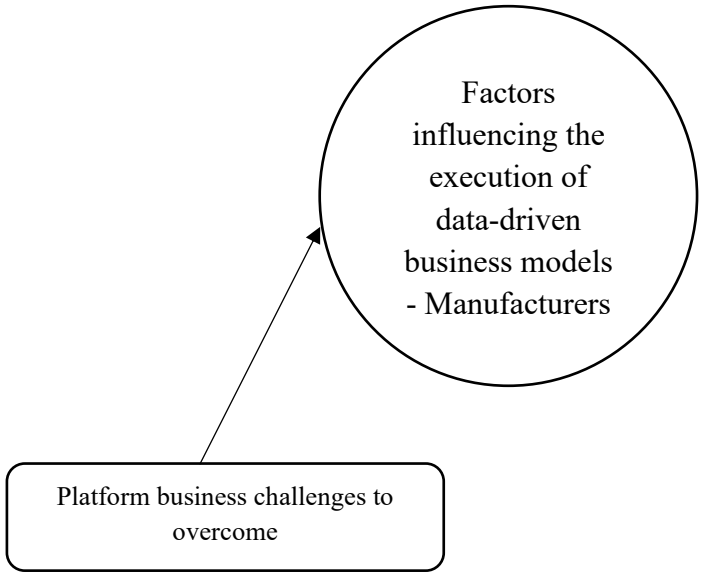
- [OPS_WOOD] “Dat hangt af van de werkvoorbereidingssoftware die de fabrieken gebruiken en hoe die kan aansluiten op API's. Daar zit ook weer verschil in hoe digitaal ze zijn. De ene fabriek kan bijvoorbeeld goed omgaan met XML-bestanden, terwijl de andere al zegt: "XML is niet de toekomst, je moet naar API's." Het gaat erom hoe je die koppelingen maakt. Ik denk dat veel bedrijven nog van software moeten wisselen om een API-integratie te kunnen realiseren.”
- [OPS_WOOD] “Het hangt af van hoe ver ze zijn en welke keuzes ze maken in de software die ze gebruiken.”
- [OPS_WOOD] “Als je je organisatie wilt verbeteren op basis van data, moet je daar ook periodiek iets mee doen en kunnen analyseren of een wijziging een verbetering oplevert of niet. Sommige organisaties zullen dat heel anders oppakken dan anderen. De één zal zeggen: "Oké, we doen het slecht, laten we proberen het te verbeteren. Maar vervolgens worden er geen acties uitgezet en gebeurt er niets.” Terwijl anderen wél serieus met het probleem aan de slag gaan. Kortom, het verschilt gewoon heel erg per partner.“
- [OPS_WOOD] “Ja, er zijn hele traditionele producenten die wel willen digitaliseren, maar nog niet kunnen of willen, omdat ze denken dat het voor hen nog niets toevoegt. Ze vinden hun aantallen bijvoorbeeld te klein om te automatiseren. Er zijn ook fabrieken die de toekomst van digitalisering niet zien. ”
- [OPS_PVC/ALU] “We zoeken daarom steeds meer samenwerking met leveranciers van tekenprogramma's en werkvoorbereidingsprogramma's om hen te helpen met digitalisering, want alleen lukt dat hen vaak niet.”
- [OPS_PVC/ALU] “De bereidheid om te digitaliseren. Dus je moet er wel voor openstaan en begrijpen wat we aan het doen zijn. Dat is niet altijd makkelijk, want ze zijn er niet aan gewend om hiermee te werken [met data].”
- [OPS_MAN] “Maar bij de meer traditionele partijen in ons landschap zal dit proces langer duren dan bij de vooruitstrevende partijen. Dus ja, de adoptie zal wat meer tijd vergen bij sommige partners.”



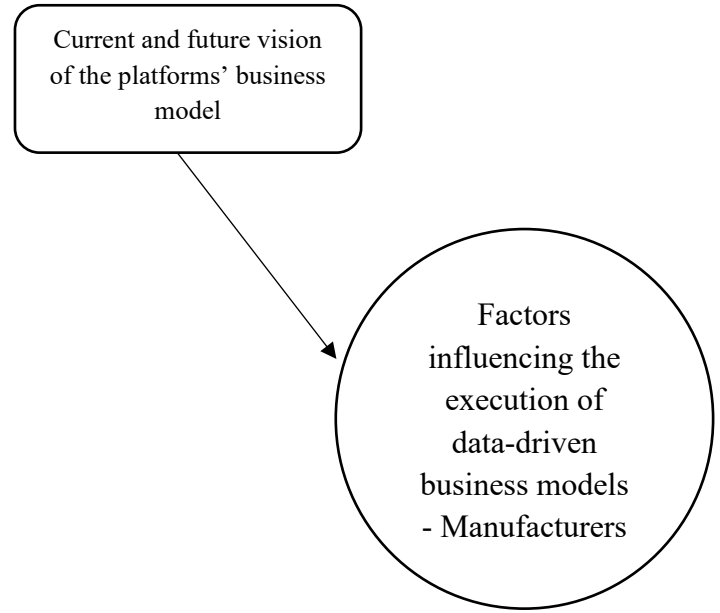
- [OPS_WOOD] “Dat soort inzichten weten we wel, en af en toe als we in gesprek zijn, kunnen we dat uitzoeken en terugkoppelen. Maar het zit nog niet in ons systeem dat we dat volledig en automatisch doen. We hebben het nog niet volledig inzichtelijk.”
- [OPS_WOOD] “Ja, ik denk dat wij heel veel data hebben, maar die nog niet altijd goed kunnen ontsluiten.. We hebben ook niet altijd alles al in data beschikbaar.”
- [OPS_WOOD] “Ja, hoe interpreteer je data? Wat gebeurt er bijvoorbeeld als een order een klacht heeft? Die klacht komt bij de fabriek die het kozijn heeft gemaakt, maar betekent dat ook dat de fabriek de klacht heeft veroorzaakt? Of is het door verkeerde montage door de klant, of is er iets gebeurd tijdens het transport? …Dus hoe je interpreteert wat je ziet, is heel belangrijk.”
- [OPS_WOOD] “De data die wij aanbieden moet zo zijn vormgegeven dat er eigenlijk geen grijs gebied is in de interpretatie. Het moet heel duidelijk zijn wat de getallen betekenen en hoe ze zijn berekend. Er moet ook uitleg achter zitten, zodat iedereen begrijpt wat we bedoelen.”
- [OPS_PVC/ALU] “Maar vaak komen we erachter dat we niet precies weten wat we ermee willen. We bekijken de dashboards en bedenken dan terplekke: "Maar eigenlijk zou het ook interessant zijn als we dit of dat kunnen zien." De week erna passen we het aan, en dan willen we weer iets anders zien. We zijn nog niet heel goed in het bepalen wat we precies met de data willen doen of hoe we het op de juiste manier willen laten zien.”
- [OPS_PVC/ALU] “Ja, we moeten weten wat we precies willen laten zien. Bijvoorbeeld, de ene week vinden we vertragingen op weekniveau belangrijk, en een andere week weer iets anders. Dat maakt het lastig, want we zijn binnen afdeling Operations niet gewend om met data te werken.”
- [OPS_PVC/ALU] “We moeten commercieel gezien veel meer gericht zijn op het communiceren van die waarde. Jarenlang hoefden we dat niet te doen, omdat de orders vanzelf binnenkwamen en de partners wel tevreden waren. Maar nu is dat anders. Er zijn minder orders en de partners verwachten meer. Dus we kunnen ook commercieel meer gericht worden.”
- [OPS_PVC/ALU] “. Uiteindelijk draait het erom dat je hen motiveert om ermee aan de slag te gaan en om te leren werken met data.”
- [OPS_PVC/ALU] “Wij hebben de data en we kunnen data inzichtelijk maken, dus we kunnen er aannames op doen. Maar vaak als je net een stapje verder wilt gaan, dan missen we informatie. Bijvoorbeeld, we weten hoeveel deuren we verkopen, maar we weten niet welk type deur dat is. Dat ontbreekt.”
- [OPS_PVC/ALU] “Kijk naar de data die wij het meest gebruiken, zoals vertragingen en klachten. De registratie daarvan is gewoon slecht.”
- [OPS_MAN] “Het niveau van data-integratie bevindt zich nog in de beginfase. We hebben wel grote en goede ideeën, maar die moeten de komende jaren nog worden uitgevoerd.”
- [OPS_MAN] “Ja, de basis voor die infrastructuur om de data te verzamelen en te integreren is aanwezig. Met de lancering van het nieuwe platform hebben we al beter inzicht in de keten en kunnen we de informatievoorziening verbeteren. Maar er zijn nog veel vervolgstappen nodig, vooral op het gebied van integratie met externe partijen.”



- [OPS_WOOD] “Die data is wel inzichtelijk en eruit te halen uit de bronnen die nu beschikbaar zijn, maar het is nog niet betrouwbaar genoeg om actief in te zetten in de samenwerking.”
- [OPS_WOOD] “Ja, ik denk dat wij heel veel data hebben, maar die nog niet altijd goed kunnen ontsluiten.. We hebben ook niet altijd alles al in data beschikbaar. Dus ja, we hebben best veel, maar niet het niveau dat we willen hebben. Dat is wel een obstakel voor de toekomst, voor wat wij kunnen aanbieden aan onze partners.”
- [OPS_WOOD] “. Hoeveel kozijnen met triple glas en hoeveel met dubbel glas verkopen we op dit moment? Die data komt gewoon niet uit het systeem. Dat is waardevolle informatie om je product op af te stemmen, je voorraden te beheren of om richting de glasleverancier te kunnen zeggen: "Dit is ongeveer wat je kunt verwachten qua productie in de komende periode.“
- [OPS_PVC/ALU] “Bij Toelevering Online vinden wij data heel belangrijk. Maar dat geldt niet voor al onze partners; de belangen zijn niet altijd hetzelfde. Als wij echter willen dat onze partners ermee gaan werken, moeten we de data zo presenteren dat ze het ook daadwerkelijk willen gebruiken.”
- [OPS_PVC/ALU] “Op het moment dat ze weten wat je ermee kunt doen, zijn ze zeker geneigd om de meerwaarde van onze data te benutten. Dat is eigenlijk niet anders. De uitdaging is: hoe laat je de partnerkant zien wat de meerwaarde is van het gebruik van data? Wat hebben wij ze te bieden?”
- [OPS_PVC/ALU] “Als we hen bewust maken van wat ze van ons krijgen en wat het kan opleveren, dan denk ik dat we die barrière kunnen overwinnen. *[Antwoord of het aan een stukje bewustwording ontbreekt bij de kozijnpartners?*]
- [OPS_PVC/ALU] “Nou ja, de grootste uitdaging is de betrouwbaarheid van de data. De datakwaliteit is momenteel teleurstellend. Dat is het grootste probleem…De datakwaliteit moet echt op orde zijn voordat we verdere stappen kunnen zetten in de datatransitie.”
- [OPS_PVC/ALU] “Nou ja, de AVG is denk ik niet het probleem, want dat hebben we denk ik over twee, drie jaar wel goed geregeld. Maar meer de vraag: wij stellen data beschikbaar, hoe zorgen we ervoor dat een partner daar niet misbruik van maakt? Dat ze bijvoorbeeld onze data gebruiken om ergens anders aan de slag te gaan. Dat ze bijvoorbeeld zien welke aantallen we doen, welke kleuren populair zijn, en dan met die informatie naar een concurrent stappen.”
- [OPS_PVC/ALU] “Ja, veel draait nu nog om blind vertrouwen. Maar we zijn onlangs benaderd door een bedrijf, hartstikke leuk, maar ze wilden meteen weten wat voor aantallen we doen. Dat wil je in zo’n vroeg stadium nog niet met elkaar delen. Eerst moet er een vertrouwensrelatie opgebouwd worden.”
- [OPS_MAN] “Ik denk dat wanneer we nieuwe producten of diensten ontwikkelen op ons platform, we goed moeten nadenken over de waarde van de data. Welke data hebben we nodig, en wat kan die data in de toekomst opleveren? Wat ik nu zie, is dat op het platform veel is ontwikkeld, maar nooit met de gedacht van; laten we het nou zo ontwikkelen dat we inzichten hebben. Dit is geen beperking, maar meer een constatering dat we nu, bij verdere doorontwikkeling, meer aandacht moeten besteden aan dat aspect, omdat dat ons later verder kan helpen bij het verkopen of beheren van de diensten.”



- [OPS_WOOD] “In de toekomst willen we dat laatste type zijn [industrial digital platform ecosystem], ja. Ik denk dat we nu een industrial product service platform zijn, waarbij we binnen de keten een klein beetje gebruikmaken van de data die we hebben en proberen die toe te passen. We proberen onze partners daarbij te helpen, maar we hebben het nog niet volledig goed en gedigitaliseerd.’
- [OPS_WOOD] “Ik denk dat we nog niet echt een grote betrokkenheid hebben met onze data binnen het ecosysteem waarin we opereren. Maar dat is wel de bedoeling voor de toekomst, zeker.”
- [OPS_PVC/ALU] “Als je kijkt hoe lang we hier nu met data werken, dan kun je niet anders zeggen dan dat we nog maar in de eerste fase zitten [industrial product efficiency].”
- [OPS_PVC/ALU] “We zijn vooral gefocust op het monitoren van productieprocessen. Veel verder dan het monitoren van vertragingen en klachten komen we op dit moment niet. We leveren geen kant-en-klare data waar fabrieken echt mee kunnen werken. We delen af en toe een Excel-exportje, maar daar blijft het bij. Het spannendste wat we ooit hebben gedaan op het gebied van het delen van data, is het laten aanleggen van een voorraad kleuren bij kunststofproducenten. Zij houden op basis van onze verkochte aantallen dezelfde kleuren op voorraad. Maar echt verder dan dat zijn we nog nooit gekomen.”
- [OPS_PVC/ALU] “Onze core business is natuurlijk het verkopen van kozijnen, waarbij het produceren daarvan gebeurd via onze partners. Maar er zijn op dit moment zoveel andere processen of modellen waar we mee aan de slag kunnen. We hebben nu al inkomstenstromen uit bonussen en jaarlijkse fees. Als we onze data goed kunnen inzetten, kunnen we daar ook geld mee gaan verdienen.”
- [OPS_MAN] “Als je kijkt naar onze huidige keten en de integratie vanuit Toelevering Online, dan zorgen we er eigenlijk alleen voor dat de orderdata van de klant zo snel mogelijk bij een partner terechtkomt, zodat ze kunnen produceren en leveren. Daarmee stopt het proces.”
- [OPS_MAN] ‘Ik denk dat we heel veel kunnen bereiken als we alles goed inrichten. Dan kun je zeker de stap maken naar een transactioneel platform”
- [OPS_MAN] “Het betekent ook dat als wij intern een team hebben dat koppelingen ontwikkelt met productiesoftware, daar een apart verdienmodel op komt. We zouden die integraties dan kunnen verkopen, bijvoorbeeld via een licentiemodel…Ja, naarmate we verder groeien en ontwikkelen, kunnen we dat soort modellen in de keten toepassen.”
- [OPS_MAN] “Ja, ik denk dat we ons uiteindelijk naar een ecosysteem zullen bewegen. We moeten zorgen voor een digitaal geïntegreerde keten, waarin we met onze data-gedreven oplossingen iedereen kunnen aansturen. Zo weten we waar de knelpunten zitten en kunnen we die inzichten doorgeven aan de relevante partijen. Dat kan leiden tot efficiëntere processen, hogere verkoopcijfers, of lagere prijzen. En of je dit gaat ‘verkopen’ dat ga je te zijne tijd wel ondervinden en zal ook afhangen van waar de meeste waarde wordt gevonden.”



Appendix N: Data Structure Data & Analytics department

First-Order Concepts	Second-Order Themes	Aggregated Dimensions
▪ [CDO] “De data die wij hebben, kunnen we opdelen in een aantal blokken. We hebben alle data die te maken heeft met wat we verkopen: klantdata, dus alles wat op ons platform besteld wordt, en eigenlijk alles wat salesgerelateerd is. Producten, orders, dat soort dingen. Dan hebben we een blok Marketing, waaronder ik online marketing schaar. Denk aan Google Analytics, e-mailmarketing, ons CRM-systeem, en ons CDP-systeem. Dit omvat alle marketing- en klantinteracties, zoals welk contact we met een klant hebben gehad en op welk moment in hun customer journey.” ▪ [CDO] “Daarnaast hebben we een financieel domein, en daarbinnen ook HR-data. HR is nog onderontwikkeld, maar op het financiële vlak hebben we al veel data. Verder hebben we operationele data, zoals gegevens van onze fabrieken. Ook de klantenservice valt hier onder, wat eigenlijk bij sales en after service hoort.” ▪ [CDO] “Wat betreft de fabrieken, weten we bijvoorbeeld hoeveel capaciteit een fabriek op een bepaald moment heeft, welke vertragingen zijn gemeld en welke orders naar welke fabriek gaan. We hebben geen data over wat er binnen de fabriek zelf gebeurt, omdat het onafhankelijke fabrieken zijn en we geen actieve data-uitwisseling met hen hebben” ▪ [CDO] “We maken gebruik van verschillende systemen. We hebben onder andere een Google Cloud-omgeving waar een deel van onze data naartoe wordt gestuurd. Daarnaast gebruiken we Matillion om de data uit de systemen te halen en te verplaatsen naar onze Snowflake-omgeving, die ons dataplatform vormt. Dit is het hart van onze data-strategie. Vanuit Snowflake kunnen we allerlei slimme dingen doen, zoals data naar andere systemen of rapportage-omgevingen sturen. Snowflake en Matillion zijn dus de kern van onze data-infrastructuur.” ▪ [DATA ANALYST] “Klantdata halen we zelf binnen; dat moeten mensen zelf invullen. KvK-data halen we er extra bij, via een API. Salesdata komt ook uit ons eigen platform.” ▪ [DATA ANALYST] “Machine data, zoals wat de machines bij een producent doen, hebben we niet. Dat soort data verzamelen we niet.” ▪ [DATA ANALYST] “We gebruiken APIs, en alles wordt dan in Matillion gezet. Daar doet *[data engineer]* zijn 'magic', en dan komt het in Snowflake.”	Process of data-acquisition by platform business	Platforms Big Data Value Chain
▪ [CDO] “We zijn momenteel bezig met het opzetten van een data-quality-framework. Dit houdt in dat we controleren welke data we binnenkrijgen en of deze voldoet aan onze verwachtingen.” ▪ [CDO] “Het uiteindelijke doel is dat in 2027 95% van de data betrouwbaar is, zodat we ervoor kunnen zorgen dat al onze beslissingen volledig data-gedreven genomen kunnen worden. Dus de kernvragen zijn: hoe zorgen we ervoor dat de data goed binnenkomt en hoe zorgen we ervoor dat deze goed door het proces heen loopt? Voor de eerste vraag hebben we een data-quality-framework en voor de tweede zijn we nog aan het onderzoeken hoe we data-lineage het beste kunnen implementeren en gebruiken.” ▪ [CDO] “Data-lineage betekent dat je de herkomst en het verloop van de data kunt traceren. Stel, je hebt een order en je filtert daar klantgegevens bij. Je begint met een order met één productregel en aan het einde heb je een order met twee productregels. Dan wil je weten: hoe kan dat? Waar is die extra productregel bijgekomen? ▪ Om dat goed te onderzoeken, kijk je naar de data-lineage. Daarmee kun je nagaan of bijvoorbeeld een product twee keer in ons systeem is opgenomen, waardoor data verdubbeld wordt.	Process of data pre-processing by platform business	

- [CDO] “Ja, dat zit allemaal in Snowflake” [*Antwoord op de vraag waar de data gefilterd wordt.*]
- [DATA ANALYST] “In Matillion wordt alle data verzameld, gegroepeerd en gestructureerd. Er wordt ook bepaald welke data we wel en niet behouden.”

- [CDO] “In principe staat alles in Snowflake. De data is decentraal opgeslagen in verschillende systemen, zoals ons commerce-systeem en Analytics. We verzamelen al die data en plaatsen het vervolgens in Snowflake, wat voor ons de 'single source of truth' is. Soms hebben we nog te maken met Excel-bestanden, maar dat zijn tijdelijke oplossingen omdat we bepaalde data nog niet netjes in onze systemen kunnen verwerken. Idealiter zou dat echter niet nodig moeten zijn.”
- [DATA ANALYST] “Vervolgens wordt alles naar Snowflake geschreven, een cloud-based datawarehouse, waar alle data blijft staan en samenkomt. ”

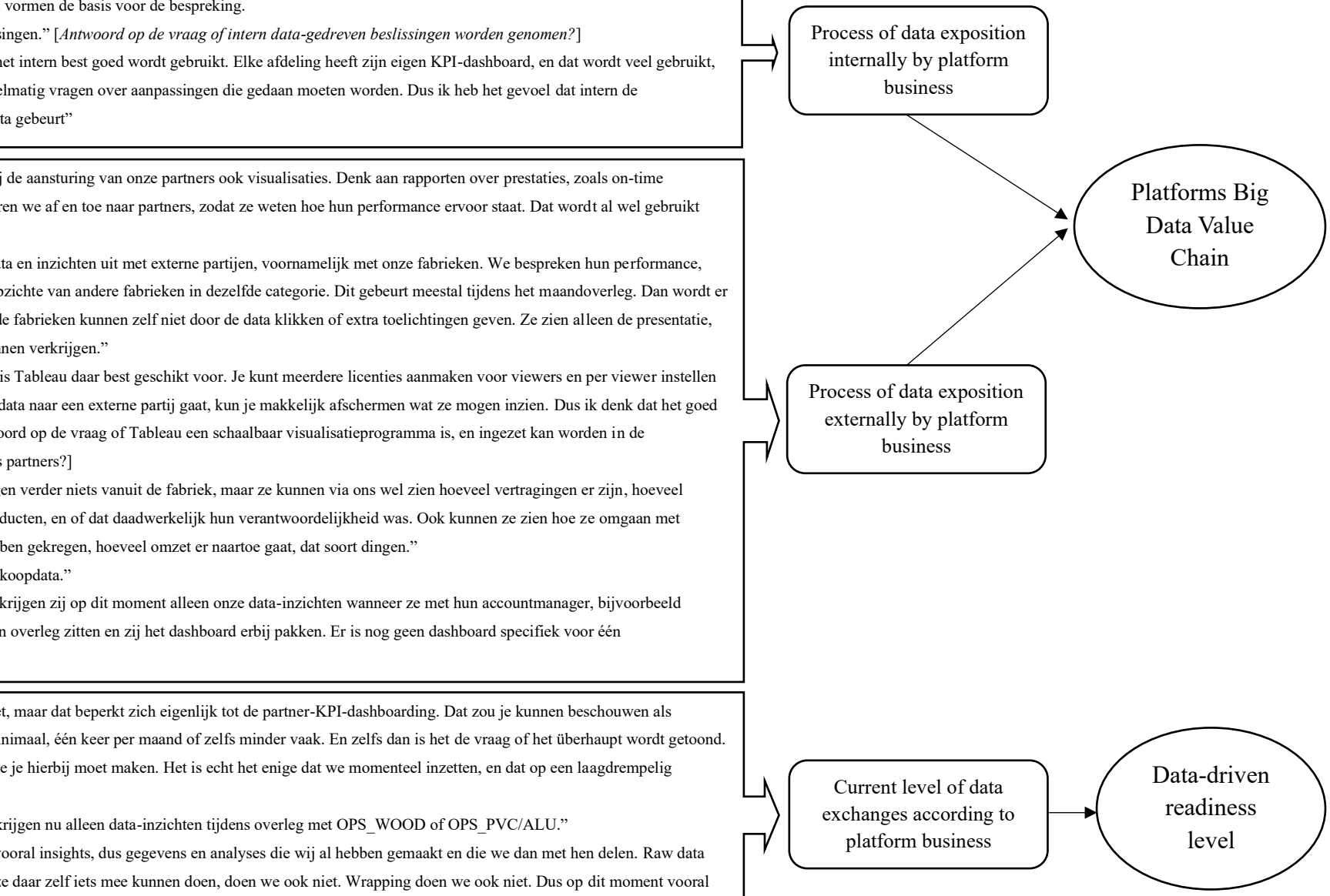
- [CDO] “Ik heb het liefst zo min mogelijk Excel, omdat je daar geen goede governance of controle over hebt. Je weet niet precies wat er met die data gebeurt, en vanuit het oogpunt van data security is dat erg belangrijk.”
- [CDO] “We gebruiken Tableau als onze rapportageomgeving. Dat is voor ons de simpelste en meest schaalbare oplossing.”
- [CDO] “Voorlopig zijn de analyses vooral descriptief. We kijken terug naar wat er is gebeurd en waarom het is gebeurd. We zitten nog niet op het niveau waarin we voorspellingen kunnen doen.”
- [DATA ANALYST] “Tot nu toe vooral statistische analyses. We doen nog niet veel met AI. Maar toevallig ga ik vanmiddag met Tableau Pulse aan de slag. Daar kun je vragen stellen, en die zoekt dan binnen onze data naar het antwoord”
- [DATA ANALYST] “De inzichten die we nu hebben, maken we echter allemaal zelf.”
- [DATA ANALYST] “Niet echt heel voorspellend. Vooral omdat de voorspellende functies in Tableau niet heel sterk zijn; die geven vaak een te brede marge. Daar is dus nog ruimte voor verbetering.” [*Antwoord op de vraag of er ook voorspellende analyses op basis van data gedaan worden?*]
- [DATA ANALYST] “” Ja, we krijgen antwoorden op vraagstukken.” [*Antwoord op de vraag of er voornamelijk beschrijvende analyses op basis van data gedaan worden?*]

- [CDO] “We gebruiken Tableau als onze rapportageomgeving. Dat is voor ons de simpelste en meest schaalbare oplossing.”
- [CDO] “Voor de anderen presenteren we de geanalyseerde data vaak al op een eenvoudige manier, zodat zij snel en gemakkelijk conclusies kunnen trekken.”
- [CDO] “Nee, dat doe ik bewust niet. Elke extra tool die je introduceert, moet weer worden beheerd en gecontroleerd.” [*Antwoord of naast Tableau nog andere visualisatietools gehanteerd worden?*]
- [DATA ANALYST] “Nee, we gebruiken voornamelijk Tableau.”
- [DATA ANALYST] “Elke afdeling heeft minimaal één iemand die ook enigszins bedreven is in Tableau, zodat die persoon zelf snelle, eenvoudige inzichten kan genereren en visualisaties kan maken”

- [CDO] “Volgende week zitten we samen [met het Management Team] en we gebruiken visualisaties om data weer te geven over onder andere klanten en KPI’s. Deze visualisaties vormen de basis voor de bespreking.
- [CDO] “Ja, zo’n 70% van de beslissingen.” [*Antwoord op de vraag of intern data-gedreven beslissingen worden genomen?*]
- [DATA ANALYST] “Ik denk dat het intern best goed wordt gebruikt. Elke afdeling heeft zijn eigen KPI-dashboard, en dat wordt veel gebruikt, heb ik het idee. We krijgen ook regelmatig vragen over aanpassingen die gedaan moeten worden. Dus ik heb het gevoel dat intern de besluitvorming veel op basis van data gebeurt”

- [CDO] “Daarnaast gebruiken we bij de aansturing van onze partners ook visualisaties. Denk aan rapporten over prestaties, zoals on-time leveringen. Dit soort informatie sturen we af en toe naar partners, zodat ze weten hoe hun performance ervoor staat. Dat wordt al wel gebruikt voor wat aansturing.”
- [CDO] “Momenteel wisselen we data en inzichten uit met externe partijen, voornamelijk met onze fabrieken. We bespreken hun performance, bijvoorbeeld hoe ze presteren ten opzichte van andere fabrieken in dezelfde categorie. Dit gebeurt meestal tijdens het maandoverleg. Dan wordt er een overzicht gepresenteerd, maar de fabrieken kunnen zelf niet door de data klikken of extra toelichtingen geven. Ze zien alleen de presentatie, zonder zelf verdere inzichten te kunnen verkrijgen.”
- [DATA ANALYST] “Volgens mij is Tableau daar best geschikt voor. Je kunt meerdere licenties aanmaken voor viewers en per viewer instellen wat ze wel of niet mogen zien. Als data naar een externe partij gaat, kun je makkelijk afschermen wat ze mogen inzien. Dus ik denk dat het goed werkt voor schaalbaarheid.” [Antwoord op de vraag of Tableau een schaalbaar visualisatieprogramma is, en ingezet kan worden in de samenwerking met externe business partners?]
- [DATA ANALYST] “Nee, zij krijgen verder niets vanuit de fabriek, maar ze kunnen via ons wel zien hoeveel vertragingen er zijn, hoeveel klachten er zijn geweest op hun producten, en of dat daadwerkelijk hun verantwoordelijkheid was. Ook kunnen ze zien hoe ze omgaan met vertragingen, hoeveel orders ze hebben gekregen, hoeveel omzet er naartoe gaat, dat soort dingen.”
- [DATA ANALYST] “Allemaal verkoopdata.”
- [DATA ANALYST] “Volgens mij krijgen zij op dit moment alleen onze data-inzichten wanneer ze met hun accountmanager, bijvoorbeeld OPS_WOOD of OPS_PVC/ALU, in overleg zitten en zij het dashboard erbij pakken. Er is nog geen dashboard specifiek voor één productiepartner”

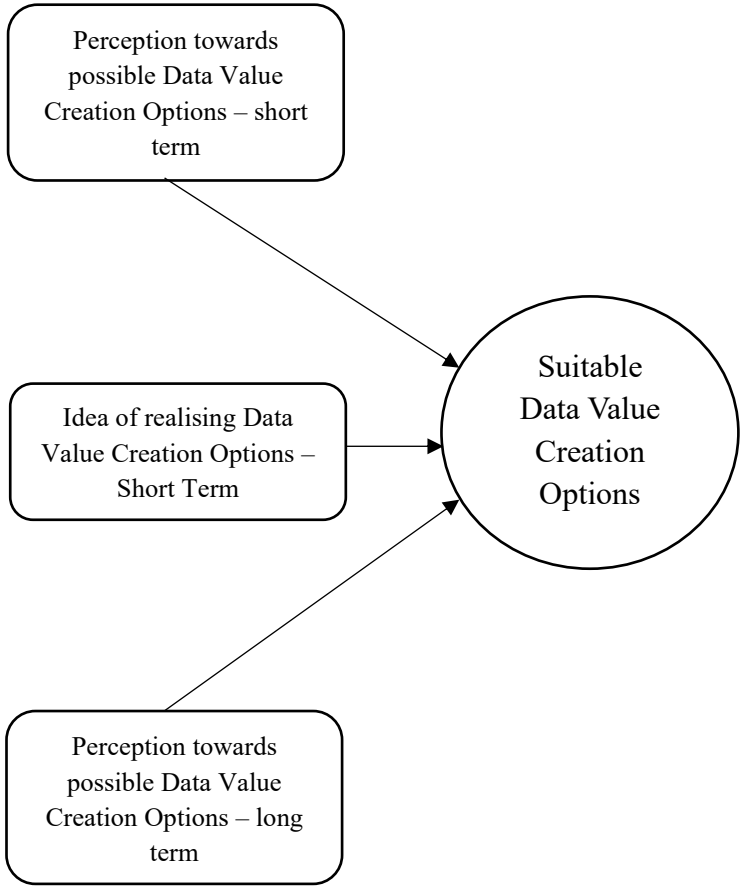
- [CDO] “Ja, er wordt wel iets ingezet, maar dat beperkt zich eigenlijk tot de partner-KPI-dashboarding. Dat zou je kunnen beschouwen als "insights.“ Maar dit gebeurt echt minimaal, één keer per maand of zelfs minder vaak. En zelfs dan is het de vraag of het überhaupt wordt getoond. Dat is een van de kanttekeningen die je hierbij moet maken. Het is echt het enige dat we momenteel inzetten, en dat op een laagdrempelig niveau.”
- [DATA ANALYST] “De partners krijgen nu alleen data-inzichten tijdens overleg met OPS_WOOD of OPS_PVC/ALU.”
- [DATA ANALYST] “In dit geval vooral insights, dus gegevens en analyses die wij al hebben gemaakt en die we dan met hen delen. Raw data delen we niet, prepared data zodat ze daar zelf iets mee kunnen doen, doen we ook niet. Wrapping doen we ook niet. Dus op dit moment vooral insights.”



- [CDO] “Op korte termijn zou ik zeggen dat we moeten zorgen dat we die insights breder en structureler gaan delen. Het gevoel dat ik krijg van samenwerking is dat het beter werkt als beide partijen dezelfde kennis hebben en dezelfde dingen van elkaar weten.”
- [CDO] “Live performance monitoring lijkt mij daarbij erg belangrijk, en ik denk dat we ons daar op korte termijn op moeten richten”
- [DATA ANALYST] “Ze willen wel dat leveranciers in de toekomst in het partnerdashboard zelf realtime kunnen zien hoeveel orders we hebben gehad, hoeveel daarvan vertraagd zijn, hoeveel omzet erachter hangt, hoeveel klachten er zijn binnengekomen, en of die klachten te maken hebben met kwaliteit, fouten in de fabriek, verkeerde kleur, verkeerde afmetingen, dat soort dingen. Dat is iets waar ze naartoe willen, maar op dit moment gebeurt dat nog niet”
- [DATA ANALYST] “Ja, ook omdat de kozijnmarkt niet supermodern is en redelijk traditioneel. Ze hebben daar niemand zitten die iets kan met ruwe data. Ze zouden dat intern ook nog moeten aanpassen.”
- [DATA ANALYST] “Ja, zodat ze er zelf zo min mogelijk mee hoeven te doen.” [*Antwoord op de vraag of er vanuit de kozijnpartner meer behoefte zou zijn voor het ontvangen geprepareerde inzichten, omdat het aan de kennis en kunde bij de ontvangende partij ontbreekt.*”

- [CDO] “Laten we beginnen met het beschikbaar maken van het dashboard dat we nu al hebben voor onze partners. We sturen daar nu nog te weinig op. Maar zodra we dat wel gaan doen en de partners bijvoorbeeld gaan afrekenen op hun prestaties—zoals hoeveel ze op tijd leveren, hoe vaak ze het in één keer goed doen (first time right), hoeveel klachten ze krijgen en hoe snel ze daarop reageren—dan gaan ze vanzelf beter presteren.”
- [CDO] “Het basisdashboard hebben we al. Het gaat alleen om het live zetten van nieuwe functies, nieuwe omgevingen inrichten en de juiste mensen toegang geven. In mijn ogen is dat een klus die maar een paar dagen zou moeten duren.”

- [CDO] “Dan moet ik me even in de positie van de kozijnproducenten verplaatsen…Ik denk dat Toelevering Online, doordat we met zoveel fabrieken samenwerken, analyses kan bieden die voor meerdere fabrieken nuttig zijn. Als iets relevant is voor fabriek A, is het waarschijnlijk ook relevant voor fabrieken B, C, D, enzovoorts.”
- [CDO] “Een vorm van rolling forecasting en sales forecasting. We hebben inmiddels behoorlijk wat data verzameld die hierbij kan helpen, en dat kan heel waardevol zijn voor de fabrieken. Op die manier kom je steeds meer richting voorspellende analyses en geavanceerde inzichten”
- [CDO] “Maar als je bijvoorbeeld zo’n oplossing beschikbaar stelt voor één fabriek en daar een model voor bouwt, kun je daarna laten zien wat het hen oplevert. Stel, je kunt aantonen dat de uptime met 50% verhoogd is dankzij een predictive maintenance-oplossing. Dat zou bij de fabrieken waarmee wij werken een enorme impact kunnen hebben.” [*Perform Action – predictive maintenance*]
- [DATA ANALYST] “Ik denk dat je dan te diep gaat. Dit soort informatie zou waarschijnlijk meer naar een profielhuis moeten gaan. Ik denk niet dat een producent daar direct iets aan heeft.”[*Antwoord op de vraag of spin-offs geallieerd aan ‘perform action’ (chips) op de lange termijn in de samenwerking met kozijnproducenten waardevol kan zijn.*]



- [CDO] “Uiteindelijk draait alles om de vraag of een producent er waarde uit haalt. Als de analyses die wij aanbieden ervoor zorgen dat een producent meer kan produceren of een hogere uptime heeft, dan heeft hij in principe lagere kosten voor dezelfde productietijd. Je hebt dus dezelfde kosten, maar meer productietijd, waardoor de kosten per productie-uur omlaag gaan. Dat betekent dat het ze technisch gezien geld oplevert. Dus de waarde die uit de data komt, moet echt leiden tot verbeteringen die financieel gunstig zijn voor de producent.”
- [DATA ANALYST] “Ik denk productverbetering en kwaliteitsverbetering. Als je bijvoorbeeld kijkt naar de klachten die we binnenkrijgen, die gaan over hun product. Dat kan heel waardevol zijn. Misschien ook wel klantdata: welke mensen, wat voor soort mensen, welke buurt bestelt welke soort kozijnen? Kunnen ze ergens standaardiseren, het proces sneller maken?”
- [DATA ANALYST] “Productspecificaties, denk ik. En ook wel inzichten in hoe ze het doen qua vertragingen, en waar dat dan vaak aan ligt. Dus als je de oorzaak van een vertraging weet, is het ook makkelijker om dat op te lossen of terug te dringen.” [*Antwoord op de vraag welke informatie potentieel waarde levert voor de kozijnpartner.*]

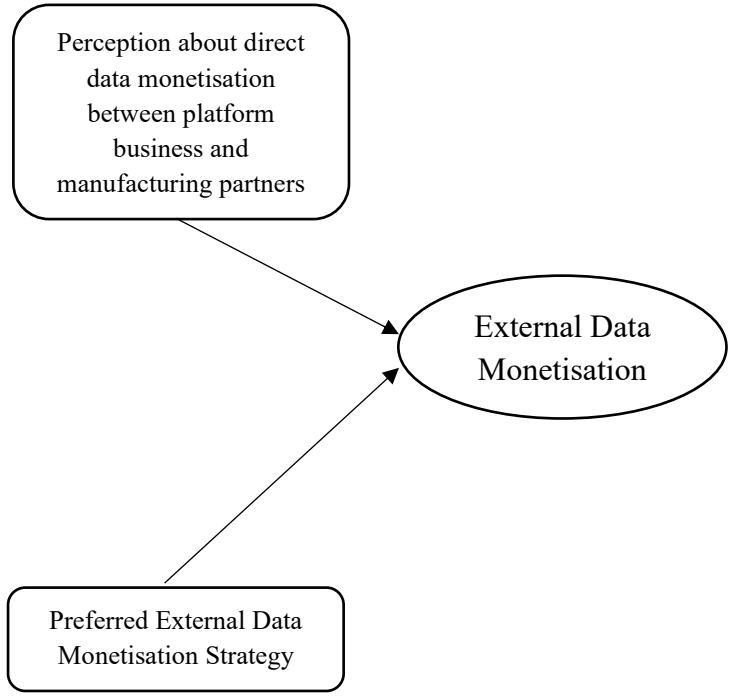
The purpose of Data Value Creation Options → Suitable Data Value Creation Options

- [CDO] “. Ik geloof zelf niet in het ruilen van data.[Data Bartering]. Ten eerste brengt het een veiligheidsrisico met zich mee op het gebied van security. Ten tweede moet de fabriek de capaciteiten hebben om iets met die data te doen, en ik denk dat veel fabrieken daar te traditioneel voor zijn. Ze hebben niet de benodigde capaciteiten. Ten derde verlies je meteen je onderhandelingspositie als ze de data al hebben. Ze kunnen er zelf iets mee doen, terwijl je liever die waarde zelf in handen houdt, zodat ze bij jou blijven terugkomen voor nieuwe inzichten.
- [CDO] “Via data wrapping weten ze precies hoe goed ze presteren, of ze beter of slechter presteren dan anderen. Stel dat een fabriek nu kozijnen maakt tot 3,5 meter, maar met hun apparatuur kozijnen van 4 meter zou kunnen produceren, dan zouden we hun kunnen laten zien dat ze daarmee een extra marktpotentieel van miljoenen kunnen aanboren.”
- [CDO] “Ja, precies. Ik geloof dat een goede relatie moet gebaseerd zijn op wederzijds begrip van prestaties.” [*Antwoord op de vraag of het platform meer waarde kan bieden door analyses zelf uit te voeren en eigenaar te blijven van de gegevens, en er geen direct prijskaartje eraan te hangen (aan de geleverde diensten).*]
- [DATA ANALYST] “Dan zit je puur op productdata, zoals wat er verkocht wordt, zodat ze eventuele trends beter kunnen inschatten. Dat zou kunnen. Maar dan geven wij hun eigenlijk meer een inzicht in plaats van iets te ruilen [Data Bartering]”
- [DATA ANALYST] “Ja, dat zou een extra dienst kunnen zijn. Misschien kunnen ze dan zien hoe laat een levering komt, maar ik weet niet of daar behoefte aan is.” [*Antwoord op de vraag of een track-and trace functie, als voorbeeld van een uitwerking van data wrapping relevant kan zijn?*]
- [DATA ANALYST] “Misschien kan dat wel. Bijvoorbeeld het aantal dorpels van een bepaald type, het aantal vierkante meters glas, dat soort dingen, dat we dat alvast voor hen sorteren. In theorie hebben wij die data al, die zit in de bestelling. Als we dat verder ontwikkelen, zouden we in theorie een hele bestelling voor hen bij *leverancier van hang-en sluitwerk* kant-en-klaar kunnen doorsturen. Dat zou hen tijd schelen en het proces makkelijker maken…het ontlast ze en maakt hun werk makkelijker.”

Perception about indirect data monetisation between platform business and manufacturing partners → External Data Monetisation

- [CDO] “Dat zou selling analyses zijn.” [*Antwoord op de vraag welke direct data monetisation type het beste aansluit in de samenwerking platform & productiepartner.*]
- [CDO] “Het verkopen van data, net als het delen ervan [Selling Data], heeft geen zin als de fabriek er niets mee kan. Ze zullen nooit bereid zijn om ervoor te betalen als ze er niets uit kunnen halen.”
- [CDO] “Bij insights is dat anders. Je biedt hun een kant-en-klare analyse aan, compleet met conclusies. Ze zien meteen wat ze ermee kunnen doen, wat het veel tastbaarder maakt.
- [CDO] “Database-diensten zouden ook interessant kunnen zijn, maar dat is momenteel nog een stap te ver.”
- [DATA ANALYST] “Je zou het kunnen verkopen. Je zou kunnen zeggen: "Als wij jullie laten weten wat er nu het meest verkocht wordt, willen we daar bijvoorbeeld 100 euro voor. Het zou dan puur om productdata.”
- [DATA ANALYST] “Die laatste optie lijkt me wel mogelijk [selling data-based services]. Je zou bijvoorbeeld een abonnementsvorm kunnen bedenken, waarbij ze dagelijks zelf het dashboard kunnen bekijken, in plaats van alleen tijdens afspraken. Daarentegen denk ik dat ze weinig hebben aan ruwe data [selling data]”

- [[CDO] “Ik zie indirecte data-monetization als een basisvoorwaarde om onze strategie te kunnen realiseren. Maar als we directe data-monetization goed uitvoeren, kan dat zeker waarde opleveren…Het gaat hier eerder om kleinere bedragen per partner, dus directe data-monetisation zal op korte termijn niet veel opleveren in deze context.”
- [CDO] “Daarom denk ik dat indirecte data-monetisation meer van toepassing is voor onze partners, terwijl directe data-monetisation meer kansen biedt aan de klantkant. Vooral voor de grotere zakelijke klanten kunnen we meer waarde bieden door hen te ondersteunen met data en inzichten.”
- [CDO] “Maar ook bij directe data-monetization voor partners valt wel wat te bereiken, al denk ik dat de klantkant meer impact heeft. We hebben immers veel meer klanten dan partners. Dus als je kijkt naar de verhouding tussen inspanning en resultaat, denk ik dat je met minder inspanning meer impact kunt hebben aan de klantkant.”
- [DATA ANALYST] “Ik denk direct, en dan met inzichten. Zoals dat voorbeeld met hoeveel dorpels, deurkrukken of scharnieren er nodig zijn. Dat is meer direct, omdat wij dan direct onze data of inzichten aan hen verkopen. ”
- [DATA ANALYST] “Wat ik ook lastig vind [het hangen van een prijskaartje aan data-gedreven diensten], is dat het een samenwerking is. Het hoort een beetje bij het standaardpakket, want wij willen ook dat zij beter worden en een betere partner voor ons worden.”
- [DATA ANALYST] “Het is niet alleen dat zij iets van ons willen, wij willen ook iets van hen. Dus dat maakt het een beetje grijs”
- [DATA ANALYST] “Ja.” [*Antwoord op de vraag of het dan voor de hand ligt om met een ‘standaardpakket’ te werken, waarin tot een zekere hoogte data-gedreven diensten ‘gratis’ worden gedeeld ten behoeve van de samenwerking, maar dat voor extra complexe functionaliteiten een bepaald bedrag tegenover komt te staan?*]



- [CDO] “Niet alle medewerkers hebben het nodig om dergelijke analyses te interpreteren. Maar ik durf te zeggen dat degenen van wie we verwachten dat ze een bepaalde mate van datageletterdheid moeten hebben, op of boven een voldoende scoren.”
- [CDO] “Het is niet zo dat we daar massaal hoog op scoren, maar voor degenen die het nodig hebben, zitten we op een acceptabel niveau.”
- [DATA ANALYST] “Ik ben wel degene met de meeste kennis, maar we zijn dat breder aan het neerzetten, zodat afdelingen in ieder geval de snelle, makkelijke vragen zelf kunnen oppakken en zelf een inzicht kunnen creëren.”
- [DATA ANALYST] “. Maar ik merk wel dat als er een dashboard wordt gemaakt of iets wordt aangepast, er nog veel vragen komen, zoals: "Hoe zit dit precies?" en "Waar hangt dit aan vast?" Het wordt wel steeds complexer.”
- CDO] “Toelevering Online heeft een eigen data- en analytics team, en er zijn ook een paar data-ambassadeurs per afdeling. Dus intern wordt er wel datagedreven gewerkt.”
- [DATA ANALYST] “Ja, en het wordt alleen maar beter.” [*Antwoord op de vraag of het platform instaat is om waardevolle inzichten die interessant zijn voor kozijnpartners uit de data te extraheren en te delen*.]
- [DATA ANALYST] “Nee, dat is de volgende stap.” [*Antwoord op de vraag of het niveau van gebruik van machine learning modellen en predictive analytics al is bereikt?*

Data Analytics capabilities of platform business employees

- [CDO] “In principe staat alles wat we doen in de cloud, dus dat is een belangrijke. Alle tools die we gebruiken zijn ook API-first en API-driven. Dus technisch gezien zou dat geen probleem moeten zijn. Wat je wel ziet, is dat de menselijke capaciteit om met API’s te werken soms ontbreekt.
- [CDO] “Maar negen van de tien tools die we hebben, hebben een goed gedocumenteerde API, dus dat zou geen probleem moeten zijn.”
- [CDO] “Ja, iedereen binnen de analytics-afdeling zou ermee kunnen werken. Ik verwacht niet van onze partnermanagers dat zij een API gaan inrichten om data met onze partners uit te wisselen. Maar het data- en analytics team wel.”
- [DATA ANALYST] “Ja, ik denk het wel. Het is er nog niet volledig, maar de kennis, kunde en de wil om het te laten werken zijn er zeker. En anders bouwt de IT-afdeling het wel.”

Technical Infrastructure level of platform business

- [CDO] “Nee. Omdat de focus bij veel mensen nog steeds heel erg intern gericht is. Ze gebruiken data om interne processen slimmer en beter te maken, maar om data extern in te zetten om daar iets mee te doen, is nog een stap die we moeten zetten. Dat heeft vooral te maken met een verandering in mindset.” [*Antwoord op de vraag of het platform bedrijf over een data-gedreven cultuur beschikt?*]
- [DATA ANALYST] “Het hele bedrijf werkt eigenlijk data gedreven. Elke afdeling heeft een data-ambassadeur, en in dit geval gebruikt Operations de dashboards al dagelijks. Ze zien de waarde van beslissingen baseren op data in, in plaats van op gevoel of iets dat ze hebben gehoord.”

Data-driven culture

- [CDO] “Dat hangt af van de medewerker, maar over het algemeen zijn we daar nog niet zo heel sterk in.”
- [CDO] “Het probleem is vaak dat we te veel willen vertellen. We willen een volledig, onderbouwd verhaal presenteren, terwijl soms één getal al genoeg is. In plaats van te weinig te vertellen, geven we soms juist te veel informatie.”
- [CDO] “..ook richting de fabrieken. Zij hebben niet altijd het hele verhaal nodig. Vaak willen ze alleen weten: presteer ik beter dan de rest? Of hoeveel procent van de omzet komt van jullie in vergelijking met andere partners?”
- [CDO] “Het gaat om de grootste en belangrijkste cijfers. Daar zie je vaak dat ze die kunnen uitleggen, maar als er meer diepgang nodig is, zie je soms een mismatch tussen hun vaardigheden en de werkelijke behoefte.” [*Antwoord of binnen afdeling Operations de medewerkers vaardig genoeg zijn in het overbrengen van de data en inzichten tijdens de maandelijkse gesprekken.*]

Ability of platform business employees to communicate data-driven

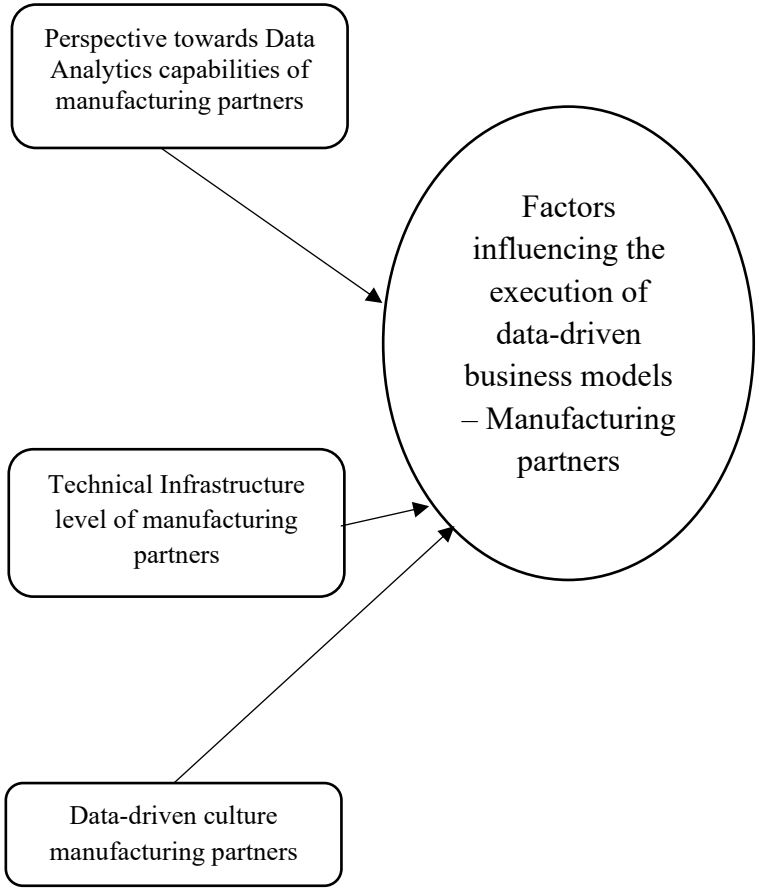
Factors influencing the execution of data-driven business models – Platform business

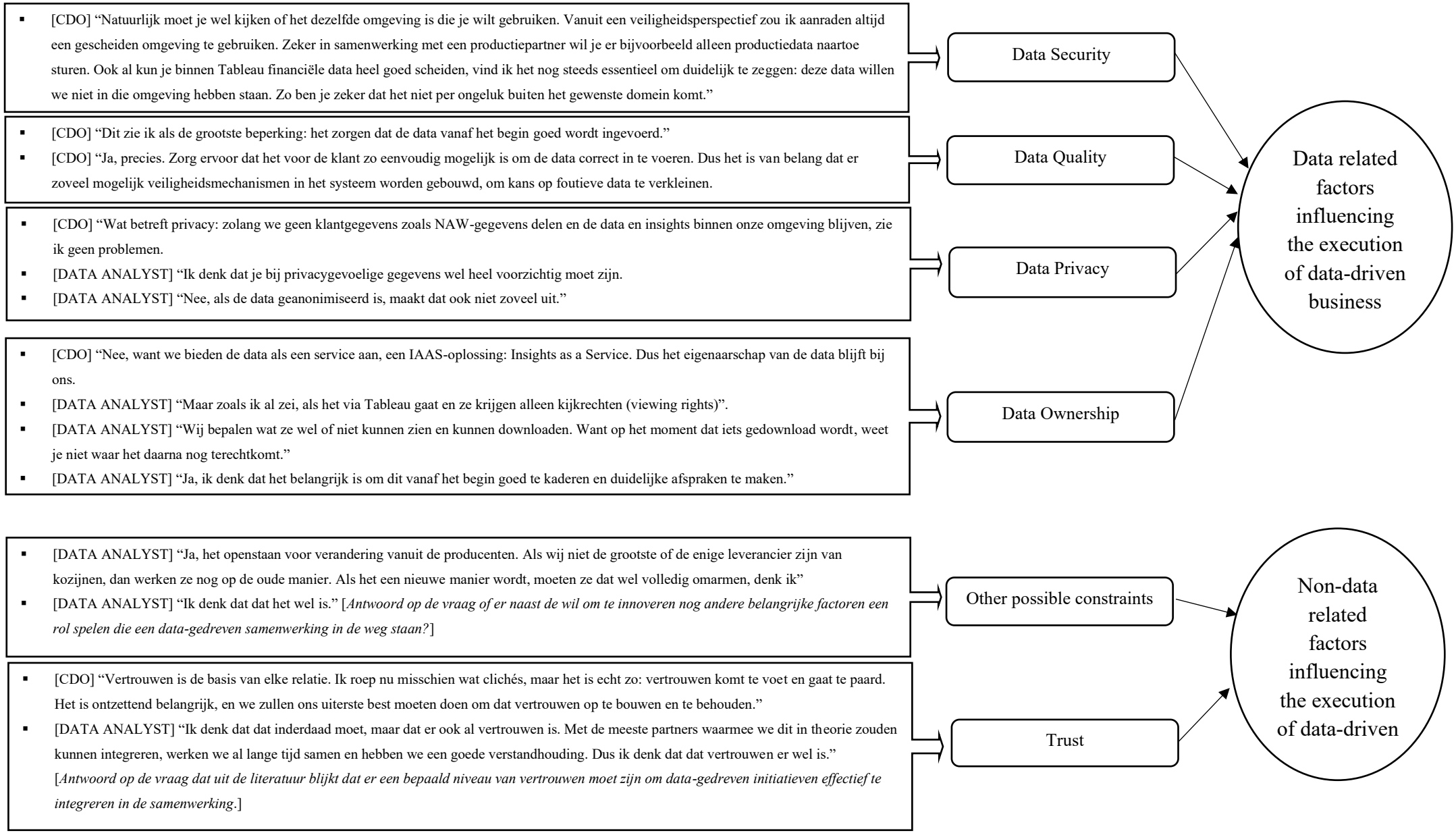
- [DATA ANALYST] “Ik denk dat de inzichten die er zijn wel goed overgebracht kunnen worden, want het is nog niet echt hogere wiskunde”
- [DATA ANALYST] “We kunnen ook steeds meer en halen steeds meer data op, maar dan is het juist belangrijk om duidelijk te maken: "Dit komt hier en hier vandaan en het betekent dit en dit." De interpretatie moet echt goed helder zijn, maar ik heb het idee dat de mensen die dat communiceren richting de fabrieken capabel genoeg zijn om dat op een duidelijke manier te doen.”
- [DATA ANALYST] “…en daar moeten wij naar toe. Dat stuk verantwoordelijkheid ligt vooral bij ons” [Verantwoordelijkheid om één waarheid en interpretatie te creëren en overdragen aan kozijnpartners.]

- [CDO] “Ja, zeker. De kozijnvervaardigingssector is een traditionele sector, en op het gebied van data-geletterdheid, zoals het interpreteren van grafieken, denk ik dat sommige mensen dat lastig zullen vinden.”
- [CDO] “Maar het belangrijkste obstakel dat ik zie, is het vertrouwen in de data. Als de data niet overeenkomt met hun verwachtingen of gevoel, zullen ze snel denken dat het probleem bij de externe partij ligt en niet bij hen.”
- [CDO] “Enerzijds het vertrouwen in de data, anderzijds het begrip van wat redelijke cijfers zijn. Wat is normaal en wat niet? Die kennis ontbreekt momenteel.”
- [DATA ANALYST] “Ja, ik denk het wel. Het ligt natuurlijk ook aan hoe je het brengt en welke data je doorgeeft. Als het vanuit onze kant helder en duidelijk is, is er eigenlijk maar één manier van interpretatie mogelijk” [*Antwoord op de vraag of de kozijnpartners capabel genoeg zijn om de data voldoende te kunnen interpreteren?*’]
- [DATA ANALYST] “Ja, ik denk dat het wat lastig kan zijn, omdat de bouwsector nog vrij traditioneel is. Maar ik denk ook dat we gewoon de juiste persoon bij de partners goed moeten informeren en inlichten. De interpretatie hoeft niet heel moeilijk te zijn.”
- [DATA ANALYST] “Maar ik denk dat, met een duidelijke uitleg, het zeker te doen is.”

- [CDO] “Bij het ontvangen zelf niet per se. Ik denk het niet, want als wij slimme diensten of services gaan leveren, zal dat binnen onze eigen omgeving gebeuren. Onze partners hebben bijvoorbeeld al een partnerportal waar ze kunnen inloggen en dingen kunnen zien. Ik verwacht dat als we slimme diensten gaan aanbieden, we dat via dat portal doen en dat we het niet naar buiten halen. Ze hebben al toegang tot het partnerportal, en ze zijn capabel genoeg om daar in te loggen.”
- [CDO] “Stel dat die data dagelijks via een SFTP-verbinding bij ons aangeleverd moet worden. Dat kan wel, maar is de partner technisch capabel genoeg om elke dag een selectie van de data op die SFTP-server te plaatsen? Dat is mijn grootste technische zorg.”
- [DATA ANALYST] “De implementatie kan wel lastig zijn, afhankelijk van hoe je de data wilt uitwisselen. Als er een partnerportaal is met een tableaudashboard per producent, dan is dat relatief eenvoudig te realiseren. Dat is vooral aan onze kant, en het hoeft aan hun kant geen ingewikkelde koppeling te zijn of investeringen te vereisen.”
- [DATA ANALYST] “Als het om sensoren en chips gaat, moeten ze wel hun machinepark aanpassen. Daar zal nog wel wat moeite mee zijn. Maar als het puur om een dashboard gaat, dan is dat zo geregeld.”

- [CDO] “Ik kan een partner wel vertellen dat ze 41% of 42% vertraging hebben, maar het maakt ze niet zoveel uit. Maar als het percentage 85% is en ze reageren daar niet op, dan weet ik dat ze nog niet klaar zijn om data gedreven te werken.”
- [DATA ANALYST] “Precies, en dat ze echt wel met de tijd mee moeten, ondanks dat het een wat ouderwetse, traditionele branche is. Ik denk dus dat, omdat ze al met ons werken, ze de waarde van datagedreven werken zeker zullen inzien.”




[CDO] “Natuurlijk moet je wel kijken of het dezelfde omgeving is die je wilt gebruiken. Vanuit een veiligheidsperspectief zou ik aanraden altijd een gescheiden omgeving te gebruiken. Zeker in samenwerking met een productiepartner wil je er bijvoorbeeld alleen productiedata naartoe sturen. Ook al kun je binnen Tableau financiële data heel goed scheiden, vind ik het nog steeds essentieel om duidelijk te zeggen: deze data willen we niet in die omgeving hebben staan. Zo ben je zeker dat het niet per ongeluk buiten het gewenste domein komt.”
Data Security
[CDO] “Dit zie ik als de grootste beperking: het zorgen dat de data vanaf het begin goed wordt ingevoerd.”
[CDO] “Ja, precies. Zorg ervoor dat het voor de klant zo eenvoudig mogelijk is om de data correct in te voeren. Dus het is van belang dat er zoveel mogelijk veiligheidsmechanismen in het systeem worden gebouwd, om kans op foutieve data te verkleinen.
Data Quality
[CDO] “Wat betreft privacy: zolang we geen klantgegevens zoals NAW-gegevens delen en de data en insights binnen onze omgeving blijven, zie ik geen problemen.
[DATA ANALYST] “Ik denk dat je bij privacygevoelige gegevens wel heel voorzichtig moet zijn.
[DATA ANALYST] “Nee, als de data geanonimiseerd is, maakt dat ook niet zoveel uit.”
Data Privacy
[CDO] “Nee, want we bieden de data als een service aan, een IAAS-oplossing: Insights as a Service. Dus het eigenaarschap van de data blijft bij ons.
[DATA ANALYST] “Maar zoals ik al zei, als het via Tableau gaat en ze krijgen alleen kijkrechten (viewing rights)”.
[DATA ANALYST] “Wij bepalen wat ze wel of niet kunnen zien en kunnen downloaden. Want op het moment dat iets gedownload wordt, weet je niet waar het daarna nog terechtkomt.”
[DATA ANALYST] “Ja, ik denk dat het belangrijk is om dit vanaf het begin goed te kaderen en duidelijke afspraken te maken.”
Data Ownership
Data related factors influencing the execution of data-driven business
[DATA ANALYST] “Ja, het openstaan voor verandering vanuit de producenten. Als wij niet de grootste of de enige leverancier zijn van kozijnen, dan werken ze nog op de oude manier. Als het een nieuwe manier wordt, moeten ze dat wel volledig omarmen, denk ik”
[DATA ANALYST] “Ik denk dat dat het wel is.” [Antwoord op de vraag of er naast de wil om te innoveren nog andere belangrijke factoren een rol spelen die een data-gedreven samenwerking in de weg staan?]
Other possible constraints
[CDO] “Vertrouwen is de basis van elke relatie. Ik roep nu misschien wat clichés, maar het is echt zo: vertrouwen komt te voet en gaat te paard. Het is ontzettend belangrijk, en we zullen ons uiterste best moeten doen om dat vertrouwen op te bouwen en te behouden.”
[DATA ANALYST] “Ik denk dat dat inderdaad moet, maar dat er ook al vertrouwen is. Met de meeste partners waarmee we dit in theorie zouden kunnen integreren, werken we al lange tijd samen en hebben we een goede verstandhouding. Dus ik denk dat dat vertrouwen er wel is.” [Antwoord op de vraag dat uit de literatuur blijkt dat er een bepaald niveau van vertrouwen moet zijn om data-gedreven initiatieven effectief te integreren in de samenwerking.]
Trust
Non-data related factors influencing the execution of data-driven

Appendix O: Within-case Analysis – Manufacturers

This appendix provides a detailed elaboration of the within-case analysis, comparing the perspectives of the manufacturers separately, and with each other. This has been done using the identified aggregated dimensions, presented in Table 10.

Table 10: Manufacturers' perspective - 2nd order themes and aggregated dimensions

Manufacturers' perspective	
2nd order themes	*Aggregated dimensions*
Current level of digitalisation Current level of data exchange with platform business Current technological infrastructure level that supports data exchange Current perceived value from platform business	Data-driven readiness level
Desired data-driven solutions for efficiency improvements Valuable uses of data analytics	Data-driven value needs
Perception about Data-as-a-Product Perception about Data-enhanced Products Perception about Data-driven Services Perception about Data-enabled Performance Outcomes	Suitability of DDVPs
Willingness to pay for data-driven value created by platform business Motives to pay for data-driven value Preferred pricing models when monetising data externally	External data monetisation
Willingness to invest in digital innovations Financial and Resource constraints in adopting data-driven solutions Level of Technological Infrastructure as limitation for data-driven collaboration Importance of Data Accuracy, Reliability and Privacy in data-driven collaboration Importance of trust in partnership to achieve a data-driven collaboration Level of data analytics capabilities	Factors influencing the execution of data-driven business models

Data-driven readiness level

MNF_A:

MNF_A demonstrates a moderate level of digitalisation and data readiness. The manufacturer primarily uses XML intake for processing orders digitally, although some tasks, such as downloading order details, remain manual: *"Right now, we download order details manually"* and *"We take all orders digitally using XML intake."* Their technological infrastructure includes tools like OneDrive, Excel, and an online order portal provided by the platform organisation, which enables real-time updates: *"We update the status of these orders in the portal, allowing Toelevering Online to see changes immediately."* Data exchange is focused on operational needs, including order details and production planning, with shared files used to adjust production: *"We share Excel files with data critical for adjusting our production plans."*

While the manufacturer values predictability in its production load for planning purposes, it acknowledges the need for more integrated solutions to further optimise efficiency.

MNF_B:

MNF_B exhibits a relatively advanced level of data-driven readiness, incorporating big data and AI-driven analytics into its operations: "*We use big data through AI-driven software."* However, their reliance on Excel for certain tasks suggests a need for more sophisticated tools: *"We only use Excel, no Power BI or Tableau."* Data exchange occurs primarily through periodic updates in Excel files and email attachments, with links to downloadable CSV data: "*We receive Excel files with links to CSV files we can download."* According to the Manager Operations of MNF_B, it prioritises speed and efficiency in production, expressing a desire for seamless data integration to minimise manual interventions: *"If data arrives in a way that we only need to verify it, it would be ideal, reducing preparation time and lowering costs."*

MNF_C:

MNF_C demonstrates a proactive approach to leveraging data for operational improvements, using internal dashboards and tools like Power BI to monitor and enhance performance: *"We use data from production and financial systems, employing Power BI dashboards to guide decisions."* Their infrastructure includes software-driven machinery that logs production data, creating actionable insights. However, data exchange with the platform organisation is more informal, occurring on an ad hoc basis during discussions: *"We do not exchange dashboards, spreadsheets, or tables."* Their readiness level is strengthened by its internal capabilities, but structured and consistent data-sharing practices with the platform organisation remain an area for improvement, according to the Chief Commercial Officer (CCO).

MNF_D:

MNF_D is in the process of enhancing its data-driven capabilities but currently operates at a basic digitalisation level: *"We are still very much an Excel-based organisation, but we are implementing an ERP system this year."* Their technological tools include for instance a CRM system, and a click robot developed in-house to automate XML code processing: *"We developed a click robot that processes XML codes from the platforms' website, significantly speeding up work."* Data exchange focuses on KPIs, shared through quarterly and monthly meetings: *"KPIs like delivery reliability and complaints are shared during meetings where we evaluate and strategies for improvement."* The partner manager of MNF_D recognises the potential of data for optimising production and anticipates improvements with the introduction of its ERP system.

MNF_E:

MNF_E demonstrates a lower level of digitalisation but is actively planning for significant upgrades. The manufacturer uses In2CRM as its primary system but relies heavily on manual processes and Excel for data management: *"We try to extract as much information as possible from our limited system, but*

we write our own queries to export data into Excel." Data exchange is primarily manual, often involving PDFs shared via email: *"We receive a PDF of a worked-out frame design, which we redraw in our design software."* The Chief Commercial Officer (CCO) of MNF_E aspires to implement an API integration for seamless data flow, aiming to automate administrative tasks and enhance efficiency: *"An API would ensure the assignment goes directly into our design programme and even guide the machines, eliminating manual actions."*

Conclusion

The semi-structured interviews revealed both similarities and differences in manufacturers' readiness for data-driven operations. MNF_B, MNF_C and MNF_E relied on Excel for data management and use of PDF files for order intake. This is in contrast to MNF_A and MNF_D, which are already compatible with processing XML files provided by the platform, which simplifies the order intake process. The latter has specially developed a click robot for this purpose. Incidentally, all manufacturers expressed a need for enhanced systems for order intake, either via XML files or API integrations.

In addition, strong similarities emerged from the analysis in terms of data exchange around orders. Every manufacturer indicated that they receive information via emails from the platform business and during quarterly meetings. At these sessions, KPIs around manufacturer performance are mainly discussed, such as realisation of capacity, delivery time, complaints and delays, said Partner Manager of MNF_D.

However, the analysis showed clear differences in technological progress and data usage between manufacturers. MNF_B and MNF_C showed higher levels of technological maturity, with MNF_B's Operations Manager indicating that they are integrating AI-driven software within their operations. While MNF_C analyses and visualises production and financial data using Power BI to inform internal decision-making. This is in contrast to MNF_D and MNF_E, both of which mainly use Excel for their data management and do not yet use an ERP system. These observations highlighted a broad spectrum of readiness levels across the manufacturers.

Data-driven value needs

MNF_A:

MNF_A prioritised predictability in its production load to facilitate long-term planning: *"For us, it's crucial to have predictability in our production load, as it impacts how we plan three to six months in advance."* Additionally, the manufacturer expressed interest in leveraging data analytics for benchmarking against competitors: *"We could compare delivery times or pricing with other companies on the platform."* Insights from such comparisons would allow them to address areas requiring improvement, such as reducing delivery times or adjusting pricing strategies: *"If we see that our delivery times are longer or our prices are higher than our competitors, we can work to improve those areas."*

MNF_B:

MNF_B's primary need revolved around streamlining the production process and reducing manual interventions: *"If data arrives in a way that we only need to verify it, that would be ideal, reducing preparation time and lowering costs."* The manufacturer also expressed interest in operational enhancements, such as implementing a track-and-trace system for logistical efficiency: *"For example, a track-and-trace system for where glass racks are located. If you don't know where they are, you're dependent on someone taking action to find them."*

MNF_C:

MNF_C identified the need for customer feedback data to refine their products and services: *"If we receive feedback from end customers via Toelevering Online, it could help us improve our product or service."* Additionally, the CCO highlighted the importance of monitoring competitive trends, particularly pricing strategies: *"If a competitor in aluminium reduces their price, it has a direct impact on our sales, and it would be helpful to monitor these trends upfront."* MNF_C also expressed interest in analysing product preferences and market trends, including seasonal patterns: *"Which products are bestsellers? Can we perhaps extract something about customer preferences from the data? What is known about seasonal influences? Do you see certain trends over the years?"*

MNF_D:

MNF_D emphasised the need for better insights into seasonal trends to optimise production planning: *"The more insight we have into seasonal trends, for example, when orders from Toelevering Online dip, the better we can prepare and adjust our planning."*

The Partner Manager of MNF_D also sought detailed customer feedback to address common issues and reduce failure costs: "*For example, if we have better insight into how customers interact with our products, we could reduce our failure costs. Now we sometimes don't have that insight fully. For example, when glass breaks: does it happen during unpacking, or during installation? Such information would help us improve our processes...You could use this information to position yourself in terms of price, but also to see if a certain problem is common within the window frame industry."*

Furthermore, they showed interest in tracking product maintenance and customer usage data: *"It would be valuable to understand how often a frame is painted or maintained based on data."*

MNF_E:

MNF_E expressed a strong need for automation and integration, envisioning solutions like an API to eliminate manual processes: *"An API would ensure the assignment goes directly into our design programme and even guide the machines, eliminating manual actions."*

Furthermore, the CCO noted the additional benefit of providing the product's end-user, the homeowners, with specific product information to address any questions or ambiguities. In this regard, he identified a potential role for QR codes on the product: *"The customer scans that code and immediately gets all the information about the specific window frame. For example, 'This is a tilt-and-turn window, here are the instruction videos.' In addition, the same QR code could be used for service notifications. For example, 'I have a broken glass,' scan the window frame, and the service notification is immediately passed on. Or, if, after delivery, the customer decides, 'I still want to add a screen,' he can scan the window frame and everything is automatically measured, after which he can order the screen to go with it."*

This approach could also facilitate after-sales services, such as automated measurements for additional orders or direct reporting of issues like glass breakage. A solution that is valuable for both, the end customer, the platform and the manufacturer, according to the CCO of MNF_E.

Conclusion:

An analysis of data-driven value needs among manufacturers revealed similarities, patterns, and variations. Improved operational efficiency emerged as a shared priority, with most manufacturers emphasising automation and the reduction of manual processes. A number of manufacturers, including MNF_A and MNF_D, expressed a desire for greater predictability in production planning. Others, such as MNF_C and MNF_D, emphasised the potential of customer feedback to enhance products and reduce failure costs. Furthermore, there was interest in using data for benchmarking and monitoring trends such as seasonal influences and competitive pricing.

The specific data-driven solutions sought ranged from track-and-trace systems (MNF_B) and QR codes for customer interaction and information provision (MNF_E) to detailed maintenance tracking and customer usage insights (MNF_D). These findings illustrate both matching and diverging data-driven needs of manufacturers.

Suitable DDVPs

MNF_A:

The Head of Ecommerce expressed limited interest in Data-Enhanced Products, emphasising its focus on production over customer engagement: *"I don't think that's something we would be interested in. We don't want to have direct contact with the final customer or deal with the product after it's delivered."* The manufacturer saw greater value in Toelevering Online using such data to enhance customer satisfaction: *"That type of data would be more useful for Toelevering Online to ensure customer satisfaction. For us, it's about producing exactly what they need."* There was no specific mention of interest in other data-driven value propositions, indicating a more limited focus on operational efficiency through data-driven incentives.

MNF_B:

MNF_B demonstrates an openness to integrating data solutions, provided they receive processed insights rather than raw data. They prefer that data filtering and analysis be managed by Toelevering Online to ensure they receive actionable insights: *"Yes, but that responsibility—the ability to filter data and extract information—should, in this case, lie with Toelevering Online, so that we receive the correct data."*

They see value in data for proactive quality control and predictive insights, interpreting Data-enhanced Products as tools for complaint analysis and issue prediction: *"We interpret it such that if you can have an active analysis on complaints, where you get a predictive factor. For example, which type of window frame is more likely to have complaints. Imagine you can predict where most complaints arise."*

The Partner Manager highlights the importance of early detection for improving production processes, including alerts for buyers configuring window frames. This would prevent error-prone designs and inform customers about configurations prone to complications: *"Suppose you have a door that is wider than normal, then you could indicate: 'Do I really want this?' or 'Yes, I want it, but be aware of this and that.' You can also send that data to us, but the earlier in the process you have those warnings, the better it is, I think."*

Warnings could be based on data analysis to identify configurations requiring attention.

In addition, the Partner Manager of MNF_B values data-driven services that enhance efficiency and reduce manual work. He expresses interest in track-and-trace systems to automate logistical processes: *"For example, a track-and-trace system for where glass racks are located. If you don't know where they are, you're dependent on someone who has to take action or follow up... Those are human actions. If you can automate that through data, for example by getting a ping when the rack has been at the customer for three weeks without being picked up, then you can follow up directly."*

Moreover, they argue that improved information flow from platform business to manufacturers reduces costs: *"How better the information flow towards us is, the less work we have to do ourselves, and the lower the cost price becomes."*

About the last data-driven value proposition, MNF_B is actively exploring advanced data solutions to enhance maintenance and customer service. They are developing NFC chips that can be integrated into window frames to collect real-time data: *"We are working on something that allows us to read vibrations, moisture content, and temperature in the window frame... That chip contains an energy source that lasts 30 years, and you can build it into the critical points in the frame. Then you can receive a daily ping in real-time with the data of the frame, such as whether it has received a knock."*

While MNF_B recognises the potential of NFC chips integrating in the window frame to gather real-time product data, they noted this as a long-term initiative: *"In the long term, I see mainly what I outlined earlier: that you can make the maintenance service towards the customer much more data-driven, instead of manually checking everything. That would ultimately save costs, because instead of inspecting a hundred and fifty window frames, you could then take targeted action."*

In the short term, the Partner Manager sees more potential in the value proposition Data-driven Services: *"In the short term, I think mainly that we need finer, more detailed data instead of coarse data... Yes, the faster we can get that [Data-driven Services] done, the faster we can reduce work preparation and reduce cost."*

MNF_C:

MNF_C exhibited strong enthusiasm for engaging with data-driven value propositions, particularly emphasising their confidence in handling raw data independently. They expressed that if provided with data containing usable columns and neatly filled-in information, they could utilise tools like Power BI or pivot tables to derive meaningful insights. As they stated: *"If I receive data supplied with usable columns and neatly filled-in information, then I could do something with it myself using Power BI or pivot tables."*

This readiness to analyse data stems from their belief that access to raw data would enable them to uncover valuable insights into market trends and customer preferences. They elaborated:

"I think you can then discover trends, seasonal influences, customer desires, and preferences for products. Yes, we certainly have the knowledge and skills to extract information from data packages."

Identifying Data-as-a-Product as the most suitable proposition for their needs, MNF_C highlighted their eagerness to experiment and find relevant information on their own: *"In my opinion, the key is the first one: Data-as-a-Product fits best with that. This way, we can experiment ourselves with finding relevant information based on the supplied raw data."*

Transitioning to Data-Enhanced Products, MNF_C acknowledged existing technologies that could enhance their offerings. They mentioned the use of QR codes to link a "passport" to a window frame, facilitating access to performance values: *"Yes, by now there are some possibilities to link a kind of passport to a window frame with a QR code. That can be useful for a maintenance company or an end customer to retrieve certain performance values of the frame."*

However, when considering more advanced data-driven services like predictive maintenance, MNF_C expressed scepticism about their applicability in the window frame industry. They explained that while such services are crucial in sectors where uptime is vital and can yield immediate financial benefits, window frames inherently require minimal maintenance if properly installed: *"In sectors where uptime*

is very important, that is the key and yields immediate money. When you have predictive maintenance and, for example, use sensors that measure vibrations, you know when maintenance is needed. But if I look at a window frame: if that is properly installed, it functions and actually requires relatively little maintenance."

Despite acknowledging that evolving towards data-enabled performance outcomes could be ideal, they deemed it less applicable to their industry: *"What would of course be the most ideal is if it eventually grows towards data-enabled performance outcomes. You can directly link a revenue model to that. For example, with predictions about maintenance: you can then connect maintenance contracts to it. But as said, that is less applicable in the window frame industry."*

They concluded that such propositions currently stand furthest from their operational focus: *"Yes, I think the proposition that currently stands furthest from us is indeed data-enabled performance outcomes."*

MNF_D:

MNF_D expressed reservations about their ability to handle raw data effectively in relation to Data-as-a-Product: *"I do not think that expertise really lies with us as a timber factory. We would probably not do much with it, or perhaps even draw incorrect conclusions from that data."*

Regarding Data-Enhanced Products, MNF_D indicated a desire for more data to improve their KPIs: *"Yes, the more data we can get about KPIs, the better. Currently, we do receive information, such as about production errors or glass breakage, but we would like to know where those problems arise. Is it at our factory, during transport, or perhaps at the customer's site... So yes, I do see value in that. If that data is supplied by the customer and we can view it, it gives us valuable insights."*

They identified both Data-Enhanced Products and Data-Driven Services as propositions that would provide the most value in the short term: *"I think that both Data-Enhanced Products and Data-Driven Services would provide the most value in the short term... With Data-Enhanced Products, you can become a little better every day, for example by using better KPIs and dashboards… With Data-driven Services you get more insight into planning, which would help us directly in day-to-day operations."*

On Data-Driven Services, MNF_D expressed interest in receiving predictive analyses to improve production planning: *"I think it would have great added value for us if Toelevering Online could provide us with predictive analyses. If they can indicate with some certainty what we can expect, we can steer our production planning very well accordingly."*

Considering Data-Enabled Performance Outcomes, MNF_D mentioned the possibility of introducing a chip into the window frame for service and aftercare: *"An example of what we would like to do ourselves is introducing a chip in the window frame. With that, you can, for example, scan on location for service*

and aftercare. I think that is more something that should come from the factory itself, not something that should be set up by Toelevering Online."

They acknowledged that they are not yet advanced enough for this and questioned whether their current target group is engaged with such technologies: *"That is something we are not advanced enough for yet. I can imagine that such insights are interesting for certain target groups, but I don't know if our current target group is already engaged with that."*

They suggested that if Toelevering Online integrates such technologies, it could be valuable: *"If Toelevering Online itself integrates a chip into the window frame after we have sold it, or if they place a sticker that collects data about usage, then that could certainly be valuable."*

MNF_E:

MNF_E indicated reluctance to receive raw data due to the additional workload it would entail: *"I find it difficult to give a good answer to that. I think we would prefer not to receive data in raw form if we still have to do a lot of work on it ourselves."*

Regarding Data-Enhanced Products, MNF_E mentioned the practical application of using QR codes to provide customers with information about their window frames: *"A QR code on a window frame would be a good example. The customer scans that code and immediately gets all the information about the specific frame."*

They expressed interest in providing more product information through QR codes: *"Yes, 100%. Ultimately, you might want to provide even more product information through QR codes. For example, that a window frame provides a certain insulation value. So not only information about the frame itself but also about everything around it. A customer can then see: 'This frame has an insulation value of x.' Those are often questions we receive, especially with sustainability subsidies. It would be super easy if you could directly download a file via that QR code that you can submit for your subsidy application."*

MNF_E also suggested that the QR code could facilitate service requests and include instructional content: *"That would really be that QR code, with which you can facilitate much more from the window frame... Additionally, the customer of Toelevering Online could put their service request in it, which would save a lot of communication. And as I mentioned earlier, it would be even better if we could also process product information in it. So, for example, instructional videos on how to assemble or adjust something. Your window frame has different parts; these are them, and this is what you can do with them. A kind of assembly manual, but also with videos."*

Regarding Data-Driven Services, MNF_E expressed a desire for real-time dashboards to monitor performance together with Toelevering Online: *"Ideally, you want to have a report every week that*

shows your scores, with insight at what level... Preferably a real-time dashboard that you have together with Toelevering Online."

They discussed tracking delivery performance and analysing issues collaboratively: *"Yes, but also if you, for example, keep track of your delivery performance in such a dashboard, so how often we deliver on time and how often not, and if we don't deliver on time, what is the reason? Is it because Toelevering Online forwarded the order too late or incorrectly? Or because our production was full at that moment? Or perhaps because one of our suppliers, like the supplier of panels or grilles, didn't deliver on time, so we couldn't deliver the complete order? Where exactly is the problem?"*

They suggested that collecting and analysing this data could help identify patterns and implement improvements: *"If you collect that data, you can start seeing connections over time. What do we see happening most often, and what is the cause? Then you can look at improvements structurally and keep yourself sharp by, for example, connecting KPIs to it. If you say: 'We strive for a delivery performance of 98%,' then you can check every week if we achieve that 98%. If you're below that, you can analyse at a higher level where the problem lies."*

Considering Data-Enabled Performance Outcomes, MNF_E expressed doubt about the relevance of predictive maintenance for their products: *"I think the window frame itself is not directly relevant for that. That is more dependent on the building. If, for example, a leak occurs around the frame over time, then something has probably happened to the building, or someone has drilled into the frame. That has more to do with structural matters, and I don't think the frame directly relates to that... Maybe after 10 or 15 years, you could send a notification that the plastic window frames are almost due for replacement."*

They emphasised the importance of providing maintenance guidance within the product information: *"Yes, that should certainly be included. So, in the product information, I would also want to see which means you should use to keep your frames clean. Which products can you use or not use? That kind of information is part of it too."*

Conclusion

Analysing the qualitative data from the semi-structured interview, revealed both similarities and variations among manufacturers regarding the suitability of DDVPs. Manufacturers such as MNF_B and MNF_D valued Data-driven Services that enhanced operational efficiency and planning, expressing interest in predictive analyses and real-time tracking systems. MNF_C and MNF_E showed enthusiasm for Data-enhanced Products, particularly in using technologies like QR codes to provide customers with detailed product information. In contrast, MNF_A preferred to focus solely on production efficiency, showing limited interest in data-driven initiatives beyond their core activities. Differences were also noted in manufacturers' willingness to handle raw data: while MNF_C was keen to analyse raw data

independently, all the others preferred receiving processed insights due to resource constraints. These observations highlighted diverse perceptions and readiness levels among manufacturers regarding data-driven value propositions.

External data monetisation

MNF_A:

MNF_A expressed reluctance to pay extra for data services provided by the platform. They stated: *"We wouldn't want to pay extra for such a system, but we could consider offering a discount to Toelevering Online if they implemented it."*

They emphasised that they already receive certain information and do not see the need to pay for additional services: *"But again, we are already receiving this information, so it's not a new service that we would necessarily need to pay for."*

Regarding the applicability of data monetisation in their industry, MNF_A commented: *"I think this idea makes more sense for other types of platforms, like Ahrefs or SimilarWeb, where companies pay for data or insights. But in our industry, I don't think it applies in the same way."*

In terms of pricing models, MNF_A mentioned their current payment structure: *"We pay based on the number of brands we work with on the platform, like different window profile brands. There isn't a tiered pricing system based on data."*

MNF_B:

MNF_B expressed a willingness to pay for data-driven services or products, provided they add value by saving time and costs. They emphasised that if Toelevering Online offers services such as dashboards or predictive models that lead to a more efficient production process or fewer errors, they are willing to invest in these enhancements. They stated: *"Ultimately, if there are costs involved, that's fine, but then it must yield us a cost saving. We are not negative about paying, as long as it benefits us."*

Regarding preferred pricing models, MNF_B expressed openness to a licensing model: *"Yes, exactly. As for the pricing model, a licence model would be fine."*

But what is more important according to the Partner Manager, is that the data-driven products or services benefit both parties, aiming for a win-win situation where both parties gain from the cooperation. *"In the end, it is all about the win-win situation where both parties benefit from the cooperation."*

MNF_C:

MNF_C expressed willingness to pay for data-driven services and products, provided they contribute to improving their business model. They emphasised the importance of such services in enhancing turnover, fulfilling customer needs, and increasing customer satisfaction. They stated: *"What is*

important is that your business model can be improved. Once that is possible, there is also willingness to pay."

They provided an example to illustrate their readiness to invest: *"Suppose hypothetically that it yields me a return improvement of €25,000 per year, then I would be willing to pay, for example, €5,000 for that."* This suggests a willingness to pay approximately 20% of the additional return, indicating a ratio of 1:5.

In terms of pricing models, MNF_C indicated that the pay-per-use model is most suitable for them, as it allows payment based on actual data usage. They remarked: *"From our perspective, pay-per-use would be the most obvious, because then you pay for what you use."*

When asked if this referred to data as a product, they confirmed: *"Exactly. You could also put it in a subscription form, which then goes more towards licensing."*

They acknowledged that a subscription or licensing model could also be appropriate, depending on the nature of the services: *"Yes, I think those are the models—pay-per-use, licensing, subscription—that fit best."*

For data as a product, MNF_C considered pay-per-use or subscription models as most appropriate, while for data-driven services, a subscription model would likely be the best fit. They noted that monetising data-enabled performance outcomes is less relevant to them at the moment, as it is not yet applicable in their sector.

MNF_D:

MNF_D was critical of the idea of data monetisation within their collaboration with Toelevering Online. They felt that paying for data intended to improve collaboration and processes seemed inappropriate.

They stated: *"Ultimately, as I said earlier, you want the platform Toelevering Online to get better. And with the help of data, I think you can achieve that... But then to say to a company: 'You must improve, and if you want the necessary data, you have to pay for it,' that sounds strange of course."*

They believed that both parties benefit from sharing data without attaching a price tag, contributing to a mutually beneficial situation: *"If Toelevering Online grows, we get more orders, and if we manufacture better window frames, they get satisfied customers. It's a win-win. So, in the end, everyone benefits from this collaboration. If we perform well, Toelevering Online profits, and vice versa."*

However, MNF_D recognised that certain data could be valuable, such as seasonal forecasts and insights into complaints. While it felt unusual to pay for data meant to enhance collaboration, they might be willing to pay for specific types of data, particularly competition insights or benchmarking information. They stated: *"Yes, perhaps. It would be interesting, for example, to know if other suppliers are facing*

the same problems as we are. Do they have the same problems, or do they not? That could be useful information."

They added: *"We would, in any case, be willing to pay for competition insights, if customers, for example, start rating factories on the platform, as you also see at Bol.com... As we do want to position ourselves well within our own industry, the wooden window frames."*

Regarding pricing models, MNF_D indicated that the Pay-Per-Use (PPU) model would be suitable for one-off insights: *"I think that if you need information once, you would choose a pay-per-use model. For example, if I want to see over the past year where other factories have had their complaints, then you pay per time for that information."*

For more continuous access to data, such as seasonal insights and forecasts, they considered a licensing model more appropriate: *"But if you want seasonal insights or want to look ahead to trends for the coming year, then you pay for a licence."*

They noted that freemium and advertising models were of little relevance to them at present, as advertising does not offer direct added value within their context.

MNF_E:

The CCO of MNF_E indicated that they would not be willing to pay for access to data generated in collaboration with Toelevering Online. They viewed the relationship as a partnership where both parties contribute and benefit equally. They stated: *"I can be very brief about that: it is a joint responsibility. I would never be willing to pay for this to Toelevering Online. I think you do that together and invest in it together. Toelevering Online is a platform where people can easily order and have window frames delivered. We, as a silent producer behind the scenes, have to invest in that together. Both parties put their hours into it."*

The CCO emphasised that MNF_ could provide valuable data to Toelevering Online on trends in their orders, while Toelevering Online could offer insights into customer behaviour and performance metrics. They expressed: "*We also have a lot of interesting data for Toelevering Online, because we have hundreds of customers who place orders with us, and from that we can see trends. For example, we see that a certain type of profile is being sold more and more often, or that a certain colour combination is becoming more popular with our contractors. We can point that out to Toelevering Online: 'Hey, this profile is gaining popularity, do something with it.' So, I think this should be a joint process."*

While acknowledging that this could be arranged contractually, MNF_E opposed a payment model where they would have to pay monthly for access to the data: *"No, I think you should develop this together [real-time dashboards or using QR codes]. Possibly you can contractually lay this down in the*

form of a bonus scheme, but I would not want to pay €50 per month for certain insights or data. That belongs to the partnership."

They reinforced their stance against paying separately for data services, seeing it as part of the collaborative effort between both parties.

Conclusion:
Observations revealed varied perspectives among the manufacturers regarding external data monetisation. MNF_B and MNF_C were willing to pay for data services that offered tangible benefits such as cost savings or increased turnover, favouring licensing or pay-per-use models. In contrast, MNF_D and MNF_E shared the view that data initiatives should be part of the partnership and were unwilling to pay separately for data services, emphasising mutual collaboration and a win-win situation benefiting both parties. MNF_A showed little interest in paying extra for data services, seeing limited applicability in their industry. Overall, the manufacturers highlighted that integrating data-driven initiatives into the collaboration should enhance mutual benefits without necessitating additional payments.

Factors influencing the execution of data-driven business models

MNF_A:
MNF_A identified financial constraints as the primary challenge in adopting more advanced data-driven services. They expressed concerns that high costs might prevent them from implementing certain technologies or services: *"The main challenge would be financial. If the costs are too high, we might not be able to implement certain technologies or services."*

They emphasised the necessity for any data-driven products they adopt to provide tangible benefits, specifically in saving time or money and contributing to increased turnover: *"We need to ensure that any data-driven products we adopt save time or money and help increase turnover."*

While they see value in accessing more real-time data, MNF_A acknowledged a lack of infrastructure and resources required for in-depth data analysis or advanced data-driven services: *"We see value in having access to more real-time data but recognise that we don't currently have the infrastructure or resources for in-depth data analysis or advanced data-driven services."*

In terms of organisational capabilities, MNF_A does not have a dedicated data analytics department. Employees handle data as part of their general roles, utilising basic tools: *"No, we don't have a dedicated department for data analytics. We're not a large enough company for that."*

Their data handling primarily involves the use of Excel and receiving some data from external platforms: *"We mostly work with Excel, and we receive some data from external platforms, but nothing as advanced as Power BI."*

They believe they are comfortable using the data they currently receive to plan production and manage operations but recognise limitations due to the absence of advanced analytical tools. Regarding trust issues, MNF_A reported no concerns, attributing confidence to existing agreements that govern their collaborations: *"Trust isn't an issue; we have agreements in place that cover everything."*

They emphasised the importance of data accuracy and compliance with regulations such as GDPR: *"We follow GDPR rules, so if there's any sensitive data, it needs to be handled according to those regulations."*

They stressed the potential impact of incorrect data on their operations, noting that errors could lead to production delays, losses, or incorrect orders: *"Incorrect data would definitely cause problems. If the data is wrong, we could end up with production delays, losses, or incorrect orders."*

MNF_A highlighted that such inaccuracies would affect their relationship with partners, underscoring the importance of receiving accurate data: *"That would affect our relationship, so it's very important that we receive accurate data."*

MNF_B:

MNF_B demonstrated a proactive approach towards innovation and data utilisation. They have already made strides in embracing data-driven technologies, utilising big data supported by AI-driven software to optimise business processes. They stated: *"We are working on something that allows us to read vibrations, moisture content, and temperature in the window frame."*

The company has deployed an established data analysis team, dedicating one day each week to analysing data and improving their NFC chip: *"We have a fixed team that spends one day a week analysing data, tweaking the NFC chip, and ensuring we make progress in data analytics within [MNF_B]."*

This structural approach indicates a conscious commitment to engage with data-driven initiatives. While they are comfortable interpreting and using data, they acknowledged that business decisions are not yet systematically made based on data: *"So I can say that we are reasonably comfortable in interpreting and using data. However, making business decisions is not always done based on data."*

Regarding challenges, MNF_B noted a limited use of advanced data analytics and visualisation tools, currently relying on basic tools like Excel. They expressed a desire for improved data integration and the adoption of more sophisticated tools: *"We would also like a better linkage for the delivery of orders.*

We are currently still working with CSV files, but from our ICT department, they would much prefer an API connection."

They recognised the significant impact of incorrect data on their operations, emphasising the need for reliable and accurate data exchange due to their goal of operating an "unmanned office": *"We aim for an unmanned office. So, receiving incorrect data causes many problems."*

Trust emerged as an important factor for MNF_B. They stressed the importance of mutual trust in their relationship with the platform company and suggested establishing formal data security agreements to ensure data privacy: *"It is important that there is mutual trust to (continue to) work together long-term. Perhaps it is a good idea to draw up some kind of non-disclosure agreement for process/company critical information."*

Despite these challenges, MNF_B sees no barriers to collaboration with Toelevering Online in the context of data-driven products and services: *"No, I don't think so." [In response to whether there are factors hindering data-driven value creation]*

They emphasised that improving data exchange and minimising errors benefits both parties: *"The better you can exchange the right information with data and minimise errors, the more both parties' benefit."*

This outlook reflects their high willingness to innovate and improve work processes using data, aiming for a win-win situation in their collaboration with the platform company.

MNF_C:

MNF_C is well-equipped to use data in their daily operations, collecting information from both production and financial systems. They utilise Power BI dashboards to monitor and improve performance. Although not all KPIs are fully established, the company is actively working to develop their data literacy and infrastructure. The COO explained: *"We are fully engaged with that, especially with data, to see how we can improve our business operations. We gladly embrace these kinds of things if we can work with them."*

They recognise the importance of strong data analysis skills in deriving value from data: *"Yes, that is correct. We are aware that strong data analysis skills are essential to derive value from data."*

MNF_C emphasised their efforts in data collection and utilisation: *"We do quite a lot with that. We collect a lot of data and make management information from that data. Based on that, we make decisions."*

Regarding challenges, the COO highlighted the necessity for data to be delivered in a usable format: *"It is mainly about the data being delivered in the right language, for example via XML or another usable format. If the language in which it is delivered is usable, we can do a lot with it."*

They stressed the importance of handling data securely, especially since the platform works with multiple suppliers: *"Toelevering Online works with multiple suppliers. When data is shared with our competitors, you have to look carefully at how you approach that. Ultimately, you want to strengthen your business operations, not weaken them."*

The biggest concern is the potential risk of data being shared with competitors, which could weaken MNF_C's competitive position. Trust is therefore a crucial aspect of their relationship with the platform, particularly when sensitive data is involved. They prefer receiving raw data instead of analysed data to maintain control over the insights derived and reduce the risk of misinterpretation: *"Receiving raw data instead of analysed data gives us more control over the insights we derive from it, reducing the risk of misinterpretation."*

The COO emphasised that working with incorrect data poses a significant risk to decision-making: *"Exactly, in any research you do, it is essential that your dataset is correct. That is the most important basis. You must be able to trust that you are working with a correct dataset. That is often also the difficult part, because datasets are not always reliable."* Despite these challenges, MNF_C is capable of working with datasets and extracting valuable insights. They emphasised the importance of data security and trust: *"It is very important that you know your data is in a safe place."*

In terms of organisational capabilities, MNF_C is actively developing their data literacy and infrastructure, demonstrating strong innovation capability to execute data-driven business models while being mindful of challenges related to data sharing, security, and accuracy.

MNF_D:

MNF_D currently possesses limited data analysis capabilities, relying primarily on Excel and a basic Power BI setup for sales analysis. They acknowledged a need to improve their skills for making data-driven decisions and emphasised the importance of looking beyond day-to-day operations: *"We are currently too occupied with the daily business and not looking ahead to the future enough. But that will become an important point in the coming years."*

Their main challenge lies in implementing a new ERP system, which must be fully operational before they can effectively adopt data-driven products and services: *"At the moment, not yet. The ERP system must first be properly in place before our organisation is ready for the adoption of data-driven products and/or services."*

Allocating time and focus to leverage data for process improvements is a priority, as is internal acceptance of data's added value: *"We are not working on it yet, and that must then get the focus... Time must be made available for it, and internally the added value must really be seen."*

MNF_D highlighted their willingness to innovate, noting that once the ERP system is established, more advanced data-driven strategies could be pursued. They also recognised the potential for real-time, high-level technological collaboration, provided trust remains intact and is nurtured by both sides: *"I think precisely because of the good understanding between us and Toelevering Online, we could get such things done quickly. You have to seek that synergy."*

Although no immediate trust issues were identified, the importance of mutual confidence and long-term reliability was acknowledged as vital for future data-driven collaborations.

MNF_E:

MNF_E currently operates with limited systems for fully data-driven work, relying on In2CRM for commercial data and manual Excel sheets for production and planning. However, they have shown a strong willingness to innovate, having hired a new employee to implement a new ERP system. This development is expected to enhance their ability to collect, analyse, and utilise more data in decision-making. *"We have hired someone who starts on 1 January, and one of his first tasks is to introduce and implement a new ERP system."*

The main challenge lies in implementing new systems and improving data literacy within the organisation. Many processes are still manual, limiting the speed and accuracy of data-driven decisions. Moreover, MNF_E noted that the platform company also has not yet fully optimised its systems, making it a matter of time, investment, and increased expertise on both sides: *"No, it's more a matter of time, willingness, the right people, and the right systems... So, it comes down to time, knowledge, and investing in the right resources."*

They acknowledged that data initiatives require collaboration and trust, emphasising that both parties—manufacturer and platform—must commit to developing and integrating data-driven solutions. MNF_E viewed this process as a joint endeavour rather than a service one party pays for: *"I can be very brief about that: it is a joint responsibility. I would never be willing to pay for this to Toelevering Online. I think you do that together and invest in it together."*

Building trust and aligning systems and capabilities were seen as key steps towards more efficient and informed decision-making, with MNF_E emphasising careful handling of information flows and a willingness to address issues as they arise: *"We are now working on a new contract for this year, so we would include these kinds of things in that. Ultimately, it's about trust in each other and carefulness in handling information flows."*

"If there is incorrect data, it is not as if we immediately stop the collaboration. As long as it is made discussable, it is not a big problem."

Conclusion

The execution of data-driven business models among the manufacturers is influenced by a combination of innovation capability, organisational challenges, required capabilities, and trust considerations. Manufacturers like MNF_B and MNF_C are actively engaging in data initiatives and possess organisational capabilities to leverage data effectively. Others, such as MNF_D and MNF_E, recognise the need for future developments in their systems and skills to fully adopt data-driven solutions. Trust emerged as a critical factor for all manufacturers, with an emphasis on data security, accuracy, and mutual confidence in the collaborative partnership. Challenges identified include financial constraints, technological readiness, data accuracy, and resource allocation, which affect the pace and extent of adopting data-driven business models.

Appendix P: Within-case Platform

This appendix provides a detailed elaboration of the within-case analysis, exposing the perspectives of the case company employees. This has once again been done using the identified aggregated dimension, shown in Table 11.

Table 11: Operations department perspective

Platform Business Perspective	
2nd order themes	*Aggregated dimensions*
Current level of digitalisation Current level of data exchange with manufacturers Current technological infrastructure level that supports data exchange Factors influencing data-driven readiness level manufacturing partners	Data-driven readiness level
Valuable information for manufacturers Data-driven value creation preferences Data-driven value creation perception	Data-driven value needs
Perception about Data-as-a-Product Perception about Data-enhanced Products Perception about Data-driven Services Perception about Data-enabled Performance Outcomes	Suitability of DDVPs
Short term preferences towards DDVPs Long term potential of DDVPs	Vision about DDVPs
Perspective towards monetising data within partnership manufacturer – platform Preferred external data monetisation strategy Perception towards pricing models Factors that influence manufacturers' willingness to pay for data-driven value created by the platform	External data monetisation
Innovation capacity of manufacturers Maturity level of manufacturers Necessary manufacturing capabilities Manufacturing challenges	Factors influencing the execution of data-driven business models - Manufacturers
Necessary platform capabilities to create data-driven value Platform business challenges Current and future vision of the platforms' business model	Factors influencing the execution of data-driven business models – Platform business

Data-driven readiness level

Current level of digitalisation

The level of digitalisation among manufacturing partners varies significantly. While some partners partially automate order processing using XML files, others rely on manual methods. For instance, *"Two factories for wood and one for plastic and aluminium work digitally... others process orders manually, transferring data from PDFs to their systems"* [OPS_WOOD]. Despite the provision of digital files,

manual integration remains common: *"We provide them with XML files, but they often redraw orders manually"* [OPS_PVC/ALU]. The platform acknowledges this fragmented digital maturity: *"We are still at the beginning of our digital and data maturity"* [OPS_MAN].

Current level of Data Exchange with Manufacturers

Data exchange between the platform and manufacturers remains limited and inconsistent. While performance dashboards are shared, there is no real-time collaboration. The Operations Manager described the current situation around data erasure as follows:

"What we mainly share now is how many hours they produce for us, how much capacity we utilise, and whether this aligns with the agreements. Occasionally, in cases of exceptions—such as a partner underperforming, based on insights derived from data we use and retain internally—we share more detailed information about what we believe might be causing the issue. However, this is all still quite high-level. We do not yet engage in weekly, detailed discussions around data."

Following on from this, both product managers indicated that performance is discussed in more detail during quarterly meetings with manufacturing partners: *"The intention is to share delays weekly, but that doesn't always happen. Once a quarter, we dive deeper into the figures to see where improvements can be made"* [OPS_PVC/ALU].

Overall, the platform acknowledges its data-sharing processes are still rudimentary: *"Our agreements with partners are still quite basic when it comes to data exchange"* [OPS_MAN].

Current Technological Infrastructure Supporting Data Exchange

The technological infrastructure supporting data exchange is underdeveloped, relying heavily on manual processes and static data sharing. Most communication is conducted via email or static files: *"Most of it happens via email contact. We have an internal dashboard for partner performance. An overview is then sent to the partners, either as a PDF of a dashboard or an Excel list of their performance. There is no active exchange or real-time access to that data"* [OPS_WOOD]. There are significant disparities between manufacturers in terms of technological adoption: *"Some manufacturers, such as MNF_B and MNF_D, differ greatly in this regard. At MNF_B, everything is still done manually, while MNF_D already works with robots"* [OPS_PVC/ALU]. These differences highlight the need for improved infrastructure to facilitate seamless collaboration.

Factors influencing Data-driven Readiness

Several factors influence the data-driven readiness of manufacturing partners, including traditional attitudes, financial constraints, and operational scale. Traditional mindsets remain a barrier: *"There are also factories that do not see the future of digitalisation. They think, 'I can automate, but I also have two or three people doing that work.' That is how they envision it"* [OPS_WOOD]. Financial challenges

further complicate digitalisation efforts: *"Geographic location plays less of a role, but I know that MNF_A, for example, received subsidies to digitalise. They were given significant funding, which enabled them to build a digital system that we now also use for our XML files"* [OPS_PVC/ALU]. Larger manufacturers are more likely to adopt digitalisation: *"For larger parties, such as MNF_D, where investors put millions into their machine parks, it has to deliver a return. Then these kinds of questions naturally arise"* [OPS_MAN]. On the other hand, smaller manufacturers focus on short-term survival: *"At smaller frame factories, where much is done manually, and they look from month to month at whether they have earned enough, there is a different kind of pressure"* [OPS_MAN]. The platform is aware that some partners who initially aligned with its goals may no longer meet current expectations: *"What we also see is that the partners with whom Toelevering Online initially started sometimes can no longer meet our ambitions"* [OPS_MAN].

Data-driven value needs

The platform identifies actionable insights as key to delivering value to manufacturers by improving operations, aligning production with demand, and addressing market trends. A primary focus is providing feedback on customer behaviour to help manufacturers refine their offerings. As one Operations staff member explained:

"It is about knowing what sells well, what customers choose, or where they drop off and why. If a customer does not choose a particular frame because they cannot find the right colours, we need to record this and inform our partners: 'Customers want more colour options." [OPS_WOOD].

This enables manufacturers to better align their products with customer needs. Similarly, operational insights such as delivery reliability and process inefficiencies, are deemed crucial. These insights allow manufacturers to address root causes of issues and improve performance:

"Insights must be deep enough to trace the root cause: why was the order not delivered on time as agreed? Was the glass late? Was there damage to the profile? Such insights are very valuable because you can immediately take action and improve the process" [OPS_WOOD].

Predictive data further supports manufacturers by enabling more efficient production and capacity management, especially during demand fluctuations. As stated by one staff member:

"The most value lies in running a factory as efficiently as possible through predictive data. If we can consistently provide predictable allocations to a factory, efficiency increases, freeing up production capacity, and that is where the real profit lies." [OPS_PVC/ALU]

The platform also highlights the value of benchmarking and comparison to motivate manufacturers to improve: *"It would be interesting to show how one manufacturer performs compared to another, or*

against the benchmark. That kind of insight can motivate improvement" [OPS_MAN]. This not only fosters competition but also supports alignment with best practices.

Collaboration across the supply chain is another area of potential value. By leveraging data, the platform can address inefficiencies at the component supplier level. For instance, *"If we see that a certain percentage of hardware fails after two years, we could share that insight with the supplier to improve the product. Addressing this with the hardware supplier, rather than the frame manufacturer, adds more value"* [OPS_MAN]. This approach enables manufacturers to focus on their core production while the platform drives quality improvements across the value chain. This holistic approach to value creation underscores the platform's commitment to enhancing the entire ecosystem.

Finally, it is noted that the platform should not interfere with machine data from individual manufacturers. Instead, it should focus on collecting general data about the entire frame to develop valuable insights within its own software. As expressed: *"We don't control machines. A software platform like ours cannot generate machine data; that's highly specific and dependent on the settings of the machine itself. We should focus on collecting general data about the frame and setting that up in our software to deliver valuable insights."* [OPS_WOOD].

Suitability of DDVPs

Perception towards Data-as-a-Product:

The perception towards providing data-as-a-product is largely sceptical among the platform's operations team. The consensus is that simply offering raw or unprocessed data to manufacturers has limited value. For example, *"If you throw raw, unprocessed data over the fence, you cannot expect them to do anything with it"* [OPS_PVC/ALU]. This scepticism stems from manufacturers' lack of readiness to analyse and utilise such data. *"They are window frame producers; they are very good at making frames. But analysing our data is a step that hasn't yet been integrated into their production process"* [OPS_WOOD].

While a few partners, like MNF_A, might have the skills to make the most out of data-as-a-product, most manufacturers don't have the know-how or resources to use it effectively. *"With data-as-a-product, you assume the other side knows what to do with the data and is willing to work with it. For most, that's just not true"* [OPS_MAN]. Therefore, this DDVP is considered unsuitable for collaboration with most manufacturers due to its limited applicability and the additional burden it places on partners.

Perception towards Data-enhanced Products:

The concept of augmenting window frames with data receives limited enthusiasm in the current context. As noted, *"Adding data to an existing product is not something I see in the context of window frames"* [OPS_WOOD].

However, its potential value in lifecycle management is recognised. As the Operations Manager stated: *"We are now in the phase where we primarily sell, order, produce, and deliver frames. But we will increasingly deal with the lifecycle of the product, such as maintenance, damage, or replacements. Service requests ultimately return to the manufacturer because a part is broken or needs to be delivered. In such situations, it would be useful to know which materials were used and where the product came from (bill of materials). A QR code could help with this. If you can quickly identify and order parts in this way, it saves a lot of time in preparing and handling service requests"* [OPS_MAN].

Although this DDVP may provide value in the future as the industry shifts towards lifecycle-oriented services, its relevance to the current collaboration between the platform and its manufacturing partners is limited.

Perception towards Data-Driven Services:

Data-driven services are widely regarded as the most valuable and applicable data-driven value proposition for collaboration with manufacturers. These services provide actionable insights that improve processes and decision-making, making them integral to the platform's collaborative approach. One operations team member noted, *"We present dashboards quarterly, and they find this very valuable. It's about looking forward: what will happen?"* [OPS_PVC/ALU]. By offering tailored insights rather than raw data, the platform helps manufacturers focus on their strengths. *"We enrich the data, present it, and provide them with insights into their production processes"* [OPS_MAN].

The practical application of these services is highlighted in the potential for manufacturers to access a comprehensive view of their operations. *"If I make it concrete, a manufacturer could have a portal where they can see how their factory is performing. We enrich the data, present it, and they gain insights into their production processes"* [OPS_MAN]. This approach ensures that manufacturers can make informed adjustments to improve operational efficiency.

Predictive analytics within these services is seen as particularly promising. For instance, predictive insights could help manufacturers anticipate trends and production bottlenecks. *"If we tie the whole chain together, we move towards managing exceptions rather than maintaining the process. That's where predictive insights add value"* [OPS_MAN].

The platform's selective collaboration model enhances the value of these services, fostering a mutual improvement strategy. As one participant explained, *"We provide insights so that the frames we deliver are always of good quality, delivered on time, and complaint-free. We don't just throw data at them; we want to improve together"* [OPS_WOOD]. By aligning insights with manufacturers' operational needs, data-driven services offer a clear win-win scenario, ensuring both platform and partners benefit from improved performance and efficiency.

Perception towards Data-enabled Performance Outcomes:

The use of advanced technologies, such as sensors and chips embedded in products, to generate data-driven performance outcomes is viewed with some potential but limited immediate relevance to manufacturers. The platform operations team acknowledges that while these technologies could be valuable in certain contexts, they may not currently align with the priorities of frame manufacturers. As one respondent noted,

"In utility construction, where you build large office buildings, this can be very interesting, especially for building maintenance or similar parties that want insights into the state of maintenance. But for frame manufacturers, they assume the profiles will perform as specified by their supplier" [OPS_MAN]. This reflects a belief that frame producers do not yet see significant value in actively leveraging such data in their day-to-day operations.

Future applications, particularly within a larger ecosystem, are recognised: *"If we grow into a larger platform, where we deliver all kinds of products including frames, we could use this data to go further up the supply chain. For instance, we could approach Schüco or Gealan with satisfaction scores and complaints to drive improvements, but this would be more relevant for our suppliers rather than the producers themselves"* [OPS_MAN]. However, within the current collaboration, there is limited alignment between this DDVP and manufacturers' priorities. *"Explicitly, the link between the platform and frame manufacturers is not something I immediately see as useful"* [OPS_MAN].

Although immediate value is limited, specific use cases such as proactive maintenance alerts or QR-code tracking could simplify processes like part replacement or repair.

Vision about DDVPs

The platform's short-term focus is on enhancing data-driven services through dashboards that provide manufacturers with insights into production performance, market trends, and customer needs. As described: *"Dashboarding: providing the best possible insight into how we perform, where things go wrong, and what we can improve. It's about ensuring every frame reaches the customer at the right time, ready for perfect installation without causing complaints or concerns"* [OPS_WOOD]. Similarly, the Data & Analytics department emphasises the importance of making dashboards more accessible. *"Let's start by making the dashboard we already have available to our partners. Once they are evaluated on metrics like on-time delivery or first-time-right performance, they will naturally improve"* [CDO].

This effort aims to improve operational efficiency and strengthen collaboration, with a current supplier portal already in use: *"Insights into how manufacturers relate to their partners and the market, combined with knowledge about their factory and customer products, are available in a dashboard in the supplier*

portal, which is already live and in use. I see this as a platform service that can be expanded with additional functions" [OPS_MAN].

In the long term, the platform envisions evolving towards data-enabled performance outcomes by connecting data across the supply chain to drive improvements. This includes helping manufacturers understand complaints, pinpoint problems, and benchmark themselves against competitors. *"We add more value by helping manufacturers work smarter, more easily, and efficiently, rather than focusing on product quality itself. If we connect all the data and show where the complaints are, where the problems lie, and how they compare to their competitors, they can improve faster and see where they are falling behind"* [OPS_MAN].

The Data & Analytics department echoes this with an emphasis on advanced analytics, such as sales and rolling forecasting, to drive predictive insights. *"We now have substantial data that can help with rolling and sales forecasting, which would be incredibly valuable for manufacturers"* [CDO]. However, realising this vision will depend on the development of advanced technologies and broader data integration.

External data monetisation

The platform's approach to data monetisation within its partnership with manufacturers emphasises fostering collaboration and mutual improvement rather than directly charging for data. Many stakeholders agree that imposing fees for insights could hinder partnerships. *"If we charge for data that helps them improve, but they must first pay for that information, it conflicts with how we want to collaborate"* [OPS_WOOD]. Instead, the focus is on using data to enhance operational efficiency and align with mutual goals. *"We aim to help manufacturers work smarter, more easily, and efficiently, creating a positive impact on both their performance and ours"* [OPS_MAN].

The Data & Analytics department supports this indirect monetisation approach, seeing it as essential to the platform's strategy. *"Indirect data monetisation is a prerequisite for realising our strategy. It's more applicable to our partners, while direct monetisation could have more potential for customers"* [CDO]. By embedding insights into collaborative frameworks, the platform can encourage adoption without disrupting partnerships. *"Via data wrapping, they know exactly how well they perform compared to others. For instance, if a factory currently produces frames up to 3.5 metres but could make 4-metre frames, we could show them the market potential they're missing"* [CDO]

Direct monetisation strategies, such as selling data or insights, are seen as less feasible in the current context. The Operations department highlights the challenges of implementing such models. *"We are not an open platform where anyone can offer their product. We make many agreements upfront about product standardisation and pricing. In such a case, direct monetisation of data is less interesting, as*

changes do not directly create market opportunities for them on our platform" [OPS_MAN]. Similarly, the Data & Analytics team cautions against selling raw data, which may be of limited use to manufacturers. *"Selling data doesn't make sense if the factory can't do anything with it. They won't pay for something they can't utilise"* [CDO]. However, selling pre-analysed insights is considered more viable. *"If you offer them a ready-made analysis, complete with conclusions, they see immediately what they can do with it, making it much more tangible"* [CDO].

When discussing pricing models, the platform business agrees that rigid approaches, such as pay-per-use, are impractical. *"That would make things unnecessarily complicated"* [OPS_PVC/ALU]. However, subscription models or performance-based fees are seen as more viable, particularly for premium services. *"You could say: for an additional fee, a premium subscription gives access to all our data. That's something I can envision"* [OPS_MAN]. Trial periods or performance-linked fees also appeal as flexible approaches to build trust and demonstrate value. *"Let them experience the value first, and as they improve, you can link their performance to a fee"* [OPS_PVC/ALU]. The Data & Analytics department also sees potential in a hybrid approach. *"A standard package could include basic data-driven services shared for free as part of the collaboration, while extra complex functionalities could come with a fee"* [DATA ANALYST].

Manufacturers' willingness to pay is shaped by the perceived balance of benefits and costs. Some express concern about paying for insights that also benefit the platform: *"One of the barriers is that we have a shared goal—to perform as well as possible. Partners might say, 'Why should I pay for something that also benefits you, like me working faster or better?'"* [OPS_MAN]. Others highlight existing demands on manufacturers, making additional fees seem unreasonable. *"We already ask a lot from our producers, such as reserving capacity without compensation, offering sharp purchase prices, and quick delivery times. And then we also want to show how they perform and ask them to pay for that? That feels misplaced"* [OPS_WOOD]. The Data & Analytics department acknowledges this complexity, noting that *"It's not just that they want something from us; we also want something from them. That makes it a bit grey"* [DATA ANALYST].

Factors influencing the execution of data-driven business models – Manufacturers

The platform recognises that successfully implementing data-driven business models with manufacturers depends on several factors, including their innovation capacity, maturity level, necessary capabilities, and specific challenges.

Innovation capacity among manufacturers varies significantly. While some partners are proactive in adopting advanced technologies, such as XML integration and chips in frames, others remain reliant on manual processes. *"There are producers who always want to be ahead; for example, they already have chips in their frames because they want to innovate. But others still print PDFs and manually transfer*

the data" [OPS_WOOD]. Additionally, transitioning to new systems often presents substantial challenges. *"They often need to overhaul their entire process, sometimes switching to other software. Every change in software has implications, and that has a significant impact"* [OPS_WOOD].

Maturity levels also influence readiness to adopt data-driven approaches. Larger and more professional manufacturers tend to be more data-driven due to the scale of their operations. *"When investments grow, and organisations become more professional, you see the importance of making efficient decisions and the need for data to support those decisions"* [OPS_MAN]. Smaller or less mature manufacturers may lack the necessary infrastructure or prioritisation for these initiatives. *"For some partners, the need to work with data is simply greater, for example, if they handle 40 orders a day and need to align their production"* [OPS_PVC/ALU]. The Data & Analytics department highlights that partners already have access to a partner portal, which can simplify the adoption of data-driven services. *"Our partners already have a portal where they can log in and view information. I expect that if we offer smart services, we will do so through that portal and not externally. They already have access and are capable of logging in"* [CDO].

The necessary manufacturing capabilities to utilise data effectively vary widely. While some partners actively use dashboards and derive meaningful insights, others struggle to translate data into actionable outcomes. *"Factories find it nice to see dashboards with information, but taking the step to actually use them is still difficult"* [OPS_PVC/ALU]. Larger partners like MNF_A often employ dedicated data analysts, while others lack such expertise. *"At MNF_A, someone actively works with dashboards and data, but at MNF_X, they have no focus on data analysis. We often have to tell them what they can do with it"* [OPS_MAN]. The Data & Analytics department stresses that interpretation challenges stem from the traditionally manual nature of the manufacturing sector. Despite that, it does see prospects for developing data-driven initiatives within the collaboration: *"The construction sector is still quite traditional, but with the right guidance, interpretation need not be difficult"* [DATA ANALYST].

The challenges in adopting data-driven models are also tied to digitalisation readiness and software integration. *"It depends on the preparation software factories use and how it connects to APIs. Many still need to switch software to realise an API integration"* [OPS_WOOD]. Technical limitations, such as managing API or SFTP integrations, also pose barriers. *"Is the partner technically capable of providing data daily through an SFTP server? That's my biggest technical concern"* [CDO]. However, leveraging the existing partner portal reduces some of these barriers by providing a familiar, centralised environment for accessing data-driven services.

Additionally, cultural resistance and a lack of perceived benefits slow adoption. *"Some traditional producers want to digitalise but do not see the value yet or think their volumes are too small to justify automation"* [OPS_WOOD]. Some organisations also fail to act on data insights: *"If you want to*

improve your organisation based on data, you must periodically use it and analyse whether a change results in an improvement. Some organisations will say, 'We're doing poorly, let's try to improve,' but then take no action" [OPS_WOOD].

Moreover, the willingness to adopt data-driven methods often depends on openness to change. *"You must be open to digitalisation and understand what we are doing. That is not always easy because they are not used to working with data"* [OPS_PVC/ALU]. Furthermore, traditional partners may face difficulties in trusting data if they are not used to working with it, mentioned by the Chief Data Officer. *"The biggest obstacle is trust in the data. If it doesn't match their expectations, they'll quickly blame the external party"* [CDO].

To fill these barriers, the platform is increasingly looking to work with software suppliers to support manufacturers. *"We are therefore increasingly seeking cooperation with suppliers of drawing programmes and work preparation programmes to help them with digitisation, because on their own they often do not succeed."* [OPS_PVC/ALU]. However, progress among traditional partners remains slow. *"For the more traditional players in our landscape, this process will take longer than for the more progressive players"* [OPS_MAN]. Adoption requires time, tailored support and ongoing collaboration to address barriers of digital readiness, cultural resistance and operational maturity.

Factors influencing the execution of data-driven business models – Platform Business

Besides factors related to manufacturers, the platform organisation acknowledges its own critical role in the success of data-driven business models. This includes the need to develop specific capabilities while anticipating and addressing challenges that arise during the implementation process.

Platform Capabilities:

The platform benefits from a strong technological foundation, with modern tools and infrastructure. *"Everything we do is in the cloud, and the tools we use are API-first and API-driven. Technically, that shouldn't be a problem*" [CDO]. However, while the infrastructure supports data collection and integration, utilisation remains underdeveloped. *"We have a lot of data but cannot always unlock it effectively. We also don't have everything available in data yet"* [OPS_WOOD]. The Data & Analytics department shares this view, recognising the need for improvements in interpreting and using data to create value. *"The focus is often on internal improvements, but using data externally to create value is a step we still need to take"* [CDO].

The platform acknowledges varying levels of data-driven culture within its organisation. While some employees demonstrate adequate data literacy, others need further development to maximise the potential of data-driven solutions. *"For those who need it, we are at an acceptable level, but it's not something we score highly on overall"* [CDO]. A cultural shift is necessary to expand the focus beyond

internal efficiency. *"Many people are still very internally focused, using data to improve internal processes, but deploying data externally to add value is a step we need to take"* [CDO].

Interpretation and presentation of data are critical areas for improvement. *"We are not very good at determining exactly what we want to do with the data or how we want to present it"* [OPS_PVC/ALU]. The Data & Analytics team emphasises the importance of clarity when communicating insights. *"We sometimes give too much information when just one figure would suffice. Interpretation must be clear and simple"* [DATA ANALYST]. Despite these challenges, the platform has a motivated and skilled team capable of supporting its data initiatives. *"The knowledge, skills, and willingness to make it work are certainly there"* [DATA ANALYST].

Platform Challenges:

Data accuracy and input remain significant barriers to success. *"Ensuring data is correctly entered from the start is the biggest limitation. Systems need built-in safeguards to minimise the chance of errors"* [CDO]. Low data quality further compounds this issue, as noted by Operations: *"The data quality is currently disappointing. That's the biggest problem... The data quality needs to be in order before we can take further steps"* [OPS_PVC/ALU].

Privacy and security concerns are also important considerations. *"If data is anonymised, it's less of an issue"* [DATA ANALYST]. However, the Data & Analytics department highlights the risks of misuse. *"How do we ensure partners don't misuse the data, like taking insights to competitors?"* [CDO]. Trust-building is therefore essential to mitigate these risks.

Another challenge lies in effectively communicating insights. Both departments agree on the need for clear, actionable information tailored to users. *"We sometimes want to present a fully supported story, but often one key figure is enough. If more depth is required, there can be a mismatch between skills and needs"* [CDO]. Misaligned expectations between the complexity of insights and users' capabilities can create barriers. *"We can gather more and more data, but it's crucial to explain where it comes from and what it means*" [DATA ANALYST].

Additionally, the platform must balance improving data insights with its core operations. *"We are primarily focused on monitoring production processes. Much beyond tracking delays and complaints, we haven't progressed yet"* [OPS_PVC/ALU].

Vision on current and future platforms' business model:

The platform's business model is perceived differently among team members, reflecting its ongoing evolution. From the perspective of OPS_PVC/ALU, the platform is in its first phase, focused on monitoring production processes with minimal data integration. *"If you look at how long we've been working with data, we're still in the first phase"* [OPS_PVC/ALU]. Similarly, OPS_WOOD sees the

platform as operating as an industrial product service platform, where data is used sparingly to assist partners. *"We are an industrial product service platform, using some data within the chain and trying to apply it to help our partners. But it is not yet fully developed or digitalised"* [OPS_WOOD]. However, OPS_MAN describes the platform as being in the transactional phase, where customer order data is transferred efficiently to manufacturing partners for production and delivery. *"If you look at our current chain and the integration from Toelevering Online, we primarily ensure that customer order data reaches a partner as quickly as possible so they can produce and deliver. That's where the process ends"* [OPS_MAN].Despite these differing viewpoints, there is consensus that the platform operates with low data integration, limiting its ability to fully leverage data-driven solutions.

Looking ahead, the ambition is to evolve into an industrial digital platform ecosystem: *"We must move towards a digitally integrated chain where we can use our data-driven solutions to guide everyone and address bottlenecks. This can lead to more efficient processes, higher sales, or lower prices. And whether you will 'sell' this will be determined over time and will also depend on where the most value is found"* [OPS_MAN].

Future ambitions also include developing new business models, such as licensing production software integrations and monetising advanced data insights. *"If we have a team developing connections with production software, there could be a separate revenue model, like a licensing model"* [OPS_MAN]. Achieving this transformation requires addressing current data quality and infrastructure challenges while fostering trust and demonstrating the value of data-driven solutions to partners.

Appendix Q: Cross-Case Analysis

The cross-case analysis between the findings of manufacturers and the platform business, showed clear similarities and differences in how they view the interpretation of data-driven value creation using DDVPs and the monetisation of this value. Furthermore, the analysis revealed that both parties lack the requisite capabilities to implement (advanced) DDVPs without encountering significant challenges. Nevertheless, both parties acknowledge the importance of DDVPs in enhancing operational efficiency and fostering collaboration. The key insights gained from the cross-case analysis with direct relevance to the research and sub-questions are discussed in this appendix.

DDVPs

Data-as-a-Product:

Both manufacturers and the platform business expressed scepticism about the feasibility of Data-as-a-Product as a value proposition. Manufacturers such as MNF_D noted their inability to process raw data effectively, highlighting a lack of expertise: *"I do not think that expertise really lies with us as a timber factory. We would probably not do much with it, or perhaps even draw incorrect conclusions from that data."* Similarly, MNF_E expressed reluctance, citing the additional workload raw data would entail: *"I think we would prefer not to receive data in raw form if we still have to do a lot of work on it ourselves."* This sentiment aligns with the platform business's concerns, where one operations member remarked, *"If you throw raw, unprocessed data over the fence, you cannot expect them to do anything with it."* [OPS_PVC/ALU].

Despite these reservations, MNF_C demonstrated a unique enthusiasm for raw data, emphasising their capability to analyse it independently: *"If I receive data supplied with usable columns and neatly filled-in information, then I could do something with it myself using Power BI or pivot tables."* However, the platform viewed such independence as an exception, stating, *"With data-as-a-product, you assume the other side knows what to do with the data and is willing to work with it. For most, that's just not true."* [OPS_MAN].

Data-enhanced Products:

The perception of Data-Enhanced Products varied significantly across the manufacturers and the platform business. Manufacturers such as MNF_E saw potential in integrating QR codes for providing detailed product information and enabling customer services: *"The customer scans that code and immediately gets all the information about the specific window frame."* This use case was echoed by MNF_C, which identified QR codes as a practical application for linking product details to performance values: *"Yes, by now there are some possibilities to link a kind of passport to a window frame with a QR code. That can be useful for a maintenance company or an end customer to retrieve certain performance values of the frame."* Conversely, the platform viewed Data-Enhanced Products as having limited

relevance in the current collaboration context. As one operations team member stated, *"Adding data to an existing product is not something I see in the context of window frames."* [OPS_WOOD]. Despite this divergence, both parties acknowledged the potential of Data-Enhanced Products in lifecycle management, such as maintenance and replacement tracking. The Operations Manager emphasised, *"Service requests ultimately return to the manufacturer because a part is broken or needs to be delivered. In such situations, it would be useful to know which materials were used and where the product came from (bill of materials). A QR code could help with this. If you can quickly identify and order parts in this way, it saves a lot of time in preparing and handling service requests."* [OPS_MAN].

Data-driven Services:

Data-driven Services emerged as the most promising and widely accepted value proposition for both manufacturers and the platform. Manufacturers such as MNF_B highlighted the importance of predictive analytics to streamline production planning: *"If data arrives in a way that we only need to verify it, that would be ideal, reducing preparation time and lowering costs."* Similarly, MNF_D valued predictive analyses for improving operational efficiency: *"I think it would have great added value for us if Toelevering Online could provide us with predictive analyses. If they can indicate with some certainty what we can expect, we can steer our production planning very well accordingly."* The platform business strongly supported this view, recognising the value of providing actionable insights rather than raw data: *"You can use those KPIs, such as delays and complaints. An overview of the most common delays and the most reported complaints per product is very valuable for them. It is also important to offer forecasts, such as: You got this from us, this is coming up, and this is what we agreed on, and at the end of the year we will probably come up with this."*

Both parties identified real-time dashboards as a crucial component of Data-Driven Services. MNF_E, for instance, emphasised their utility in performance monitoring: *"Preferably a real-time dashboard that you have together with Toelevering Online."* The platform echoed this sentiment, stating, *"If I make it concrete, a manufacturer could have a portal where they can see how their factory is performing. We enrich the data, present it, and they gain insights into their production processes."* [OPS_MAN].

Data-enabled Performance Outcomes:

The perception of Data-Enabled Performance Outcomes revealed a lack of immediate relevance for both parties. Manufacturers such as MNF_C and MNF_E viewed these advanced propositions as more applicable in sectors requiring high uptime or regular maintenance: *"In sectors where uptime is very important, that is the key and yields immediate money. When you have predictive maintenance and, for example, use sensors that measure vibrations, you know when maintenance is needed. But if I look at a window frame: if that is properly installed, it functions and actually requires relatively little maintenance."* [MNF_C]. This perspective was mirrored by the platform, which noted, *"In utility*

construction, where you build large office buildings, this can be very interesting, especially for building maintenance or similar parties that want insights into the state of maintenance. But for frame manufacturers, they assume the profiles will perform as specified by their supplier." [OPS_MAN].

Despite limited current applicability, both parties recognised potential future use cases. MNF_D suggested that proactive maintenance alerts could be valuable: *"An example of what we would like to do ourselves is introducing a chip in the window frame. With that, you can, for example, scan on location for service and aftercare."* Similarly, the platform highlighted the value of embedding sensors for lifecycle monitoring within a larger ecosystem: *"If we grow into a larger platform, where we deliver all kinds of products including frames, we could use this data to go further up the supply chain."* [OPS_MAN].

External Data Value Creation Options

Manufacturers and the platform business share a strong preference for Prepared Data and Insights over Raw Data, citing accessibility and actionable potential. MNF_D highlighted the value of dashboards for tracking KPIs: *"Dashboards help us align production capacity more effectively and track key metrics like delays and complaints"* [MNF_D]. Similarly, the platform noted: *"Providing insights rather than raw data ensures we work together to improve outcomes"* [OPS_WOOD]. However, MNF_C uniquely expressed enthusiasm for Raw Data, emphasising their capability to independently derive trends: "*We can experiment ourselves and discover trends or seasonal influences from raw data packages"* [MNF_C]. In contrast, MNF_E rejected raw data due to the workload: *"We wouldn't want raw data that requires further work on our part"* [MNF_E], aligning with the platform's concern: *"Throwing raw data over the fence assumes partners have the skills to interpret it, which most don't"* [OPS_MAN].

Interest in Wrapping, particularly through QR codes, is emerging among both groups. MNF_E and MNF_C saw QR codes as a way to enhance customer service: *"QR codes could reduce communication by providing immediate access to product manuals and service options"* [MNF_E]. The platform mirrored this, stating: "*A QR code can help with this. If you can quickly identify and order parts that way, it saves a lot of time in work preparation and handling service requests. You could also analyse how much damage has occurred to window frames on average and at what point in the life cycle. That could be useful information for the manufacturer.*" [OPS_MAN]. Despite alignment in its potential, some form of its execution lies in the long term.

While Knowledge Products and Perform Action options were not explicitly prioritised, both parties acknowledged the long-term potential of actionable and predictive services. MNF_D suggested proactive maintenance alerts: "*Introducing a chip in the window frame… could scan on location for service and aftercare"* [MNF_D]. The platform envisioned broader lifecycle monitoring: "*We could use this data to go further up the supply chain*" [OPS_MAN].

External Data Monetisation Strategies

Indirect vs. direct monetisation:

Both manufacturers and the platform business align on a preference for indirect monetisation strategies embedded within collaborative frameworks, aiming to preserve strong partnerships. The platform reinforced this commitment, stating: *"Indirect data monetisation aligns with our strategy and fosters collaboration without disrupting partnerships"* [CDO]. Manufacturers like MNF_D similarly emphasised shared benefits, stating: *"If Toelevering Online grows, we get more orders, and if we manufacture better window frames, they get satisfied customers. It's a win-win. So, in the end, everyone benefits from this collaboration. If we perform well, Toelevering Online profits, and vice versa"* [MNF_D].

Perspectives diverge significantly regarding direct monetisation strategies. MNF_C expressed a willingness to invest if measurable benefits were evident, stating: *"Suppose hypothetically that it yields me a return improvement of €25,000 per year, then I would be willing to pay, for example, €5,000 for that"* [MNF_C]. MNF_B shared this openness, highlighting: *"Ultimately, if there are costs involved, that's fine, but then it must yield us a cost saving. We are not negative about paying, as long as it benefits us"* [MNF_B].

MNF_E, however, opposed the idea of direct payments, emphasising partnership equity: *"I can be very brief about that: it is a joint responsibility. I would never be willing to pay for this to Toelevering Online. I think you do that together and invest in it together"* [MNF_E]. MNF_D also questioned the appropriateness of such payments, asserting: *"To say to a company: 'You must improve, and if you want the necessary data, you have to pay for it,' that sounds strange of course"* [MNF_D].

The platform mirrored these concerns, with one operations member observing: *"If we charge for data that helps them improve, but they must first pay for that information, it conflicts with how we want to collaborate"* [OPS_WOOD]. The Data & Analytics team further criticised the idea of selling raw data, stating: *"Selling data doesn't make sense if the factory can't do anything with it. They won't pay for something they can't utilise"* [CDO].

The Operations manager reasoned his choice of indirect data monetisation strategies over direct monetisation strategies on the basis of the platform's characteristics: *"We are not an open platform where just anyone can offer their product. We make many agreements in advance with our partners about product standardisation and pricing. In such a case, directly selling data is less interesting, because what they modify does not directly lead to market opportunities on our platform. But if we were an open platform, then selling data directly would be interesting, because they can directly benefit from it."* [OPS_MAN].

Pricing models:

Manufacturers expressed varied preferences for pricing models. MNF_C supported pay-per-use for occasional insights, commenting: *"From our perspective, pay-per-use would be the most obvious, because then you pay for what you use"* [MNF_C]. MNF_B leaned toward a licensing model, stating: *"As for the pricing model, a licence model would be fine"* [MNF_B]. MNF_D, despite scepticism about direct payments, acknowledged the suitability of pay-per-use for one-off insights: *"I think that if you need information once, you would choose a pay-per-use model"* [MNF_D]. MNF_E, however, rejected additional fees altogether, stressing: *"I would not want to pay €50 per month for certain insights or data. That belongs to the partnership"* [MNF_E].

The platform proposed hybrid approaches to accommodate diverse needs, with a Data Analyst suggesting: *"A standard package could include basic data-driven services shared for free as part of the collaboration, while extra complex functionalities could come with a fee"* [DATA ANALYST]. The Operations Manager clarified that current manufacturing partners already pay a fixed-fee to sell through their platform, and that with input of data-driven services, an additional fee could be charged. *"What we already do is that we charge our partners to be linked to our platform. That is a kind of fixed fee. But you could also say: for an extra fee, for instance a premium subscription, you also get access to all the data we have. I can definitely see that happening."* [OPS_MAN]

Capabilities

Similarities:

Both the platform and manufacturers agree that data literacy and analytical skills are critical for executing data-driven value propositions and transitioning toward a data-driven business model. MNF_C highlighted their capability to analyse prepared data, stating: *"We can derive insights using tools like Power BI if the data is well-prepared"* [MNF_C]. The platform also emphasised the importance of presenting data clearly to ensure alignment with manufacturers' capabilities, stating: *"Interpretation must be simple to ensure alignment with manufacturers' capabilities"* [DATA ANALYST]. Additionally, both parties identified trust in data accuracy as foundational to fostering collaboration. MNF_B noted: *"It is important that there is mutual trust to (continue to) work together long-term"* [MNF_B], while the platform reinforced this sentiment, explaining: *"Ensuring correct data input and explaining its origins are essential for building trust"* [CDO].

Differences:

The readiness and depth of capabilities for adopting data-driven value propositions vary significantly among manufacturers. MNF_C demonstrated advanced data literacy and confidence in handling raw data, expressing: *"We are fully engaged with that, especially with data, to see how we can improve our business operations"* [MNF_C]. In contrast, MNF_D and MNF_E rely heavily on prepared insights and

dashboards, with MNF_E acknowledging: *"We need dashboards to guide us, as we lack the resources for data analysis"* [MNF_E].

The disparity extends to technological infrastructure and innovation readiness. MNF_B has adopted proactive innovation strategies, including advanced technologies like NFC chips, dedicating resources to weekly data analysis: *"We have a fixed team that spends one day a week analysing data, tweaking the NFC chip, and ensuring we make progress"* [MNF_B]. On the other hand, MNF_A and MNF_D cited resource and infrastructure constraints. MNF_A remarked: *"We don't currently have the infrastructure or resources for in-depth data analysis or advanced data-driven services"* [MNF_A], while MNF_D explained: *"The ERP system must first be properly in place before our organisation is ready for the adoption of data-driven products and/or services"* [MNF_D].

Cultural readiness to embrace data-driven business models also differs across stakeholders. The platform observed resistance from more traditional manufacturers, stating: *"Some producers don't see the value in digitalisation, believing manual processes are sufficient"* [OPS_WOOD]. Similarly, MNF_D acknowledged that internal acceptance of data's potential benefits remains a work in progress: *"Internally the added value must really be seen"* [MNF_D].

Conclusion:

The platform and manufacturers share a recognition of the importance of data literacy, analytical skills, and trust in data accuracy as essential to executing data-driven value propositions and transitioning toward a data-driven business model. However, significant differences in readiness and innovation capabilities exist. Advanced players such as MNF_B and MNF_C are better positioned to integrate data-driven tools, while others, such as MNF_D and MNF_E, face technological, resource, and cultural challenges. These disparities highlight the need for the platform to provide tailored support, foster trust, and address barriers to digital readiness, ensuring a cohesive transition for all stakeholders toward a data-driven ecosystem.

Challenges

Data accuracy and input quality emerge as crucial barriers to the execution of DDVPs and their role in evolving the platform's business model. MNF_A underlined the operational risks posed by inaccuracies: *"Incorrect data would definitely cause problems. If the data is wrong, we could end up with production delays, losses, or incorrect orders"* [MNF_A]. Similarly, the platform stressed the importance of reliable data input: *"Ensuring data is correctly entered from the start is the biggest limitation. Systems need built-in safeguards to minimise the chance of errors"* [CDO]. Poor data quality further compounds the issue: *"The data quality is currently disappointing. That's the biggest problem... The data quality needs to be in order before we can take further steps"* [OPS_PVC/ALU].

Financial constraints are also a significant challenge, particularly for smaller manufacturers. MNF_A identified cost as a barrier to implementing advanced technologies: *"The main challenge would be financial. If the costs are too high, we might not be able to implement certain technologies or services"* [MNF_A]. The platform highlighted that smaller manufacturers face unique pressures that hinder their ability to innovate: *"At smaller frame factories, where much is done manually, and they look from month to month at whether they have earned enough, there is a different kind of pressure"* [OPS_MAN]. This pressure stems from the need to balance short-term survival with limited resources for long-term investment.

Maturity levels further influence readiness to adopt data-driven solutions. Larger, more professional manufacturers exhibit greater openness to digital transformation, driven by their operational scale and investment needs. *"For some partners, the need to work with data is simply greater, for example, if they handle 40 orders a day and need to align their production"* [OPS_PVC/ALU]. The platform observed that as organisations grow and professionalise, the demand for data increases: *"As investments grow and organisations become more professional, you see that the importance of efficient decisions and payback times increases. This leads to roles within these organisations responsible for making the right choices, which require data to make those decisions"* [OPS_MAN]. In contrast, smaller or less mature manufacturers often lack the infrastructure and prioritisation to embrace such initiatives.

Cultural resistance also slows progress. Some traditional manufacturers remain sceptical about the value of digitalisation: *"Some producers don't see the value of digitalisation. They think manual processes are sufficient"* [OPS_WOOD]. The platform acknowledged this mindset, noting that many organisations fail to act on insights despite recognising the need for improvement: *"If you want to improve your organisation based on data, you must periodically use it and analyse whether a change results in an improvement. Some organisations will say, 'We're doing poorly, let's try to improve,' but then take no action"* [OPS_WOOD].

Privacy and trust issues further complicate adoption. MNF_C expressed concerns about data security and its potential misuse by competitors: *"Toelevering Online works with multiple suppliers. When data is shared with our competitors, you have to look carefully at how you approach that. Ultimately, you want to strengthen your business operations, not weaken them"* [MNF_C]. The platform reinforced the importance of trust, particularly in explaining and contextualising data insights: *"If data doesn't match expectations, they'll quickly blame the external party"* [CDO]. Privacy concerns are partially mitigated by anonymisation, but ongoing efforts are required to build confidence: *"If data is anonymised, it's less of an issue"* [DATA ANALYST].

Finally, technical limitations pose a barrier to implementation. Many manufacturers lack the systems or expertise to integrate APIs or manage complex data exchanges: *"It depends on the preparation software*

factories use and how it connects to APIs. Many still need to switch software to realise an API integration" [OPS_WOOD].

In short, key barriers to executing DDVPs include data accuracy and input quality, financial constraints, and varying maturity levels. Smaller manufacturers face resource limitations, while larger ones are more prepared for digital transformation. Cultural resistance, privacy concerns, and technical limitations, such as inadequate API integration, further hinder adoption and collaboration.