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**"ADVANCED SERVICE OFFERING AND VALUE-BASED PRICING
STRATEGY FOR AN INDUSTRIAL EQUIPMENT MANUFACTURER"**

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Per questo, con la conclusione del mio percorso fin qui compiuto,
dei ringraziamenti sono dovuti.*

*Ai miei genitori,
fonte primaria di qualsiasi
opportunità mi si sia presentata nella vita.*

*Ai miei amici,
per avermi sempre accompagnato.*

*Al mio relatore,
per la disponibilità, l'aiuto e la formazione ricevuti,*

*Ai miei tutor,
per l'opportunità e fiducia concesse.*

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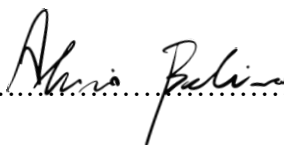


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INTRODUCTION

The current trend toward digital servitization is extremely relevant for industrial companies, as it extends the classic concept of servitization that concerns the transition of product-centric companies to the services business. Specifically, digital servitization can be defined as the transformational process by which a product company changes its business model toward innovative customer-oriented service-centered business models enabled by digitalization, that encompass the delivery of smart services and solutions to create superior customer value.

Digitally-enabled advanced offerings can support a customer's value-generating process, consequently creating opportunities to provide new and unique value propositions based on smart solutions, that allow the provider to be remunerated on the basis of the customer value-in-use through innovative revenue models. As a consequence, the focus shifts from a cost logic to a value logic with the guiding principle being holistic customer value maximization, and the role, function and process of sales changes from product-based and transactional toward a more strategic customer-focused and relational version of solution selling: the value-based selling approach. All this deployed together leads to the successful exploitation of new value-capture opportunities based on customer value delivered, namely value-based pricing strategies.

The digital servitization potential particularly caught the attention of *Danieli*, an Italian company operating in the plantmaking for the steel industry. Through its dedicated service business unit *Danieli Service*, it is currently active in the exploitation of the opportunities offered by the digital servitization with the development of innovative service-centered business models, and it is empowered to drive the company's overall transformation toward the service business. This same infusion drove the business unit to experiment collaboration with the University of Padua, in particular with Mr. Marco Paiola professor of the Service Management course which deals with the digital servitization topics, establishing the ground for the development of this research.

The purpose of this project is to explore and develop the possibilities that Danieli Service Guide Systems' sub-unit has with regard to the creation of an advanced service offering enabled by digital servitization, oriented at customer business support and optimization that can suit the final aim of understanding and implementing a value-based pricing strategy.

The first chapter presents the theoretical background that is needed for understanding the development of the research on the topics of digital servitization, customer-business related advanced services and innovative business models that support value-creation processes, and value-based pricing in industrial contexts.

The second chapter will introduce the company and its core business, and Danieli Service business unit with its current mission and vision digital servitization. Foremost, the *intelligent guides*, the core of this research, are presented and the current business models in place for their sale are discussed.

In the third chapter a new innovative business model for the intelligent guides is developed, consisting in an advanced service offering oriented at supporting customer's business through the delivery of a smart solution. The new features, risks and procedures required for its tangible implementation are addressed, and the fundamentals for the implementation of a value-based pricing strategy are discussed, establishing a value-based selling process as the core for the success.

Finally, the last chapter validates the new advanced service offering and the value-based pricing possibilities, through interviews with a sample of customers who already own the smart products. Empirical evidence will be discussed to draw the conclusions of the research project.

1. THEORETICAL BACKGROUND

1.1 DIGITAL SERVICIZATION ENABLES THE TRANSFORMATION TOWARDS CUSTOMER-ORIENTED SERVICE-CENTERED BUSINESS MODELS

The recent trend toward digital servitization is extremely significant for industrial firms, which extends the broader servitization concept that entails incorporating services into existing products and the shift to the service business of product-centric companies (Frandsen et al., 2022; Classen and Friedli, 2019; Jaspert and Thoma, 2021; Linde et al., 2020), with its profound transformation in terms of business models from transactional to relational (Rapaccini, 2015; Oliva and Kallenberg, 2003). Digital servitization can be defined as the transformational process enabled by digitalization by which a product company changes its product-centered business model to innovative customer-oriented service-centered business models (Jaspert and Thoma, 2021; Agarwal et al., 2022; Favoretto et al., 2022; Thomson et al., 2022), that encompass service and solution offerings with analytical capabilities to create value and coordinate and optimize work processes through the combination of monitoring data, remote control, and optimization algorithms using digital technologies (Frandsen et al., 2022; Classen and Friedli, 2019; Huang et al., 2020). However, optimizing service revenues necessitates a focus on delivering the correct levels of customer care with the right tooling, which comprises developing the right selling capabilities and pricing strategies (Salesforce and Noventum, 2021).

1.1.1 DATA IS THE KEY ENABLER

The fundament of the digital servitization are physical products, industrial machines and equipment furnished with sensors, processors, software, big data analytics, and connectivity, that collect and transmit data to external and internal networks (Internet of Things), enabling exchanges between the product and the environment, manufacturer, operator/user, and other products and systems (Classen and Friedli, 2019; Linde et al., 2020). Therefore, digitalization opens the path for the provision of the so-called smart products, which in turn change the value propositions to the end-user: “from product working efficacy to the product’s efficiency and effectiveness within the end-user’s process” (Oliva and Kallenberg, 2003). At the same time, smart products enable the creation of the so-called smart (digital) services, which leverage and give meaning to the data produced by the technology of the former to realise the development of new customer-support value propositions based on data acquisition and

analysis. As opposed to being at the center of the focus, products are increasingly incorporated into more complex offerings of software systems and services to deliver higher levels of operational capability (Favoretto et al., 2022; Oliva and Kallenberg, 2003; Thomson et al., 2022). As a consequence, processes, capabilities, and offerings within industrial firms are reshaped by digital servitization, so that greater value resulting from a variety of supporting digital technologies is gradually developed, provided, and captured. This goal demands technological complexity since the service provider must integrate connectivity into the equipment and, more critically, act promptly on the data obtained from the product's usage and surrounding environment. (Linde et al., 2020). Moreover, digital technologies support the ability to establish transparency and improve interactions, efficiency and operations within digital offerings. These technologies impact existing hurdles to openness and conceptions to information rights, resulting in data-driven transparency between stakeholders and directly improving trust and value exchange (Agarwal et al., 2022). However, from the standpoint of the customer, the commercialization of digital services necessitates the modification of value propositions, effective pricing models, and sales processes, as well as a strong sales force. (Frandsen et al., 2022).

Figure 1a and Figure 1b describe the typical evolution of the digital servitization of manufacturing companies. “Starting from the offering of field services in the form of warranty, time and material, today, companies have transformed their service business. They now use the knowledge gained through field services to continuously optimize the state of a product through advanced predictive field services and remote support. Leading manufacturing companies apply insights acquired through product related field and support services to offer services that are focused on improving the business of the customer” Salesforce and Noventum (2021).

Figure 1a: Servitization evolution enabled by digitalization (Salesforce and Noventum, 2021)

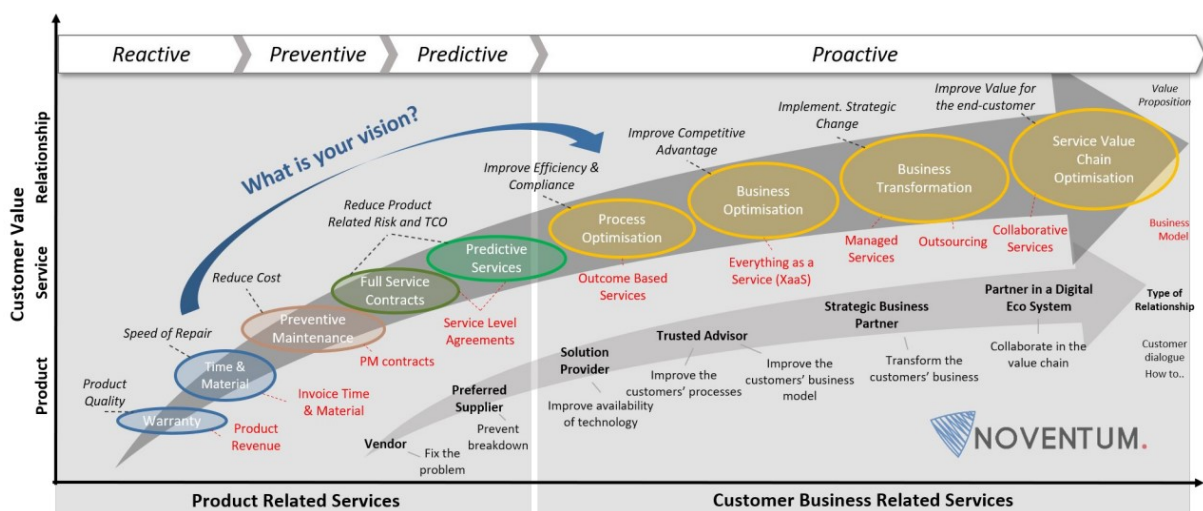
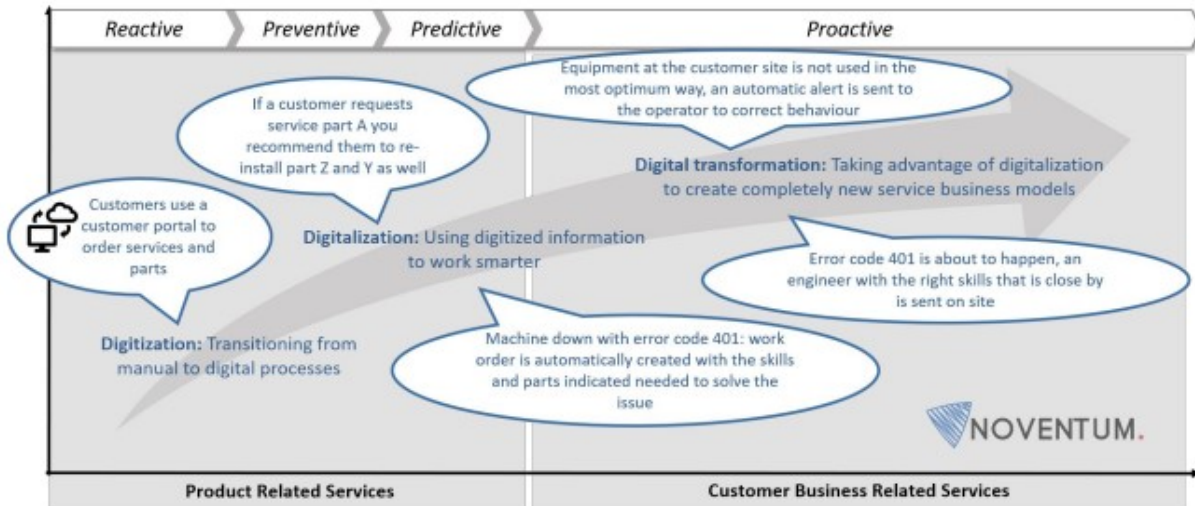


Figure 1b: Servitization evolution enabled by digitalization (Salesforce and Noventum, 2021)



1.1.2 SMART SOLUTIONS: THE INTEGRATION OF SMART PRODUCTS AND SMART SERVICES

Digital offerings change the business models of manufacturing firms as they engage in new activities, take on new risks, and exploit new value-creation and value-capturing opportunities (Linde et al., 2020).

In industrial contexts, solutions are longitudinal relational processes, during which a solution provider integrates goods, service and knowledge components into unique combinations of product-service systems (PSS) into the customer’s environment, that solve strategically important customer specific problems with high interaction (Raja et al., 2020; Frandsen et al., 2022; Agarwal et al., 2022; Stoppel and Roth, 2016). The complexity of designing and delivering these solutions increases as products and services become more seamlessly integrated, increasing operational and financial risks for the supplier. (Rapaccini, 2015).

When smart products and smart services (and the embodied software) are merged into integrated offerings, they form smart PSS, so-called smart solutions: “Smart solutions consist of *physical elements* such as hardware and mechanical parts, *intelligent elements* such as software, sensors, and internal intelligence, *connectivity elements* such as ports, protocols, and enabling networks connected to the cloud, *data elements* such as production data, malfunction data, and predictions based on data analysis, and *intangible service elements* such as personnel competencies to repair and fix equipment and processes“ (Huikkola et al., 2022).

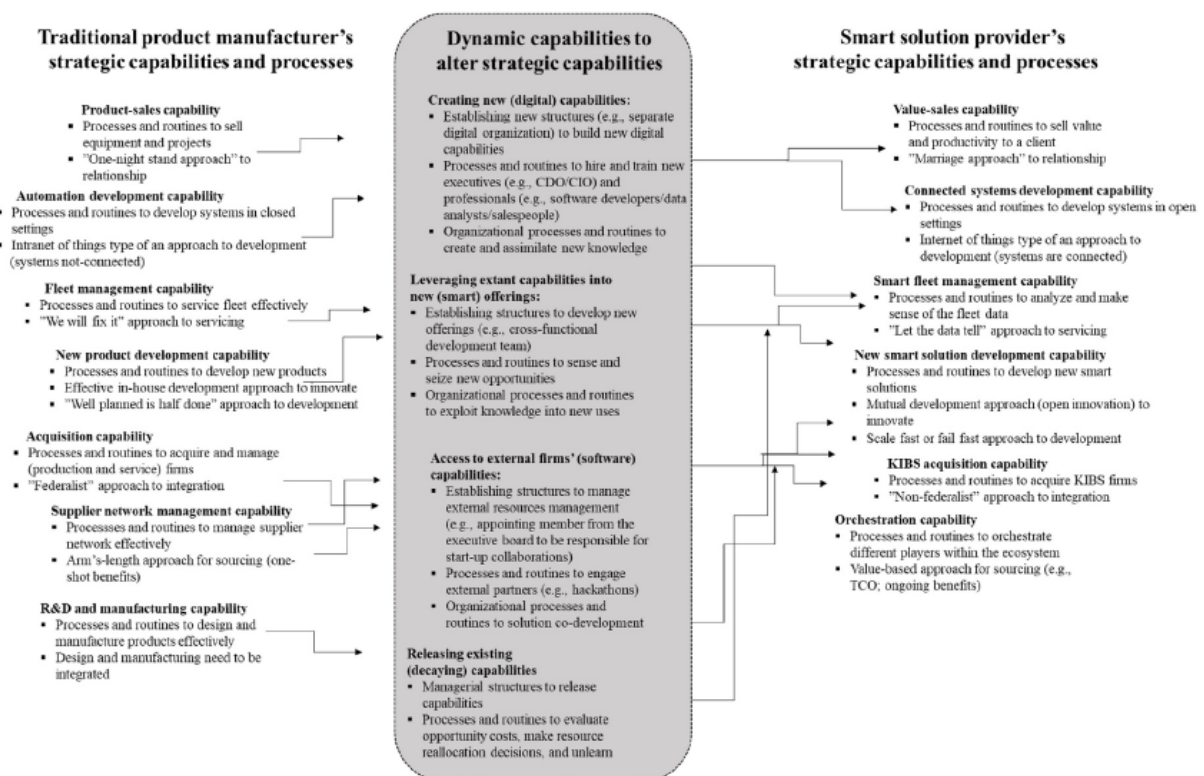
The digital component does not necessarily add value to the end-user per se, but manufacturers can capture financial and strategic benefits by delivering new advanced and unique value propositions based on smart solutions (Huikkola et al., 2022; Oliva and Kallenberg, 2003), that enable value-creation through monitoring, control, optimization and

autonomous function, and allow the provider to be compensated on the basis of the customer's value-in-use (Raja et al., 2020; Frandsen et al., 2022; Agarwal et al., 2022).

1.1.2.1 MANUFACTURERS NEED TO LEVERAGE STRATEGIC CAPABILITIES FOR SUCCESSFUL SOLUTION PROVISION

The possession of a firm's most distinctive resources and their successful use and deployment through strategic business processes are referred to as strategic capabilities. The use of strategic resources by the firm to generate value through organisational structures, processes, and routines is referred to as strategic processes. By developing capabilities related to data processing and interpretation, risk assessment and mitigation, service innovation, and hybrid offering sales and delivery, successful manufacturers are able to transform their distinctive resources into the strategic capabilities needed in solution provision. (Figure 2) (Huikkola et al., 2022).

Figure 2: Product manufacturer's strategic capabilities when becoming a smart solution provider (Huikkola et al., 2022)



Huikkola et al. (2022) describe the capabilities that product manufacturers can typically leverage: their brand, distribution channels, customer understanding, production assets, and collected product and customer data. In total solutions data become vital, thus data ownership becomes a key issue because the clients understand the value of data, and the manufacturer must obtain the relevant data to run the process effectively.

Additionally, new procedures and processes are needed when selling advanced digital offerings, particularly when it comes to estimating risks, costs, and revenue sources. Accounting for the expenses connected to product failure, wear and tear, and opportunistic customer behaviour during the duration of service consumption is crucial as the manufacturing business expands and takes on responsibility for supplying smart solutions. (Linde et al., 2020).

1.2 VALUE-BASED STRATEGIES AND SMART SOLUTIONS: SUPERIOR CUSTOMER VALUE AND VALUE-CAPTURE OPPORTUNITIES

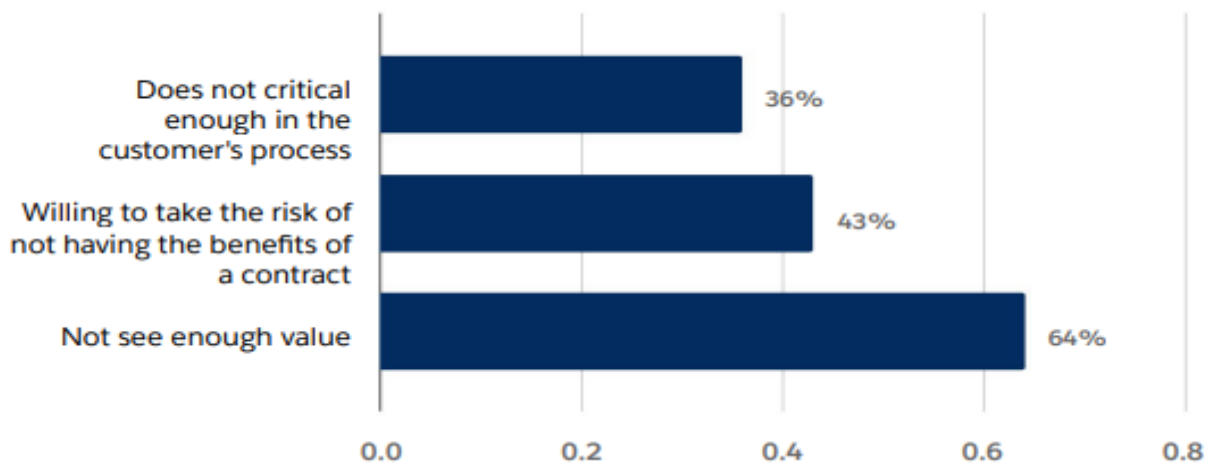
Capturing value from digital services can be challenging for firms as their implementation tends to disrupt and radically change the traditional business logic, the cost structure, and the revenue streams of a manufacturing firm. In contrast to a more straight-forward transactional deal where the firm captures value through product sales, the provider must now seek to achieve this end by investing in digital technologies that meet performance guarantees, ensure availability of the equipment, and co-create value over the duration of an extended customer contract (Linde et al., 2020). Moreover, digital servitization may enable the possibility for dynamic or variable prices and contracts relating to value-capture, which might affect the distribution of value between the two parties (Agarwal et al., 2022).

Smart solutions rely on digital technologies to support a customer's value creation process. Value emerges through consumption in a customer's value-generating processes, value-in-use, creating a basis for a reciprocal promise of value finally determined by the customer: "both seller and customer play an active role in creating value, entailing a mutual orientation, and the role of the seller shifts towards making superior value propositions that create opportunities for co-creating value with the customer, acting as a value facilitator who provides the foundation for a customer's value creation processes and co-creation during direct engagement in interactions with the customer" (Terho et al., 2012). Thereby, smart solutions have the potential to provide superior customer value and so induce the dominant business perspective to move from a cost logic to a value logic, where the guiding principle is holistic maximization of customer value (Classen and Friedli, 2019).

1.2.1 VALUE-BASED SELLING: A CUSTOMER-CENTRIC SALES APPROACH THAT SELLS ON VALUE

As a result of the digitally-enabled changes in business models, the role, function, and process of sales shifts from an operational, product-based, and transactional role toward a more strategic, customer-focused and relational process of solution sales (Storbacka et al., 2011). Thus value-based approaches seem highly relevant for manufacturing companies but require a shift of the sales focus to the offering's implications for the customer's business (Classen and Friedli, 2019; Terho et al., 2012), so-called value-based selling (VBS). VBS is the sales approach that works on identification, quantification, communication, and verification of customer value (Raja et al., 2020). VBS requires a profound understanding of the customer's distinctive business model and processes through customer-specific interactions for sufficient understanding of a customer's unique business goals, value drivers, and usage situations associated with value creation (Frandsen et al., 2019; Almquist, Cleghorn and Sherer, 2018; Terho et al., 2017; Hinterhuber and Snelgrove, 2020). This at first will drive the development of the business model, value proposition and subsequently of a value-based pricing (VBP) structure. VBS makes the companies' value orientation operational at the individual salesperson level. It seeks to advance customer value-in-use jointly with the customer by demonstrating the vendor solution's profit contribution to the customer's business profitability in clear monetary terms instead of seeking to offer a lower price than their competitors (Liinamaa et al., 2016; Terho et al., 2017). Subsequently, salespeople are ultimately in charge of adapting the supplier's general segment-level value propositions to the unique business conditions of customers and demonstrating the value-in-use potential (Terho et al., 2017). Articulating the value proposition by taking in account customer's needs and addressing the value potential to the customer is key in smart service and smart solution sales. If the approach is not employed coherently, the result will be ineffective sales performance (Figure 3) (Salesforce and Noventum, 2021). Companies that sell value stand out from the competition because they support their customers' profitability not by purchasing lower-priced products but by delivering the most value (Snelgrove, 2017).

Figure 3: Why B2B customers choose not to buy a service contract (Salesforce and Noventum, 2021)



In industrial solutions, the creation of value is crucial as a first step (Frandsen et al., 2022), and the value proposition itself is based on solid and verifiable data rather than on marketing appeals (Liinamaa et al., 2016), translating the supplier's offers into monetary terms and benefits that demonstrate their contribution to the customer's profitability (McDonald and Oliver, 2022; Terho et al., 2012); but capturing value is equally crucial for the success of business models (Frandsen et al., 2022). When a company commits to solving a customer's problem, it takes on much more risk since there is a specific output that must be delivered and the remuneration is based on how well it is achieved (Reinartz and Ulaga, 2008). Therefore, capturing value requires an increased focus on pricing in a way that reflects the generated value. This can be challenging, especially when the pricing structure is at the opposite of customer expectations. A lack of experience with pricing services and the high level of risk associated with service agreements can also lead providers to over- or underestimate the value of solution offerings (Parida et al., 2014).

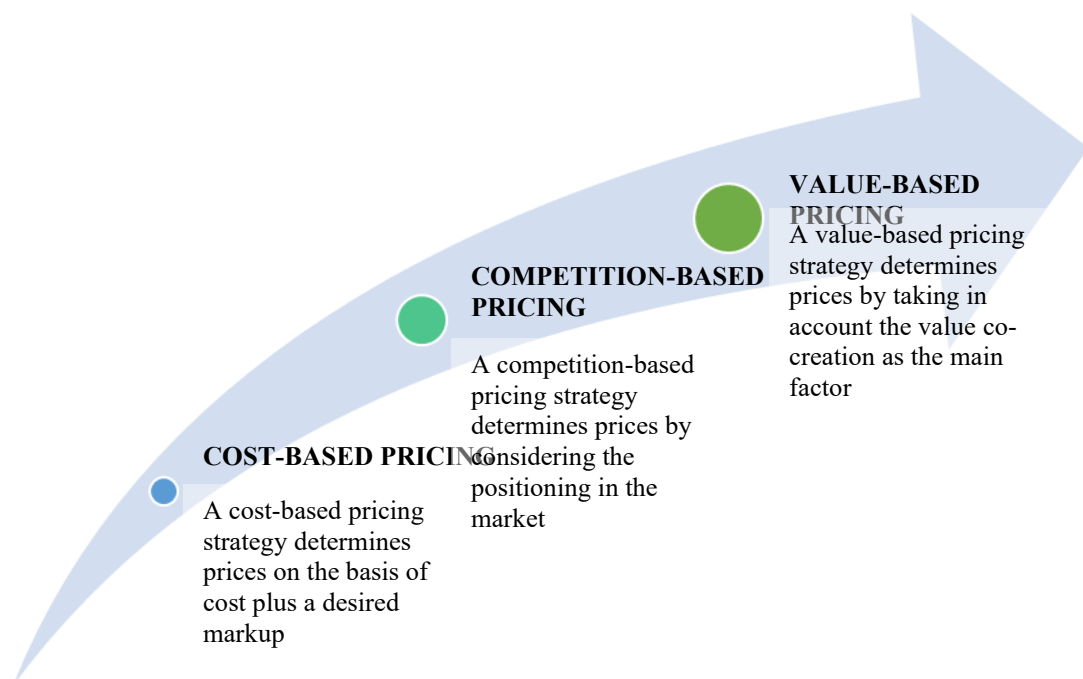
1.2.2. PRICING STRATEGIES AND CAPABILITIES TO SHARE THE VALUE BETWEEN CUSTOMER AND SUPPLIER

Pricing is the key mechanism to share the value created between the customer and the supplier (Töytäri et al., 2017). Therefore, pricing has a huge impact on every firm's profitability and long-term survival (Hinterhuber, 2008; Töytäri et al., 2015).

Traditionally, the literature identifies three groups of pricing strategies: cost-, competition- and value-based pricing, with the first dominating both the manufacturing and service industry (Rapaccini, 2015; Hinterhuber, 2008). Through cost-based pricing, a company determines price on the basis of cost plus a desired markup, which is the easiest strategy to

implement and ensures that the costs are covered even with low sales volume. In competition-based pricing, differentiating factors and market pressures also influence prices which vary in consideration of competitors' price levels and desired positioning in the market. Finally, in value-based pricing, prices are dependent to the value delivered to and perceived by customers through a close alignment with their needs and interaction (Figure 4) (Rapaccini, 2015; Hinterhuber, 2008; Deloitte, 2020). Long-term customer-centric service-based exchange, relationship emphasis, value creation based on a holistic and shared value conception, seller-driven relationship initiation, and an even power balance are all characteristics of VBP logic (Töytäri et al., 2017). In terms of profit potential, research has highlighted the superiority of the VBP approach to cost- and competition-based approaches (Frandsen et al., 2019; Hinterhuber, 2008), and the ineffectiveness of a traditional cost-based pricing in a service-oriented business (Rapaccini, 2015). Because pricing is crucial in discovering and capturing value, companies offering advanced services that bring productivity gains to the customers can gradually shift from cost-based to value-based pricing. It follows that manufacturers should price their most advanced service offerings according to value-, rather than to cost- or competition-based strategies (Rapaccini, 2015; Frandsen et al., 2022). For industrial firms and their customers, VBP offers the potential to increase differentiation, profitability, and value creation. (Töytäri, Keränen and Rajala, 2017).

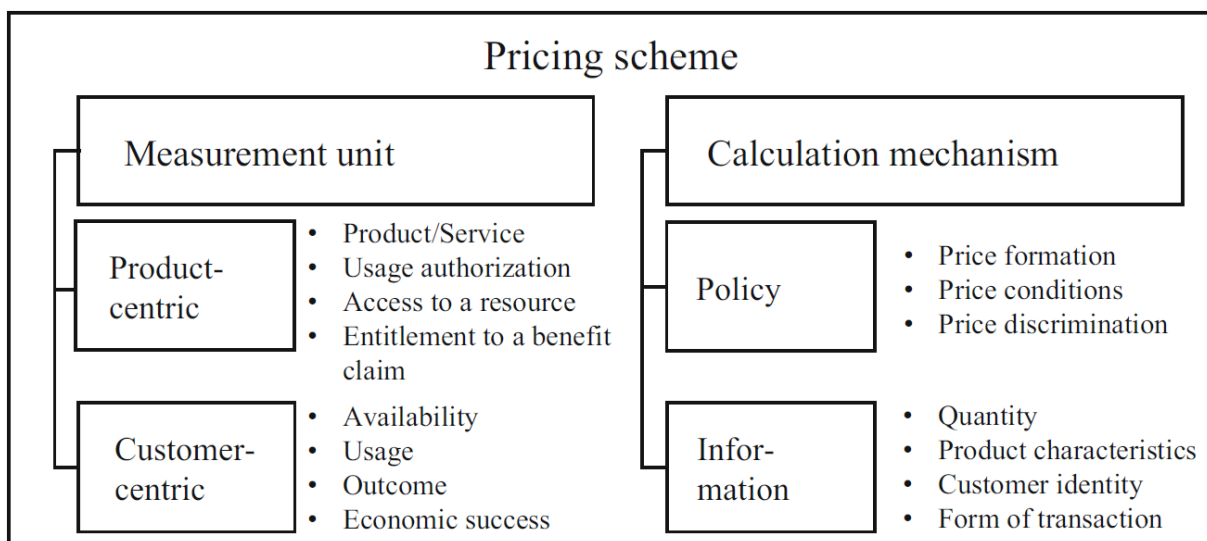
Figure 4: Pricing strategies (own elaboration)



Pricing (price-setting) capabilities are described as the set of managerial practices, routines, skills, know-how, systems, organisational principles and coordination mechanisms that

companies exploit both within the firm and in relation to customers for setting prices (Rapaccini, 2015; Raja et al., 2020). The results are pricing schemes (or structures) intended to capture the value and share it among business partners by means of a monetary measure. A pricing scheme consists of two elementary components (Figure 5). The first component is the measurement unit, which is the reference item for price calculations and it defines the parameter for measuring the monetary value. So, the customer actually pays for this item. The second component is the calculation mechanism, which represents the functional relationship between the measurement unit and the monetary equivalent (Stoppel and Roth, 2016).

Figure 5: The concept of pricing scheme (Stoppel and Roth, 2016)



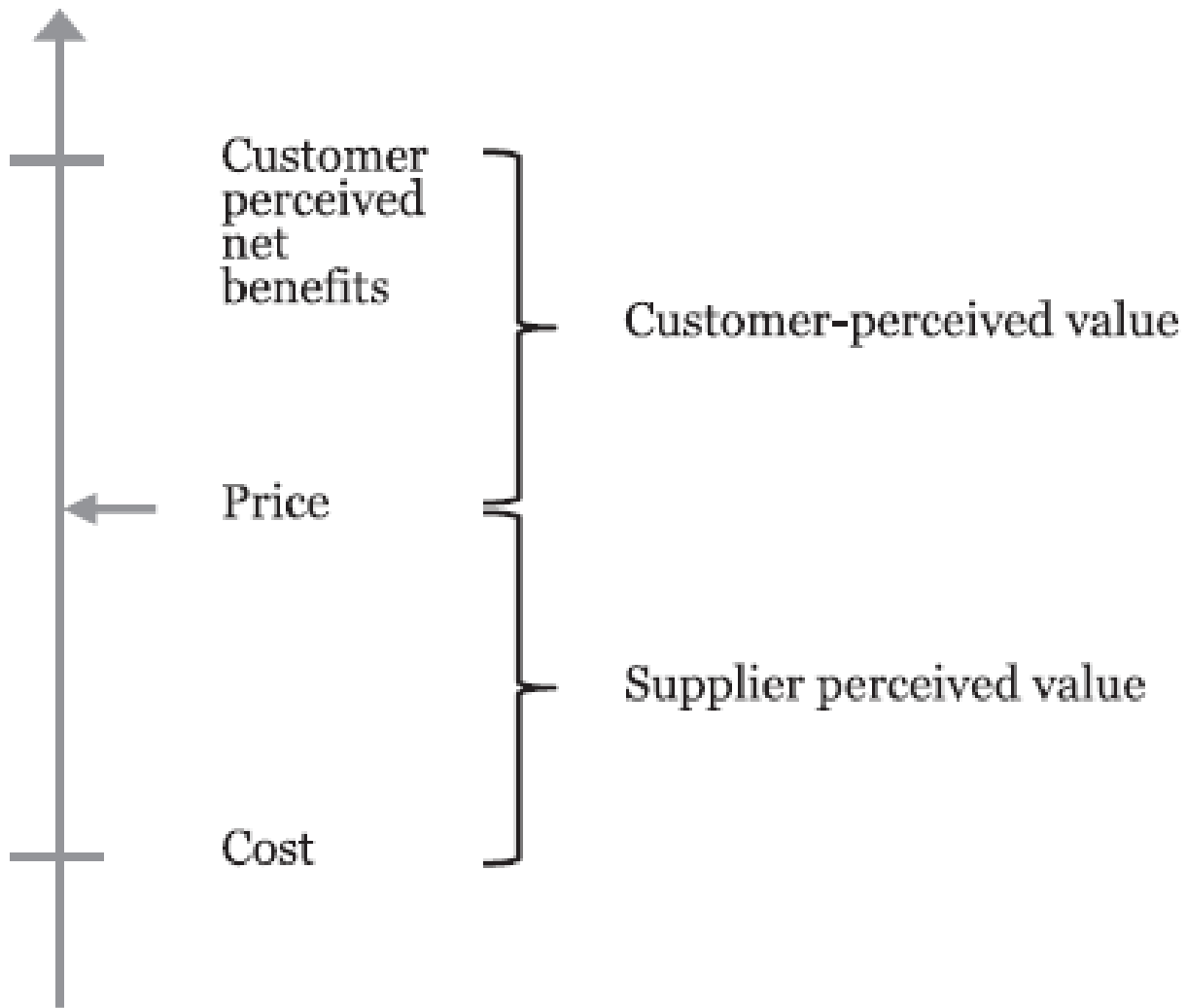
As Stoppel and Roth (2016) studied, depending on the characteristics of the calculation mechanism, a large number of pricing schemes are possible. Goals, risk distribution, duties, and costs between the customer and the supplier are reshaped as a result of the measuring unit and calculation mechanism combinations. The measurement unit of product-centric pricing schemes refers to value propositions with a focus on the product and access to the product. Measurement units of customer-centric pricing schemes refer to the customer's value creation. Here, the focus is not on the product's value but on the value-in-use realized by the customer using the resources delivered by the provider and how to support the customer in creating value. Consequently, customer-centric pricing schemes generally avoid determining value in advance, while the value creation takes place in the usage phase. The idea is to capture value with a specific measurement unit in the usage phase and transform it with a calculation mechanism into a monetary quantity. Thus, the provider generates revenue not until the usage. This approach takes the concept of value creation as an ongoing process into consideration for pricing.

1.3 VALUE-BASED PRICING AS A MECHANISM TO CAPTURE VALUE

VBP is defined as the value a product or service delivers to customers as the main factor for setting prices (Frandsen et al., 2019; Raja et al., 2020; Hinterhuber, 2008). In other words, it is a pricing strategy where the value captured by the provider is indexed to the value generated for the customer (Frandsen et al., 2019). From the customer perspective, value is not inherent in the offer. Value is perceived while using the offer as value-in-use (Stoppel and Roth, 2015). Therefore, pricing schemes with revenue streams in the usage phase and an alternative measurement unit that refers to the customer's creation of value-in-use are better suited in this context (Stoppel and Roth, 2016). In the case of industrial services and solutions, the amount and timing of customer payments must be aligned to when and how the actual value is realized by the customer (Frandsen et al., 2019), translating in variable fees for the customer value-in-use (Raja et al., 2020).

VBP has been described as a sophisticated but complicated approach to pricing in business markets. It uses customer-perceived value (CPV) as a pricing reference. Pricing based on CPV requires understanding the sources, dimensions, and outcomes of value for the customer. In addition, using CPV as the reference mandates the measurement of customer value and communication about it with customers (Töytäri et al., 2015). Distance and a lack of collaboration between the customer and supplier might result in differing opinions of the value provided, value is usually the core of hurdles to VBP. The value-added estimations are complicated by the subjectivity of perceived value, as well as the information asymmetry between the provider and the customer (Frandsen et al., 2019). The source of value might be a product, a relationship, or the network in which the relationship is integrated, or all of these. Customer-perceived value is the difference between perceived benefits received and perceived sacrifices made by a customer (Figure 6). Benefits and sacrifices both encompass operational, strategic, social, and symbolic dimensions of value, making them multidimensional concepts. Value is context-specific and dynamic, which results in varying judgments of value in different business contexts and at different points in time (Töytäri et al., 2015).

Figure 6: Customer perceived value scheme (Töytäri et al., 2015)



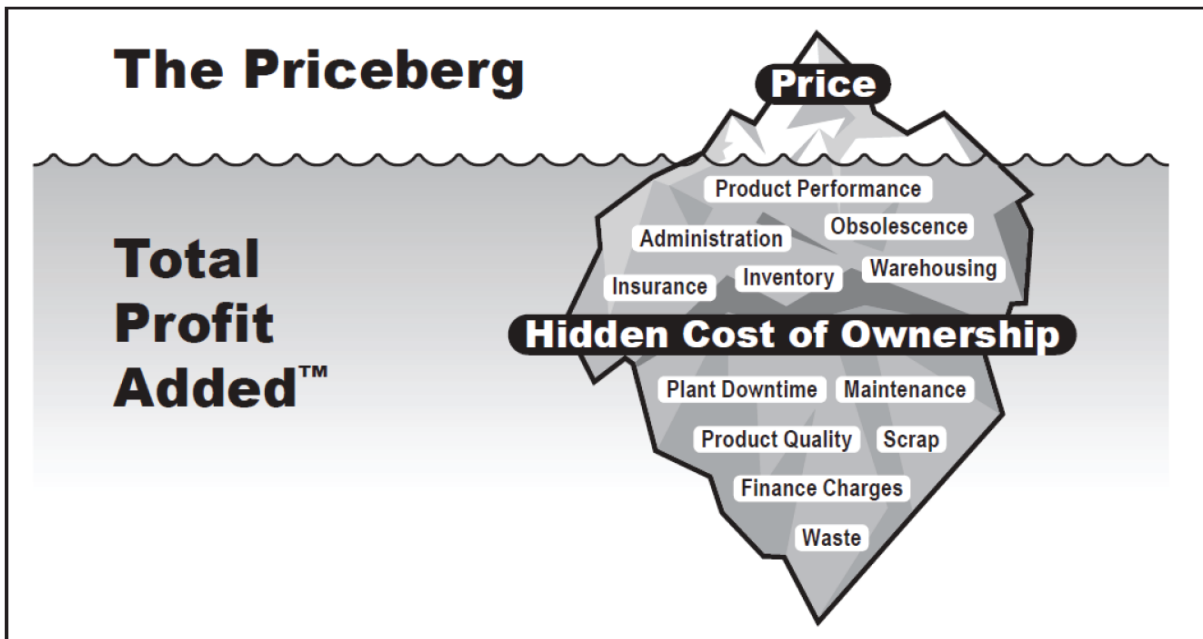
Customer VBP is increasingly recognized in the literature as superior to all other pricing strategies (Hinterhuber, 2008; Liinamaa et al., 2016; Rapaccini, 2015) because the customer’s willingness to pay for a service price is related to their recognition of service value. Despite the technological revolutions, customers will not be willing to pay more if their perception of an offering value doesn’t improve (Huang et al., 2020). The customer’s ability and willingness to pay will increase if that value can be measured, demonstrated, and documented using its distinctive metrics (Snelgrove, 2017). The superiority of customer value-based strategies is based on a general recognition that the keys to sustained profitability lie in the essential features of customer VBP, including understanding the sources of value for customers, designing products, services, and solutions that meet customers’ needs, setting prices as a function of value, and implementing consistent pricing policies (Hinterhuber, 2008). To sum up, VBP has implications for the capabilities required to discover, sell, deliver, and capture value (Frandsen et al., 2022; Raja et al., 2020; Frandsen et al., 2019; Oliva and Kallenberg, 2003; Hinterhuber and Snelgrove, 2020; Töytäri et al., 2017; Stoppel and Roth, 2015;

Gebauer et al., 2017). Therefore, VBP is not an accounting standalone implementation but is closely linked to VBS: it reflects the firm's ability to capture the value promised to the customer through the offering, which can only capture sufficient created value if the corresponding profit formulae and revenue model are well justified. In this sense, VBP is enabled by VBS. Taken together, the VBP and VBS approaches are potential means for firms to move beyond simply discussing prices with customers to address value (Raja et al., 2020). Thus, value-capture processes involve the activities that enable providers and customers to determine how the additional value-created should be efficiently distributed between provider and customer. However, it is also challenging because setting a reasonable price requires that the involved parties quantify the exact value from the service and set a price that reflects the customers' willingness to pay (Agarwal et al., 2022). Access to customer-specific data about their operations and business models is essential for VBS and VBP in order to develop insights about customer value-creation process and to craft an effective value proposition and pricing model (Raja et al., 2020; Classen and Friedli, 2019). Collecting this data and obtaining access to it has been frequently reported as a major barrier (Classen and Friedli, 2019) but the seller has to somehow gain access and overcome potential distrust and reluctance to quantify value: developing trust and reputation is especially important for implementing a VBP and VBS approach (Liinamaa et al., 2016; Raja et al., 2020). Quantification concerns the ability to measure the service or solution performance in qualitative and quantitative ways, which allows for different pricing structures (Frandsen et al., 2019). It aims to determine a figure about the offering's monetary implications in the customer application for developing a related value-in-use calculation mechanism (Terho et al., 2012; Mulari et al, 2020): a unitary price for each unit of value, based on the worth of that value and not on the supplier's costs. Only the operational dimension of value is systematically quantified and leveraged as a basis of VBP (Töytäri et al., 2015). Terho et al. (2012) found that, even if salespeople cannot precisely quantify the value of their offerings, the basic requirement is to make the size of the value opportunity visible to the customer, which is more important than trying to quote the most precise numbers. Without value quantification, the customer focuses on what easily visible and understandable, the price (Hinterhuber and Snelgrove, 2020).

Snelgrove (2017) proposes a *total profit added* methodology (TPA) for value quantification based on the *total cost of ownership* methodology (TCO) (Figure 7). TCO addresses all the costs associated with the acquisition, installation, and operation of an asset throughout the lifecycle of a product or service. Using a TCO methodology, value emerges by definition only if the offering leads to a cost reduction, leaving out other tangible, measurable benefits that drive profit. Therefore, TPA not only considers all the cost reductions but also measures all

the benefits created. Because value is always dependent on the customer or user of a product or service, the ability to calculate the total profit impact will be different between users, but the aim always remains the summation of the overall value for the company. Helping a customer view all the cost and benefits they realize, and how that affects their company's TPA, allows the pricing of that incremental value created (Snelgrove, 2017; Hinterhuber and Snelgrove, 2020).

Figure 7: TPA representation (Snelgrove, 2017)



Töytäri et al. (2015) define the value quantification process in seven steps: (1) selecting an appealing economic outcome as an aggregate measure of value created, (2) select salient dimensions of value in the quantification exercise, in line with the previous step of achieving a shared conception of value, (3) establish the (functional) relationship between the salient value dimensions and the value measure, (4) establish a baseline situation for every salient value dimension by auditing the current situation, (5) determine the achievable performance level for every value dimension, (6) calculate the aggregate impact on the value measure, and finally, (7) communicate value by involving the customer in the process.

Once the value has been agreed upon, created, and quantified, the remaining challenge is to determine how the value is shared between the parties. The industrial exchange is characterized by repetitive buying, competitive alternatives, and high buyer power, thus capturing a fair share of the value created requires overcoming the institutionalized barriers of cost-based pricing, managing the uncertainty in value creation, and building a strong bargaining position. Customers are seldom prepared to share the value evenly, despite a convincing proof of value. Perceived fairness influences decisions. Bargaining power is the

relative ability of the exchange parties to influence how the value is shared. Regardless of how much value a supplier contributes, or how critical the supplier's role is in creating the value, the supplier can still capture a small amount of exchange value, if their bargaining power is low. The prerequisites for VBP discussed are among the fundamental ways of building trust and fairness (Töytäri et al., 2015).

1.3.1 STRONG BARRIERS PREVENT THE EXPLOITATION OF A VALUE-BASED PRICING STRATEGY

Despite the significant economic potential of VBP, many firms struggle to capture value from their customers, and its implementation may be incredibly difficult, requiring innovation and well-planned courses of action. Hence, it has not been widely adopted in practice in industrial markets (Frandsen et al., 2019; Hinterhuber, 2008; Deloitte, 2020).

Value quantification is generally the main challenge for industrial companies. Quantification can fail at any stage during the quantification process. As Töytäri et al. (2015) found, the parties may fail to agree on the salient dimensions of value, the baseline data upon which to make the VBP scheme may be inaccessible, or the customer could be unwilling to share the data due to the lack of trust, the customer may be reluctant to engage in the quantification exercise, the calculation of value may be difficult, or the end result may not be credible. Additionally, the contribution of a supplier's offering to a company's value creation process significantly influences the relationship that the company is willing to enter into with the supplier. Pretended ignorance of value or reluctance to evaluate value in anticipation that undesired value would be discovered may occur when customers pretend that sellers could then leverage that information for a higher price. This highlights the critical role of data transparency as a potential mediator in the relationship between perceived customer value outcomes and contractual flexibility in digital servitization (Agarwal et al., 2022).

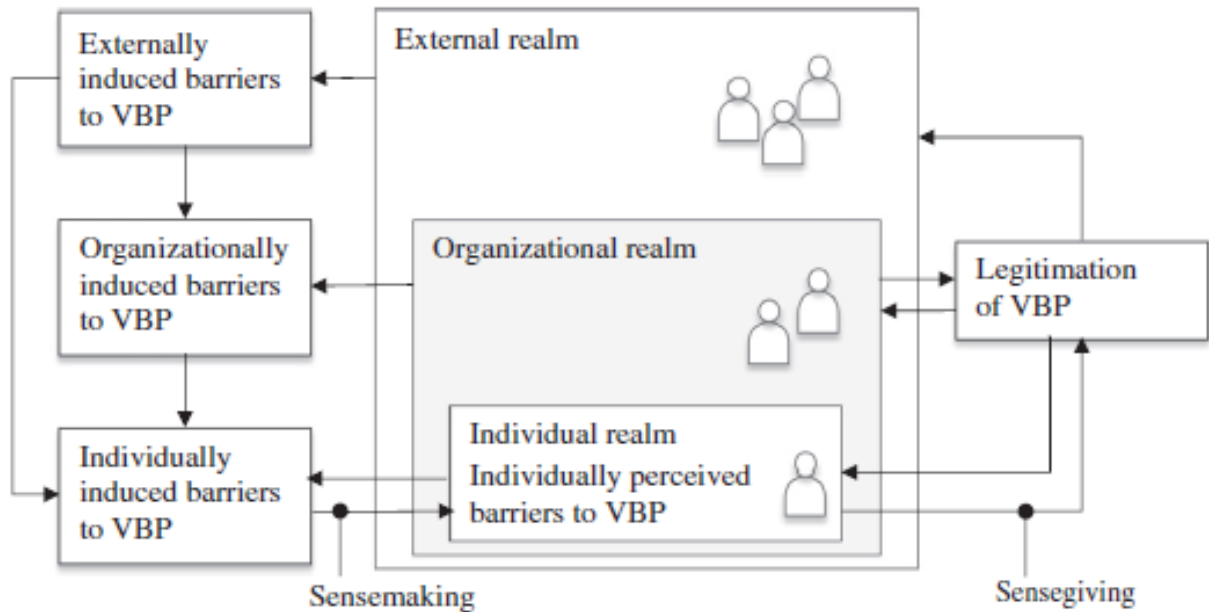
VBP could be also prevented by the widespread bias of a strong industrial culture favoring aggressive buying with a focus on the initial purchase price. This culture is firmly grounded in organisational conservatism, procurement institutions, rules, and conventions that resist the implementation of value-based approaches (Töytäri et al., 2015). Also, the individuals within the customer company may have technical heritage, making them more inclined to focus on technology than pricing schemes. These buyers could maintain a more conservative approach and choose traditional transaction-based pricing over value-based pricing (Frandsen et al., 2019) and they could be unable to evaluate innovative pricing models and, possibly, escalate them to top management. Liinamaa et al. (2016) found that approving a new pricing model was often subject to a customer top management or board decision and always conditional

upon its lawyers' endorsement. Relationship maturity and a partnering approach to the supplier relationship management could facilitate access to influence (Töytäri et al., 2015). In practice, it often goes down to the negotiation ability between companies (Huang et al., 2020). Finally, traditional contracting is a key barrier to VBP as it performs contracts as structural governance tools. “In this frame, called the structural approach, contracts serve a safeguarding function by fixing rights and obligations that remain dormant until eventual litigation, and formalize incentive structures designed to deter opportunistic behavior. An appropriate contracting mindset should focus on the coordination (facilitating cooperation) and adaptation (adapting to changed circumstances) functions fulfilled by contracts and the relationship between contract terms and performance” (Liinamaa et al., 2016).

In a more orderly fashion, Töytäri et al. (2017) suggest that companies face eleven barriers to the implementation of a VBP strategy, falling into three distinct and adjacent groups: individually, organizationally, and externally induced (Figure 8).

- “Individually induced barriers are the assumptions and behaviors that prevail in an individual manager's cognitive processes and impede his or her ability to exercise value-based pricing: Beliefs and attitudes, Experience and skills, High cost and complexity of value quantification.”
- “Organizationally induced barriers are the assumptions and behaviors that prevail within a broader organizational culture, climate, and practices, and impede the individual manager's capability to exercise value-based pricing: Product-oriented sales culture, Governance and tools, Inefficient customer selection.”
- “Externally induced barriers consist of the assumptions and behaviors that prevail in the interactions within a firm's customer relationships and networks that impede the individual manager's capability to exercise value-based pricing: Prevailing buying culture, Incompatible value conceptions, Supplier's brand identity, Incompatible time horizons, Value sharing power within the network.”

Figure 8: Barriers to VBP implementation (Töytäri et al., 2017)



1.4 THE SUCCESSFUL IMPLEMENTATION OF A VALUE-BASED PRICING LOGIC: THE REVENUE MODEL

Digital servitization emphasizes innovative value-capture precisely because it makes possible new flexible contractual agreements. The sale of the usage or the output produced by the provision of the solution to the customer can now become the revenue stream instead of transactions related to the sale of the ownership of the physical products from the producer to the customer (Sassanelli et al., 2022). The offerings prices do not need to be predetermined, but instead they can be set based on collected data and analytics during the consumption based on the actual value delivered and perceived by the customers (Agarwal et al., 2022). As previously described, a large part of the value co-creation occurs in the usage phase. It is in this phase that the provider can shift the revenues from separate transactions to the customer's usage processes (Stoppel and Roth, 2015). Indeed, a product-centric pricing scheme that fixes the price before the customer's usage and value creation does not conform to the concept of customer solutions as relational processes. Rather, pricing schemes with revenue streams in the usage phase and an alternative measurement unit that refers to the customer's creation of value-in-use are better suited in this context (Stoppel and Roth, 2016). In the case of industrial services and solutions, the amount and timing of customer payments must be aligned to when and how the actual value is realized by the customer (Frandsen et al., 2019), translating in variable fees for the customer value-in-use (Raja et al., 2020). A VBP logic requires firms to establish new appropriate payment intervals and to align customer and provider incentives through performance and price parameters, and new forms of contractual agreement. All of

these challenges in finding the right value-capturing mechanism rest on a firm's revenue model, which needs to undergo substantial modification to meet the specific design requirements of digital servitization offerings (Linde et al., 2020). A revenue model determines the revenue sources and defines how value is captured from a business model (Classen and Friedli, 2021; Linde et al., 2020). Misalignment between business model and revenue model can result in missed opportunities and value leakages (Thomson et al., 2022). Fixed time-rate fees are typical of rental services in which the customer acquires the right to use a product for the duration of the contract and this may also include basic maintenance and assistance. Variable fees take into account situations in which remuneration is based on either the use of the product or other operational and financial performances. Examples are pay-per-use contracts and performance-based contracting (PBC) (Rapaccini, 2015). PBC is a results-oriented contracting strategy that focuses on the outputs, quality, or outcomes which may link at least a portion of a contractor's payment, contract extensions, or contract renewals to the fulfilment of specific, measurable performance standards and requirements. These contracts may include both financial and non-financial incentives and disincentives (Liinamaa et al., 2016). Through these contracting strategies, manufacturers sell outcomes rather than products. In the most extreme situations, they are responsible for entirely managing functions of the customer's organization (Rapaccini, 2015). This latter case is called a functional and operational services business model which consists in operating customer processes or operating products sold to the customer. The service provider is responsible for ensuring availability of the desired output. Consequently, this model tends to be highly service-based and requires the provider to assume a high level of risk and responsibility (Parida et al., 2014).

The more manufacturing companies servitize their business, the more they shift from revenue models based on pricelist and fixed time-rate fees, to pay-per-use, pay-per-outcome, and risk-reward sharing mechanisms (Rapaccini, 2015). Companies emphasizing VBS are extensively using guarantees to assure their real commitment to delivering superior value. Bearing some of customer's risk is often recognized as compulsory for sharing the value co-created (Terho et al., 2012): understanding risk, and potentially being able to reduce or reallocate it for the customer, can be a significant value proposition (Frandsen et al., 2019). Fee-at-risk contracts will facilitate the transition from a speculative value proposition to a real business case as a dynamic, iterative document guiding the relationship (Hinterhuber and Snelgrove, 2020). A pay-per-use or pay-per-outcome revenue model is feasible as long as the provider can accurately monitor the outcome of the offering and implement remote technologies to maintain access to its product or services in the customer environment (Deloitte, 2020).

Through data it can be monitored the exact use of the equipment, when intervention is needed in order to keep outcomes as high as possible, avoid opportunistic behavior and track how much the customer must pay (Salesforce and Noventum, 2021).

1.4.1 THE PAY-PER-USE REVENUE MODEL: SHIFTS IN THE VALUE PROPOSITION AND REFERENCE ITEM FOR REVENUE STREAMS

The pay-per-use concept is similar to use-oriented PSS, in which product ownership remains with the product provider, with product usage and its output being made available as a service to the users (Gebauer et al., 2017). Thus, pay-per-use services represent an innovation in the business model, as they shift the value proposition from products to services and apply usage as a new reference item (Stoppel and Roth, 2015; Gebauer et al., 2017). By choosing a usage-based RM, providers bear the responsibility for and the costs of capital expenditures, availability of the offer and related risks during the usage phase. In doing so, providers enhance the value proposition by demonstrating the contribution to the risk coverage for the customer's business (Stoppel and Roth, 2015; Gebauer et al., 2017). Considering product usage availability as output suggests that pay-per-use services are also close to the notion of outcome-based contracts (Gebauer et al., 2017).

With usage as a reference item, customers only pay for the service received. If customers cannot use the solution, they do not need to pay. Therefore, the price refers to the provider's contribution to the customer's value creation broken down to one unit of use. By measuring the units of use, the parties can compute the actually perceived scope of service and express it in monetary terms. In this pricing scheme, the intensity-of-use of the offer is a customer-driven item and the customer alone determines the amount payable (Stoppel and Roth, 2015). Providing a pay-per-use service involves several challenges and hurdles for the provider. On an economic level, supplier must first consider the financial risks since it is unable to predict how costs and revenues will affect the contract's performance at the end of it. Compared to traditional sales, usage-based revenues take longer to recover costs and generate a profit since customers pay for consumption. Revenues are the result of the usage fee for the actual product usage and replace individual product and service sales (Gebauer et al., 2017). Because of the customer's low consumption or the contract's early termination, revenues could be less than expected. The specific investment for a customer could prove to be unprofitable afterward, especially when the specific offer is not transferrable to other customers. When capacity is limited, a long-term commitment to an unprofitable customer and a capital commitment to that relationship restrict the supplier from exploiting new opportunities with more promising customers (Stoppel and Roth, 2015). Costs basically include research and development

(R&D), equipment, operation and maintenance costs. Operation and maintenance costs capture all activities for ensuring product usage. The intensity of the product usage increases these costs, and vice versa (Gebauer et al., 2017). In addition, usage-based costs can arise from too severe wear and tear or inappropriate handling of the infrastructure, which results in a risk factor regarding the customer's behavior (Stoppel and Roth, 2015).

Stoppel and Roth (2015) describe that by deploying a pay-per-use revenue model the relational value proposition is extensively improved with many favorable arguments about bearing several customer risks:

1. "First, the provider must finance the infrastructure, which shifts the *investment risk* and the capital costs from the customer to the provider."
2. "Second, the provider also bears the *availability risk* because it is responsible for the operational availability."
3. "Third, given the responsibility for the operational availability and because revenues are lost when the infrastructure is not in operation, the provider has the incentive to improve the quality, reliability and durability of the solution (*quality risk*) rather than designing the components with regard to future maintenance orders."
4. "Fourth, the provider also takes on part of the customer's *market risk*. For the customer, it is difficult to predict whether an innovative product will be successful in the market and whether the investment will achieve the required return on investment. With low sales, the intensity-of-use as well as the customer's derived demand will decrease. In this case, the provider bears part of the economic consequences of not-fully-utilized capacities because the revenue is directly linked to the usage."
5. "Fifth, in case the customer's usage requirement exceeds the present capacity in the long run, it is in the provider's interest to adjust the capacity to the customer's requirement and gain higher revenues along with higher usage. Thus, the provider takes on the customer's *capacity risk* and the costs involved."
6. Sixth, to maximize revenues, the provider wants the customer to have efficient and effective processes. Thus, the provider is interested in obviating malfunctions in upstream processes that result in lower usage and bears part of the *process risk*."

The risk awareness and estimation for a long-term relationship is a significant challenge for the provider. Moreover, technical challenges arise from the high requirements for the configuration and integration of multiple services. For example, new technical improvements during the usage phase must be integrated with existing components. Then, challenges arise in the management of usage-based pricing. Price management requires new approaches that

center on the relationship's value-in-use rather than on transactions (Stoppel and Roth, 2015), as, indeed, the VBP studied till now.

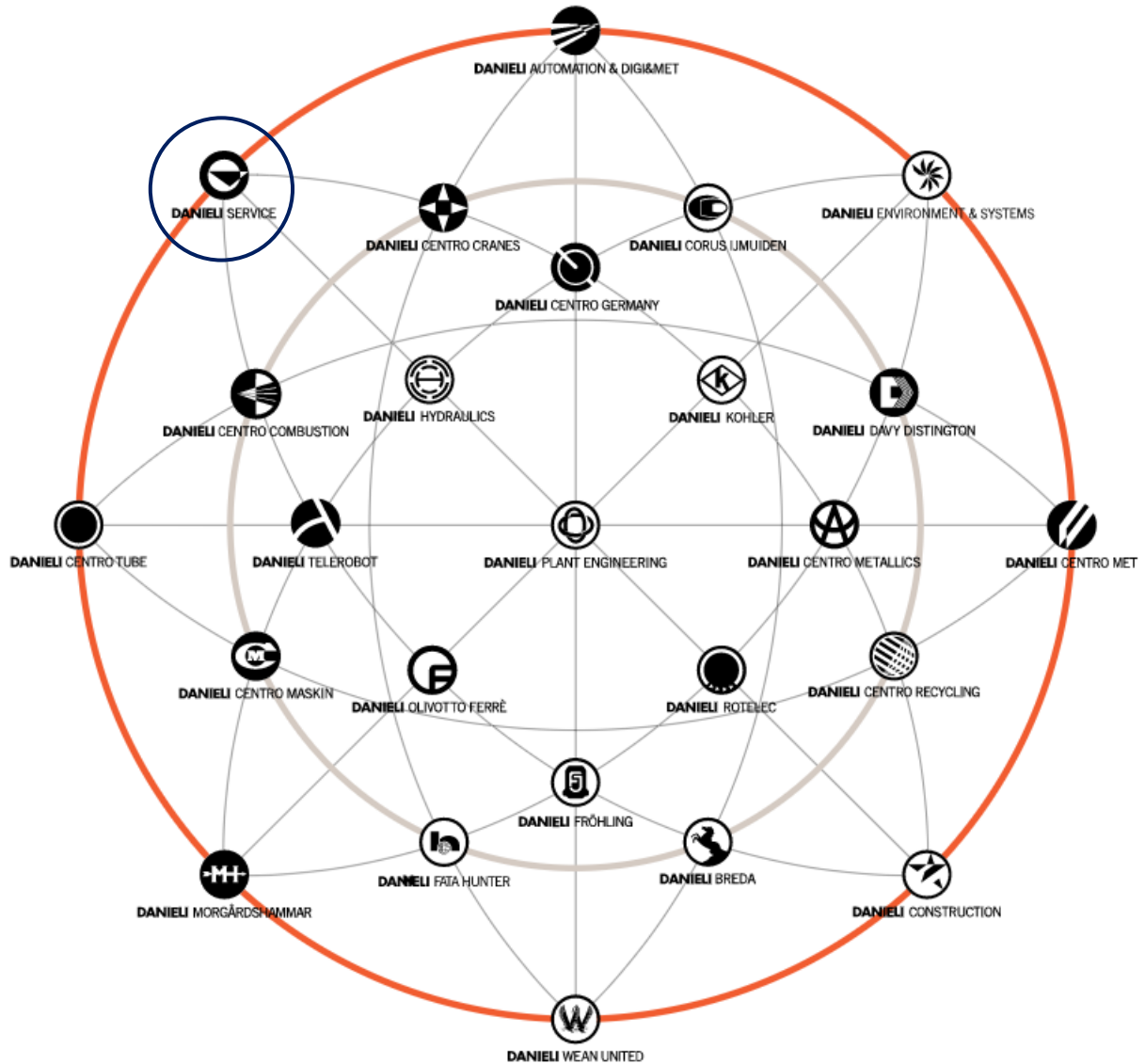
The topics of this theoretical background are relevant for all the industrial companies striving for exploiting the digital servitization opportunities. This chapter leads the way to the development of the following experimental research, whose objective is to develop an innovative business model in the form of an advanced service offering, and to explore value-based pricing opportunities, for the specific case of Danieli.

2. THE COMPANY AND THE RESEARCH'S STARTING POINT

2.1 AN INTRODUCTION TO DANIELI AND ITS SERVICE BUSINESS UNIT

Danieli is an Italian multinational company established in 1948 based in Buttrio (UD), among the world leaders in the design, manufacturing and supply of plants and machinery for the steelmaking and non-ferrous metal production industry. The group operates with 30 production plants worldwide, 9.100 employees, and revenues of 3.64 billion euros in the last financial year. Throughout its history it gradually expanded both internally and through M&A, leading to the current structure characterized by 25 business units to deal with the wide variety of product lines, services and functions that the company operates. Among these there is *Danieli Service* (Figure 9).

Figure 9: Danieli Business Units (courtesy of Danieli)



Danieli Service represents the after-sales customer service business unit of Danieli Group, spreading around the world with 31 service centers. It supplies own-brand and resale spare parts and consumables, technical assistance and consulting, remote condition monitoring, maintenance, refurbishment and repairs, revamping and modernization packages, and training. Moreover, Danieli Service engineers and supplies own-brand technological products that are complementary to the operation of plants and equipment (Table 1). Thanks to its distinctive know-how, capabilities and reputation, it also acts on competitor plants within the customers. Danieli Service has recently split into two sub-units to increase functional specialization: one responsible for after-sales and customer assistance on plants and equipment, and one focused on the technological products introduced above and their after-sale. This latter sub-unit is divided into several offices, each one dedicated to the design and sale of each specific product. More specifically, the focus of this research concerns the *Guide Systems* sub-unit.

Table 1: Description of Danieli Service offerings. Baines et al. (2014) categorization (own elaboration)

Danieli Service offerings	Description	Category
e-Spare	Spare parts orders through digital platform	Basic
Teleservice: remote support and troubleshooting	24/7 year-round on-line assistance through video/audio connection and sharing of plant applications	Basic
LTSA - Long-Term Service Agreement	Full range of consulting services for the full performance of plants	Basic
Small revamping and modernization packages	Update to latest standards or install state-of-the-art technological packages	Basic
Refurbishing, repairing and upgrading	Reconditioning to "as-new" condition of existing equipment with an extended warranty	Basic
Original spare parts	Supply of original spares and consumables	Basic
Own-brand technological products	Original products complementary to plants and equipment operations and after-sales provision	Basic
Consignment Stock Agreement (C-Stock)	Delivery program for wear and tear parts with fast delivery time, high rotation and on-demand approach	Intermediate
CMS - Equipment Condition Monitoring System	Assists customers to control the rolling mill plants' machine status during operation	Intermediate

2.2 A DESCRIPTION OF THE CONTEXT: STEELMAKING, MARKET AND DIGITAL SERVICITIZATION

In steelmaking, *rolling* is the production process in which metal stock is passed through pairs of rolls to reduce thickness, to make thickness uniform, and/or to impart a desired mechanical property. Rolling is classified according to the temperature of the metal rolled. If the temperature of the metal is above its recrystallization temperature, then the process is known as hot rolling. If the temperature of the metal is below its recrystallization temperature, the process is known as cold rolling. The *roll stands*, holding the pairs of rolls, are the machinery responsible for processing the metal and are grouped together into *rolling mills*, the general name of the plants. Depending on the above rolling classification, we can distinguish between hot rolling mills and cold rolling mills. Another distinction is made between rolling mills for the production of flat products (i.e., slabs, strips, plates) and for the production of long

products (i.e. bar, wire rod, profiles). The most common plants worldwide and, indeed, manufactured by Danieli are the hot rolling mills for long products. From now on the focus will be on these latter and we will refer to them simply as rolling mills. Generally, these rolling mills are mainly composed of two parts (Figure 10a): a first line of roll stands called *train* (Figure 10b), which is devoted to performing the majority of the material thickness reduction (i.e. from 150mm diameter to 20mm diameter) at increasing speeds (the more the thickness reduction, the more the elongation of the material within the same space, the more the rolling speed); the second part is called *fast-finishing block* (Figure 10c), which is devoted to making the final thickness reductions (i.e. from 20mm diameter to 5.5mm diameter) and uniforming the output quality at high speed (up to 130m/s).

Rolling mills have a high level of customization depending on individual customers' needs, therefore their configuration, composition, dimension and scope is generally never the same among Danieli's customers.

Figure 10a: Representation of Danieli's hot rolling mill (courtesy of Danieli)

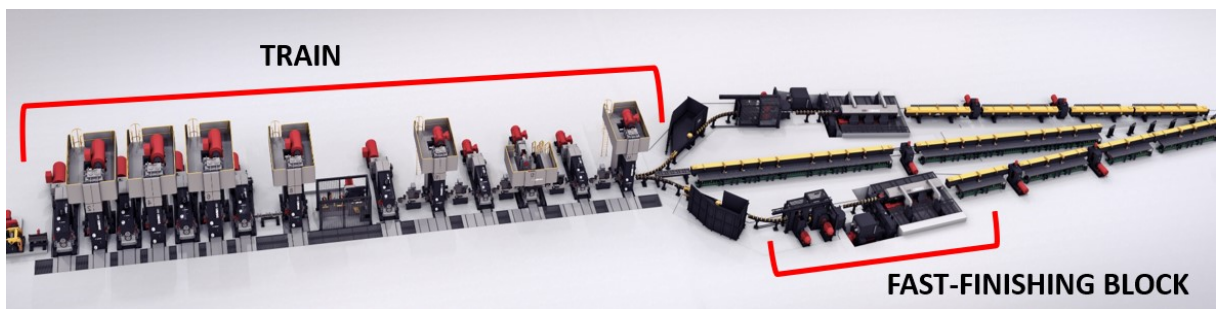
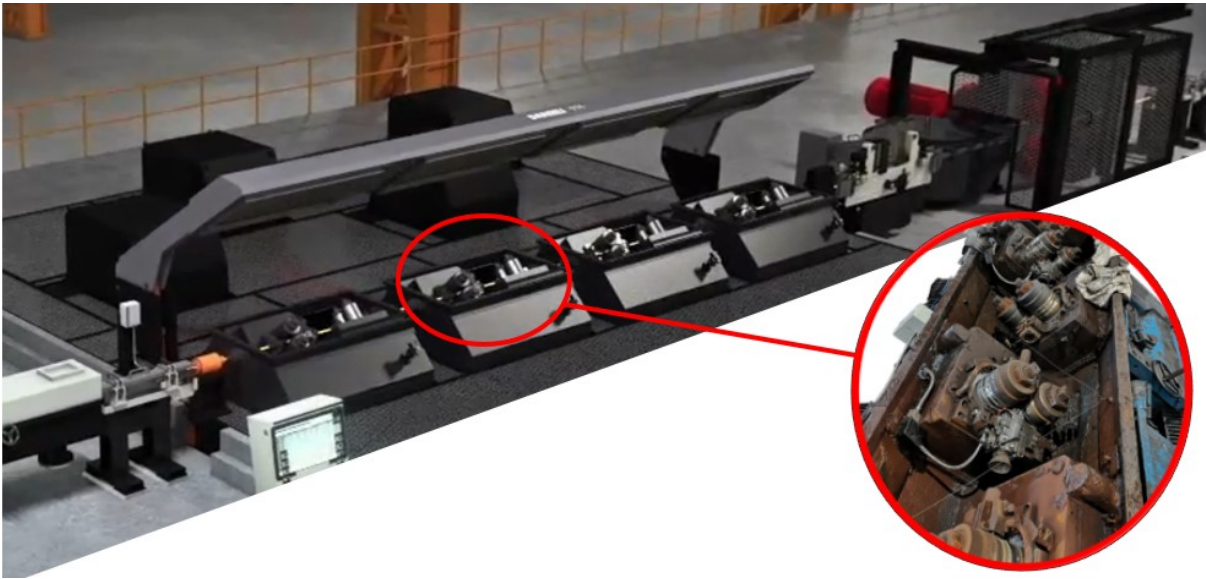


Figure 10b: Example of Danieli's train (courtesy of Danieli)



Figure 10c: Example of Danieli's fast-finishing block (courtesy of Danieli)



Concerning the market, steelmakers can be divided into two general customer segments: intensive producers and special steel producers. The former are characterized by the production of products of the highest market demand and dedicated to few common applications (i.e., construction, rails, commodities), therefore produced in high quantity and standard quality; these customers are highly competitive on prices so their usual working logic consists of long production campaigns and economies of scale to achieve profitability through marginal costs reductions. The latter are characterized by the production of special steel dedicated to various sophisticated applications (i.e., automotive, turbines, tooling) with perfect quality; here the working logic is short production campaign due to frequent product changes, striving for achieving constant maximum quality standard and profitability improvement through waste and errors minimization.

In order to increase profit margins, customers are usually highly vertically integrated in the steelmaking value chain and they put considerable efforts in building distinctive capabilities, processes and customizations to achieve incremental production performance and exceed the supplier's nominal performance of the plant. The result is the development of strategic know-how that can drive competitive advantage. Consequently, as a protection measure, these firms work in very closed mindsets and environments of information exchange.

Concerning Danieli's industry, the plantmakers' arena is strongly competitive and world-widespread, with the main differentiating factor being technological innovation. The company's motto, *Innov-Action to be a step ahead in CapEx and OpEx*, well describes Danieli's DNA in always putting innovation into action to achieve higher levels of product quality and potential, which brought it to technologically stand out from competitors and currently fight for world leadership in the sector. The same values reflect also in the

innovation of business models for satisfying customers' financial preference of OpEx rather than CapEx, leading to an increased focus on advanced service solutions.

2.2.1 DANIELI'S DIGITAL SERVICIZATION: CURRENT SITUATION AND VISION

As previously described, Danieli Service is responsible for all the after-sales customer services, with a customer service orientation, even if only reactive, already in the nature of the business unit. Consequently, it is empowered to exploit the opportunities offered by the digital servitization theory, and to drive the company-wide transformation toward overall service-centered business models. The responsible teams are already putting efforts in exploring and managing the technological complexity required by the integration of connectivity and data collection and interpretation (Linde et al., 2020), thereby gradually developing the strategic capabilities required (Huikkola et al., 2022).

As we can see from Table 1, up to now Danieli Service has put in place a service supply characterized by a variety and complexity that still covers only the first steps of the digital servitization path described in Figure 1a, the ones not yet involved by the digitalization potential. Product-related after-sales service offerings dominate the business unit's scope, entailing a reactive approach towards customers in supporting the operational working conditions of their plants (spares, assistance, etc.). The current service delivery results from random touchpoints throughout the customer lifetime: Danieli proposes its products and services unlinked and in subsequent periods from the plant sale. Machine data and connectivity capabilities are not exploited for developing and providing proactive services because the disconnected business strategy translates in barriers and inaccessibility to installed base data from customers in the after-sales phase (Figure 11a). From customer perspective, access to data requires the commercialization of justified value propositions and sales processes (Frandsen et al., 2022). An internal report entailing a last ten-year trend, showed that customers are rarely linked to Danieli Service, which is perceived only as complementary and optional to the product line. The performance of the business unit and the maintainability of customer relations relies only on salespeople capabilities and not yet in advanced offerings that create value for the customers. Moreover, distance and poor relationship between the customer and supplier can result in differing opinions about value (Frandsen et al., 2019).

Currently, Danieli Service is becoming increasingly aware of the digital servitization potential and of its effortful dynamics. The key role of an internal *digital servitization enabler*, Mr. Alessandro Viviani, is driving the empowerment of more and more teams in becoming closer

to the digital servitization concepts, and to rethink their individual transactional business models toward customer business related service-centered solutions.

Danieli Service's own-brand technological products will be all embedded with digital technologies and it is recognized that they should be exploited as connected machines for the development of advanced smart services based on data acquisition and analysis, and be integrated into higher value propositions (Thomson et al., 2022). Today, Danieli Service released some *intelli-products* with the double purpose of growing in terms of digital awareness and market contamination through new business approaches in order to set the fundamentals for future digital servitization evolution. These intelli-products are physical products and machines furnished with sensors, processors and connectivity, that exchange data between the product and the customers' operators (Classen and Friedli, 2019; Linde et al., 2020). As a starting point, the active mission entails the incorporation of the former smart products into more complex offerings of process optimization outcome-based services to deliver higher levels of operational capability and value creation (Favoretto et al., 2022; Oliva and Kallenberg, 2003; Thomson et al., 2022), thereby a shift from the role of vendor to the role of smart solution provider (Figure 11b). In a broader view, the vision looks at a complete company integration and transformation towards becoming a complete customer business optimization provider (Figure 11c): data access and exchange with the customers should be established from the plant sale in order to set the foundations for continuous monitoring; the smart products should be separated from the plant CapEx and sold as smart solutions; the relationship touchpoints will be dramatically transformed and maximized by the predictive delivery of analytical and digital interventions through the smart services enabled by data; the result will be a true digital ecosystem for customer business optimization that will encompass service and solutions with digital capabilities to coordinate and optimize work processes through the combination of monitoring data, remote control, and optimization algorithms. Every scope of action will be oriented to holistic customer value maximization and capture through digital means (Frandsen et al., 2022; Classen and Friedli, 2019; Huang et al., 2020).

Figure 11a: Danieli's current digital servitization situation (courtesy of Danieli)

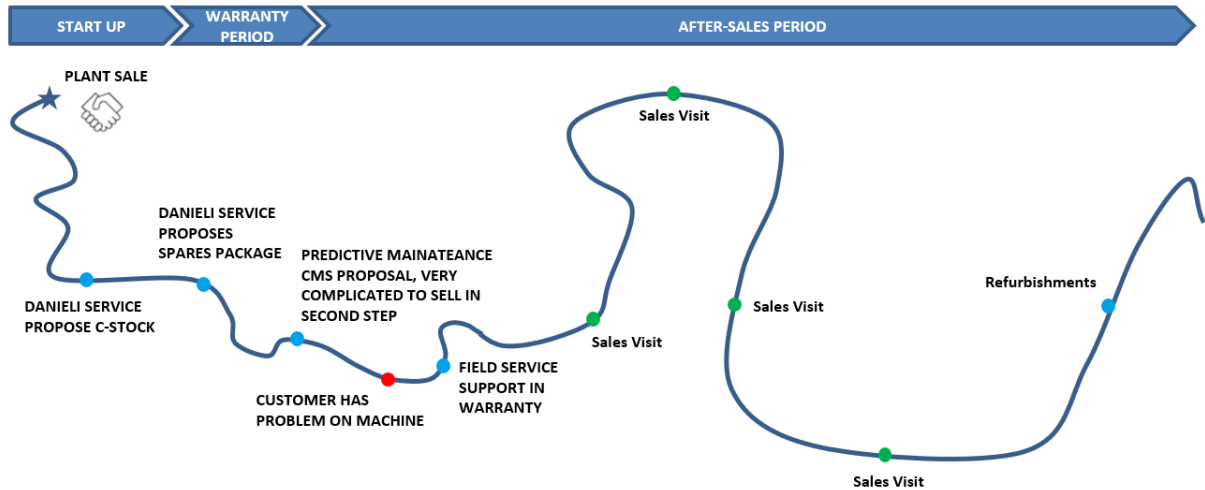


Figure 11b: Danieli's digital servitization active mission (courtesy of Danieli)

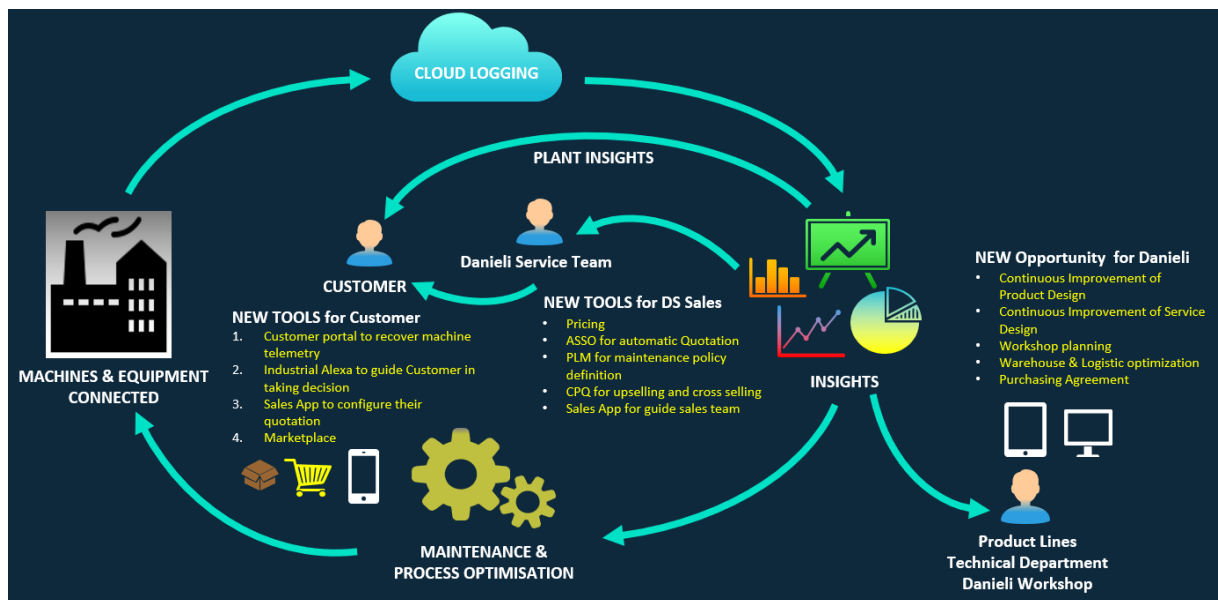
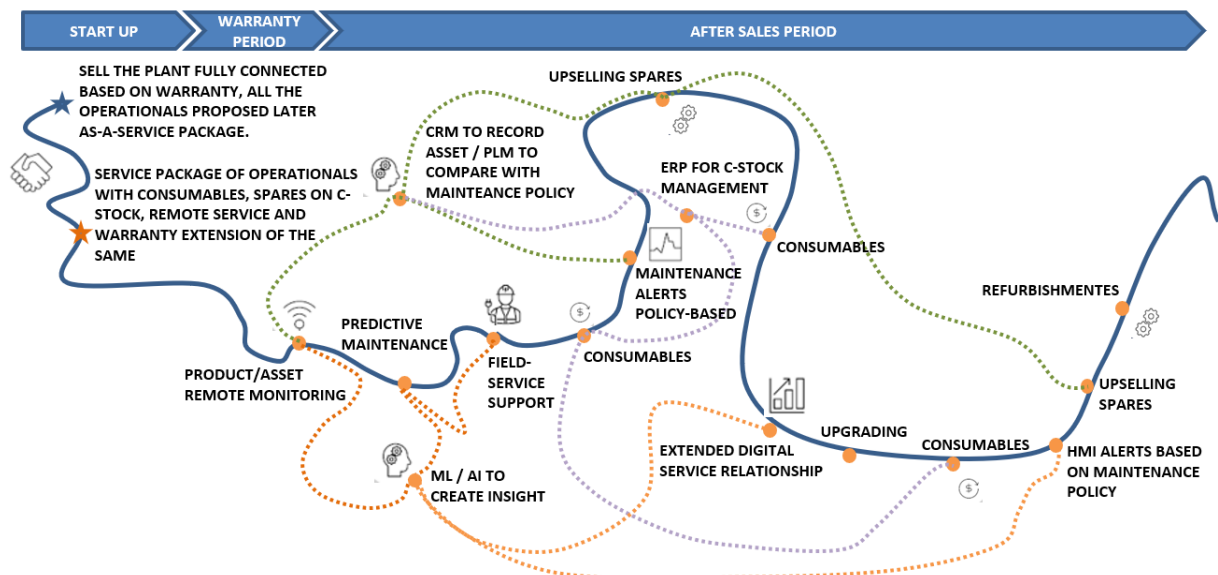


Figure 11c: Danieli's digital servitization vision (courtesy of Danieli)



2.3 THE RESEARCH'S FOCUS: DANIELI GUIDE SYSTEMS

As previously introduced, this research's focus is on Danieli Service's Guide Systems sub-unit; more specifically, the objects are the latest smart products of this sub-unit, which will be introduced in the next paragraph.

Guide Systems are complementary but necessary products in rolling mills for the production of long products. There is a wide variety of them as a consequence of the many different dimensions, materials, shapes and processes they have to handle. The most common are called simply *roller guides* (from now on also abbreviated as *guides*), which are characterized by a pair of rollers at the guide's exit (Figure 12a). During rolling, they are responsible for guiding the material into the roll stands with precise alignment with the rolls' grooves (the rolls' part responsible for shaping the metal), so to guarantee accurate and consistent rolling of the material throughout the entire process (Figure 12b). Misalignment between guide's exit and roll's groove translates in compromised quality of the output, non-smooth flow of material, and increased wear of the equipment involved (Figure 12c). In the worst but not so rare scenario, cobbles could occur, causing expensive downtime and repairs. The material guided by the guides has a temperature of approximately 900°C, and, in the fast-finishing blocks, is rolled at a speed of up to 130m/s. Due to these harsh conditions, the parts in contact with the material are subject to intense wear, thus roller guides have consumable components: foils and rollers are changed approximately daily. Sometimes, after long-term wear or rolling accidents, guide's body parts could also need repairs or substitution. Consequently, the maintenance activities are always carried out internally on customer site by customer's specialized staff and are never outsourced. Indeed, Guide Systems sub-unit's role in the after-sales phase consists only in the provision of reactive product-support activities such as technical assistance and spares and consumables delivery; there has never been the opportunity or request to servitize more the roller guides' maintenance.

Figure 12a: Generic roller guide (courtesy of Danieli)



Figure 12b: Roller guides application (own elaboration)

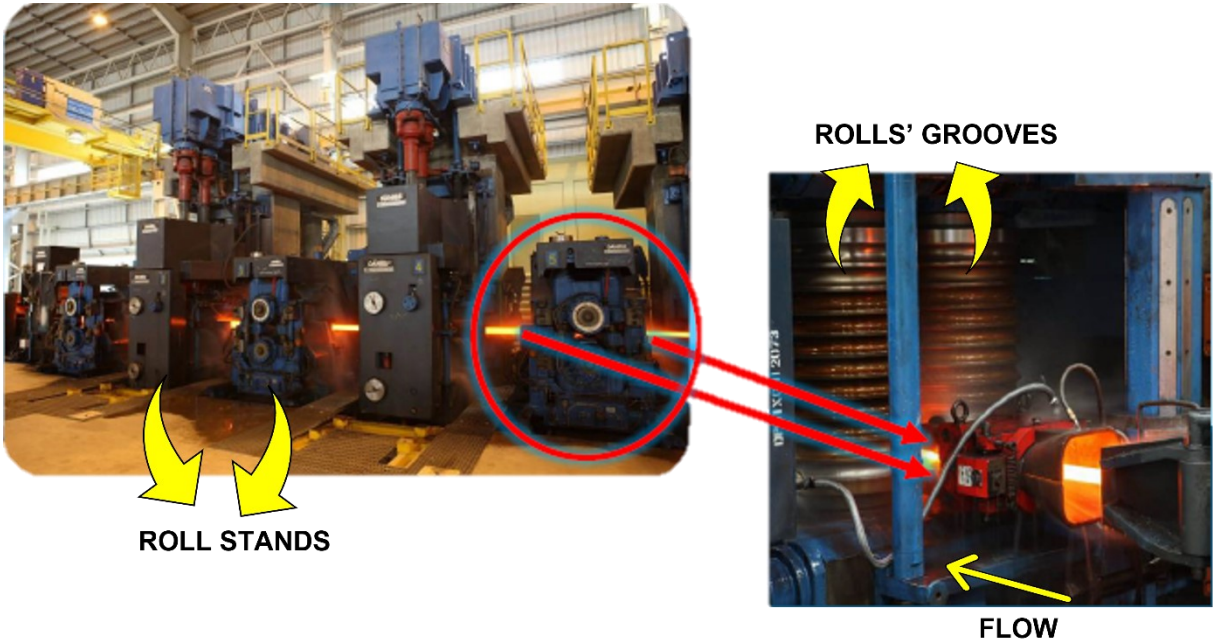
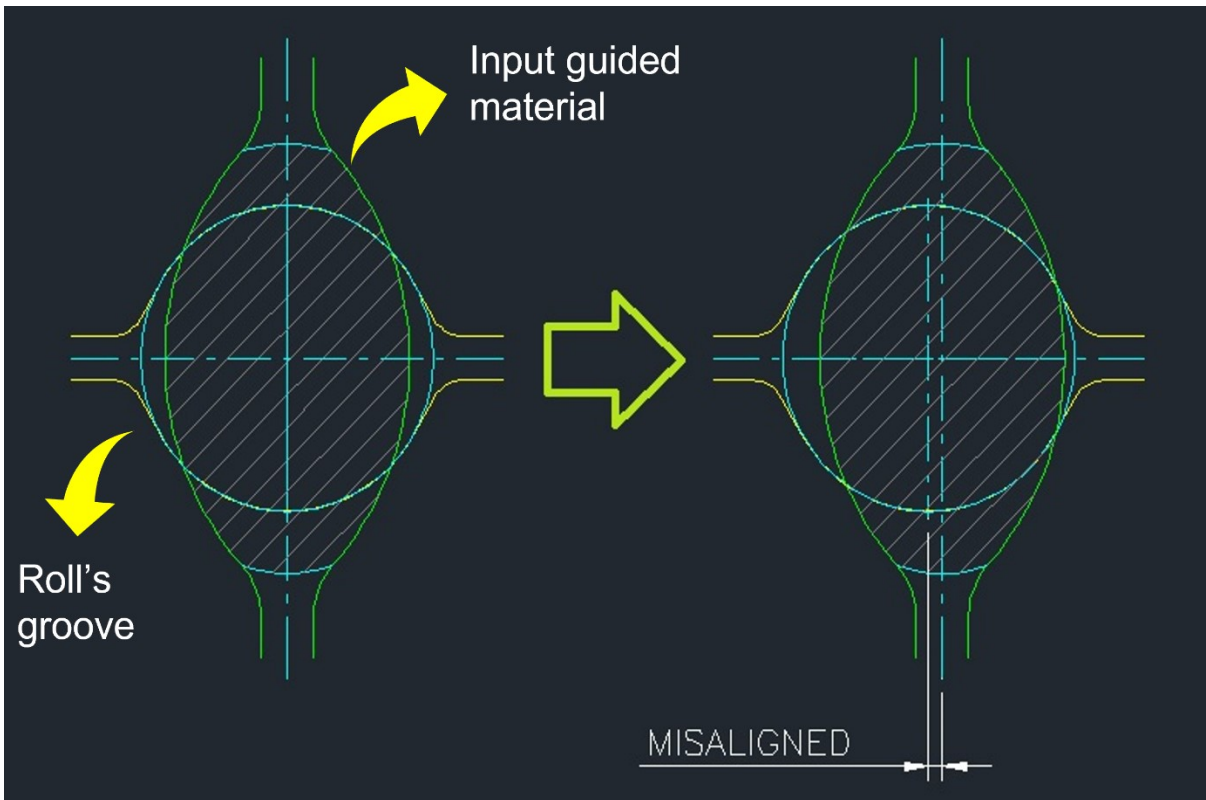


Figure 12c: Representation of the guide's alignment with the rolls' grooves (courtesy of Danieli)



2.3.1 DANIELI'S LATEST SMART PRODUCTS IN THE FIELD OF GUIDE SYSTEMS ARE A UNIQUE BREAKTHROUGH INNOVATION

Thanks to the technological development over recent years with the introduction of sensors and actuators, roller guides have now progressed from mechanical devices to fully developed machines. Danieli Guide Systems is ready to introduce new automatic and motorized *Intelligent Guides* for any type of rolling mill to help the rolling mill plant to become smart, digital, and safe. They are unique on the market and represent a radical innovation compared to the traditional guides. The intelligent guides are the result of many years of attentive customer assistance in the field of roller guides' applications that, thanks to Danieli engineers' ability of integrating mechanical and digital technologies, have led to solve all the main problems and limitations related to the traditional products:

- Solved the misalignment problems;
- Solved guides' failures;
- Reduced guide setup changes;
- Adjustments in safety conditions.

2.3.1.1 ROLL X GUIDE SERIES

The Roll X guide series (RX) is a smart semi-autonomous roller guide to be used in the train (Figure 13a). It features force sensors and motors for self-adjusting the rollers gap depending on the dimension variations of the flowing material during rolling for a more precise and accurate guide control, thereby reducing force loads on the roller holders. This translates in reduced wear of the RX and its consumables, directly increasing guide uptime and reducing maintenance intervals. The dimension variations measurements are displayed in real time on a dedicated Human-Machine Interface (HMI): thanks to it, the operator can remotely monitor the process and be reactive to needed interventions, therefore maximizing stability and avoiding cobbles, but also being able to increase know-how. The HMI is also featured with a database containing all the guide setups for each output to be produced, and the proper one can be selected in just a click, resulting in instant guide self-setting; this brings significant advantage in terms of rolling mill flexibility because now one RX can suit a variety of different rolling dimensions, thus reducing the range of guides needed and saving setup changes' downtime.

Figure 13a: Roll X guide series (courtesy of Danieli)



2.3.1.2 WIRE ROD SMART GUIDE SERIES

The Wire rod Smart Guide series (WSG) is a smart semi-autonomous roller guide to be used in the fast-finishing blocks, where speed is high and precision is key (Figure 13b). It features force sensors and motors for precisely self-adjusting the alignment of the guide's exit with the rolls' grooves, which during rolling are subject to move up to 10% due to thermal expansion (Figure 13c). The results are an increased quality consistency and a reduced wear of consumables directly translating in reduced maintenance intervals. Moreover, WSG features a Bearing Monitoring System (BMS) that activates an alert in case of bearings' malfunctions,

predicting bearings' failures and thus avoiding inefficiencies or cobbles due to guide's fault, but also maximizing bearings' use with an impact on improved maintenance planning. The measurements and alerts are displayed in real time on a dedicated HMI (or in the same of the RX if customer has both the guides) so that the operator can remotely monitor the process, be reactive to needed interventions and increase know-how. WSG is the first-ever product that gives the possibility to customers to become aware of the conditions of the rolling process inside the fast-finishing blocks: for safety reasons, these latter are completely closed boxed during rolling, making it invisible to operators what happens inside (Figure 2c).

Figure 13b: Wire rod Smart Guide series (courtesy of Danieli)

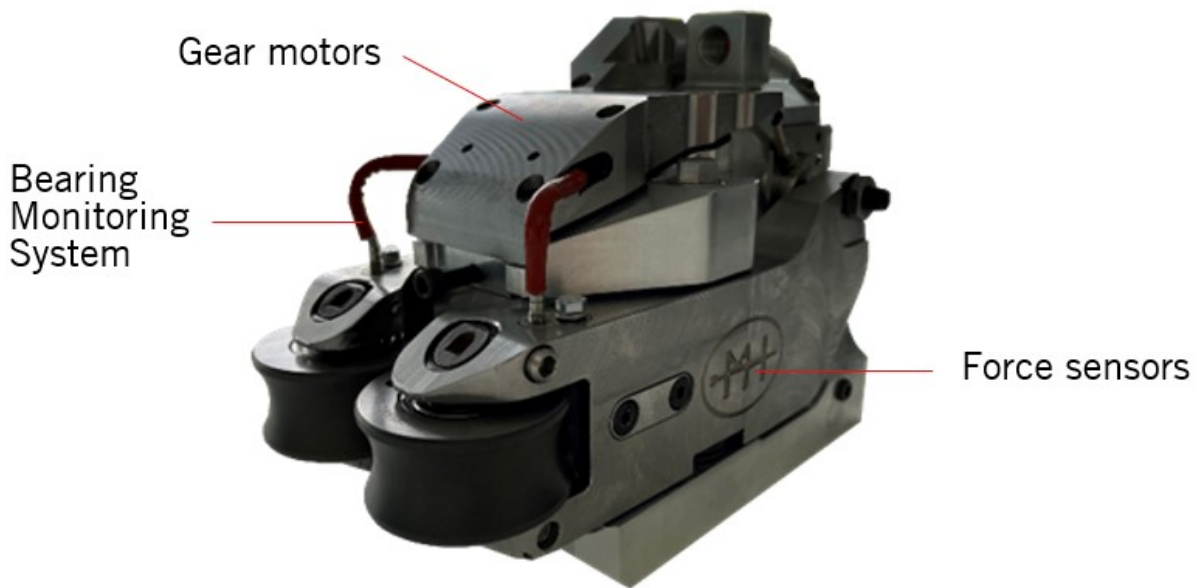
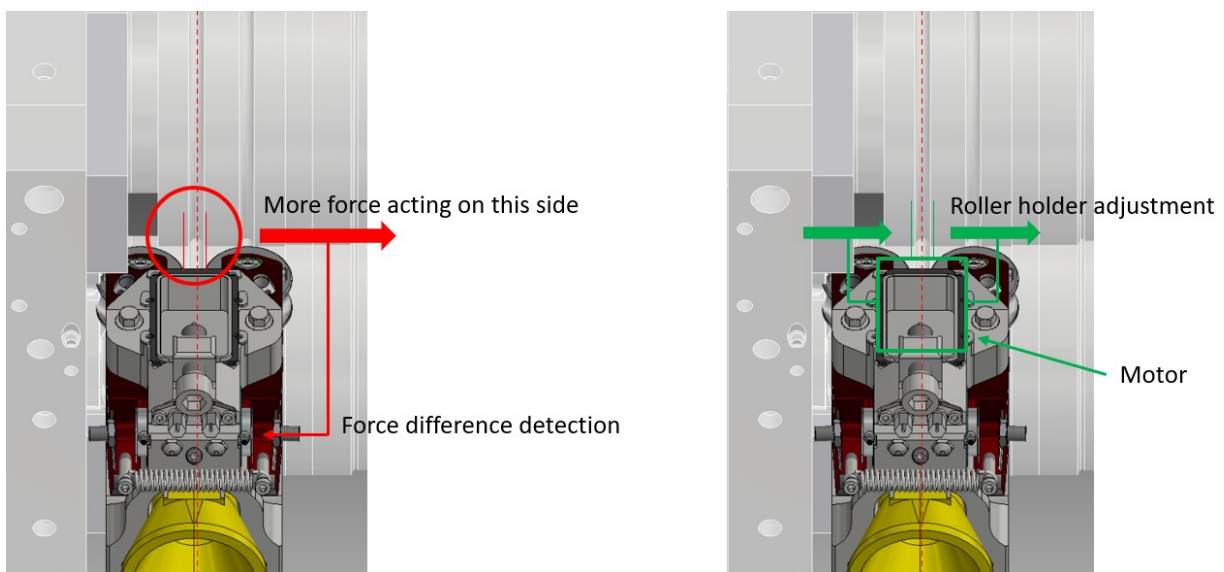


Figure 13c: WSG self-adjusting function (courtesy of Danieli)

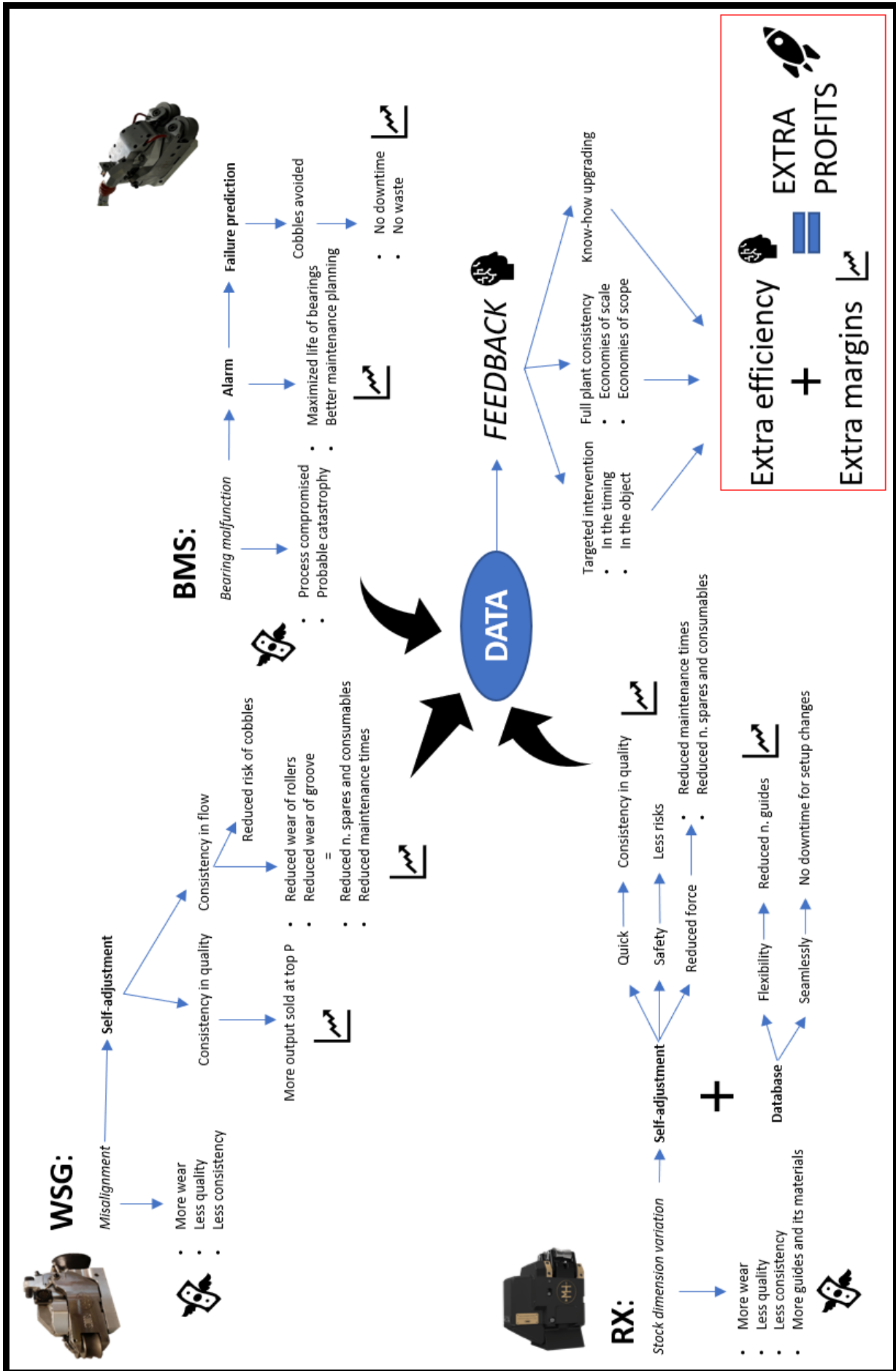


2.3.1.3 INTELLIGENT GUIDES' OPERATIONAL IMPACTS SUMMARY

It is clear that the new smart products represent not only improved versions of the roller guides, but also become enablers of additional efficiency and process optimization, especially through the embedded smart capabilities.

In order to reach a more thorough understanding of the meaning of the intelligent guides' operational breakthroughs, with a deep focus on the total nominal profit impacts for the customers' processes, the schematization of Figure 14 has been achieved, following a design thinking approach. It serves also as a summary of the above-described capabilities and gives a clearer view of the smart products.

Figure 14: Intelligent guides operational profit impacts scheme (own elaboration)



2.4 THE CURRENT BUSINESS MODELS FOR THE PROVISION OF THE INTELLIGENT GUIDES ARE STILL TRANSACTIONAL

The guides have been designed and developed from technical product-centric perspectives only, with an R&D process aimed at testing reliability and working effectiveness, but leaving out any performance assessment and analysis. As soon as the intelligent guides were ready for the market, Danieli started offering them with the traditional revenue model of a transactional sale, cost plus markup (cost-based pricing strategy). As a result of the technological development for transforming the roller guides from mechanical products to smart semi-autonomous machines, the manufacturing cost per-package rose considerably, translating in a much higher market price compared to the one of the traditional guides. Confident that the new smart products are a total breakthrough, Danieli was expecting very good sales performance in terms of orders volume. In contrast, the results have been of poor success in the market. According to internal reports, during negotiations the majority of the customers declared that the intelligent guides are expensive and above budget compared to the traditional guides, and because they weren't able to see or be convinced about a demonstrated quantified impact on their operational performance and profitability, they couldn't see the value or the need of adopting such innovative offering. In simpler words, they weren't able to evaluate a ROI for justifying the purchase. This especially underlines the fact that despite technological revolutions, customers will not be willing to pay more if their perceptions of the value of an offering doesn't improve, leaving the deal dependent to customer's price and brand sensitivity, and technological propension. Also, technology innovation itself can be perceived as risky regarding performance and availability guarantees (Huang et al., 2020). Customers' ability and willingness to pay will increase if operational value can be measured, demonstrated and documented using its distinctive metrics (Snelgrove, 2017), compared to an elevate price. Danieli's impossibility to demonstrate quantified performance, a TCO calculation, or a TPA calculation (Snelgrove, 2017) on few or some of the operational impacts of Figure 14 prevents salespeople to align the supplier's general segment-level value proposition to the customer's unique business situation and demonstrate a ROI (Terho et al., 2017), leaving the industrial customer to focus only on the comparison between price and budget. A quantified value proposition, even if for a product-centric transactional sale, would shift the sales focus and negotiation power from price competitiveness toward offering's implications for the customer's business, therefore approaching the customer with a VBS strategy (Classen and Friedli, 2019; Terho et al., 2012), so that increased attractiveness in created.

Nonetheless, lately buyers are slowly increasing thanks to past buyers' references and a metabolization of their readiness to adopt the new intelligent guides. At the same time, Danieli recognized that through a product-centered transactional sale they were cutting themselves off from access to the machine-generated data, foreclosing the possibility of data collection and future exploitation for the pursuit of their digital servitization vision.

Driven both by the need to increase the economical appeal of the intelligent guides and to reshape their business model towards a service-centered value proposition so that increasingly connected products would become the new installed base, Danieli integrated each new smart product in a service offering of recent conception.

2.4.1 A FIRST EaaS MODEL TO START CONTAMINATING THE MARKET WITH CONNECTED MACHINES: THE D-RENT

The current service business model for the intelligent guides is that of an Equipment-as-a-Service (EaaS) package, developed in order to match the interest of the customers in breaking away from a CapEx logic towards an OpEx one, and to supply additional value through services and experience. The offering consists in a rent contract, the *D-Rent*: the bundle includes the design (engineering), supply and commissioning of the equipment with the addition of a yearly maintenance activity that extends warranty by one year, the *D-Swap* service (Table 2). The D-Swap consists in a yearly maintenance of the intelligent guides previously delivered: once per year, in the date agreed by the parties, Danieli collects one set of guides to carry out a complete refurbishment activity, replacing damaged and/or wearied parts with new original spare parts, and extending the warranty of the equipment of one additional year; simultaneously, to grant smooth and uninterrupted operations for the customer, Danieli supplies a *Jolly* set of guides for covering the quantity taken out for the yearly maintenance. The Jolly set remains at customer site for the entire period before the following yearly maintenance occurs. The commissioning consists of an advisory service activity, carried out in one ordinary working week by one mechanical specialist and one automation specialist for guiding the buyer's personnel to install, test and understand the equipment supplied.

All the data collected by the guides are displayed and stored in the HMI included in the scope of supply. The same data is also gathered by a separate PC which simultaneously shares them to a Danieli cloud through internet connection (Figure 15). The information acquired by Danieli's cloud includes only the data from the intelligent guides and no other details are shared. The ordinary maintenance performed on-site is at buyer care and, in case of necessity, the buyer can require an extraordinary maintenance activity not included in the service. In

case of damage, the replacement of broken parts is granted only in case of problems attributable to the roller guides or the system (warranty). In case of any cause attribution divergence, Danieli's specialist and buyer's staff will analyze together the data collected by the guides and compare them with the process information in order to properly define which are the reasons of the accident.

The D-Rent revenue model is based on an all-inclusive fixed cost-based monthly fee, which gives the buyer the right to use the equipment supplied in its totality without gaining ownership. The contract has a validity period of three years after which can be extended, and a minimum granted period equal to twelve months.

The D-Rent represents a shift of the value proposition from smart product to full-service contract, therefore a move from the role of vendor to preferred supplier (Figure 1a). Anyway, the relationship remains weak, even if improved from the simple provision of a product, because the business model is still transactional: the service consists in the reactive deployment of analogic capabilities only, not engaging in new activities, risks, and value-creation opportunities (Linde et al., 2020). More specifically, the service outcome is the supply of the product and its support at a predefined fixed recurrence, and not the product's efficiency and effectiveness within the end-user's process for customer business support (Oliva and Kallenberg, 2003); contractual responsibilities are well defined in a traditional contracting mindset, with safeguarding rights and obligations that remain dormant until eventual litigation, translating in a Service Level Agreement (SLA) that emphasizes the transactional approach by distributing risks as in Figure 16. As a consequence, also the pricing scheme is product-centric, indeed resulting from a cost-based pricing strategy: the measurement unit is the monthly access to the product by the customer, and the calculation mechanism is based on costs (Stoppel and Roth, 2016). In conclusion, it is not an advanced service oriented at supporting the customer's business value-creation, value-in-use, and ultimately prevents the implementation of a VBP strategy.

The D-Rent is the first disruption of the traditional business logic, cost structure and revenue streams of Guide Systems sub-unit. In contrast to the typical transactional deal and its profit and loss accounting, now the business model follows the accounting rules of balance sheet (Figure 17): the rented equipment is property of Danieli, therefore is accounted in the company balance sheet and follows an amortization plan of seven years after Italian law. Consequently, the equipment is an investment made by Danieli for providing the service, and the business logic becomes that of the Return on Investment, in terms of yearly profits that payback the assets to the point of generating margins till the end of the assets' life. Therefore, the only direct costs of service provision consist of design, commissioning and D-Swap

activities. Then, the fixed monthly fee results from the monthly amount of equipment amortization plus a markup that breaks even after the third year, net of direct service costs.

Table 2: Intelligent guides' EaaS package (own elaboration)

BUNDLE	REVENUE MODEL	PRICING STRATEGY
INTELLIGENT GUIDES 3 SETS	ALL-INCLUSIVE FIXED MONTHLY FEE	COST-BASED: monthly amortization plus markup
D-SWAP SERVICE		
ADVISORY SERVICE (commissioning)		
ENGINEERING (design)		
WORKSHOP & CONNECTIVITY EQUIPMENT		

Figure 15: WSG installation and connectivity layout example (courtesy of Danieli)

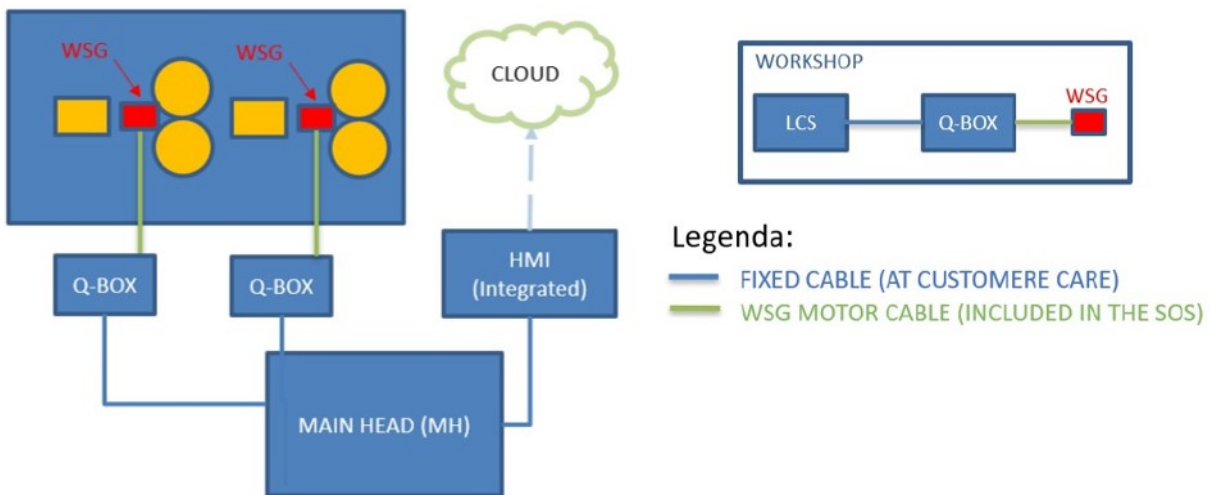
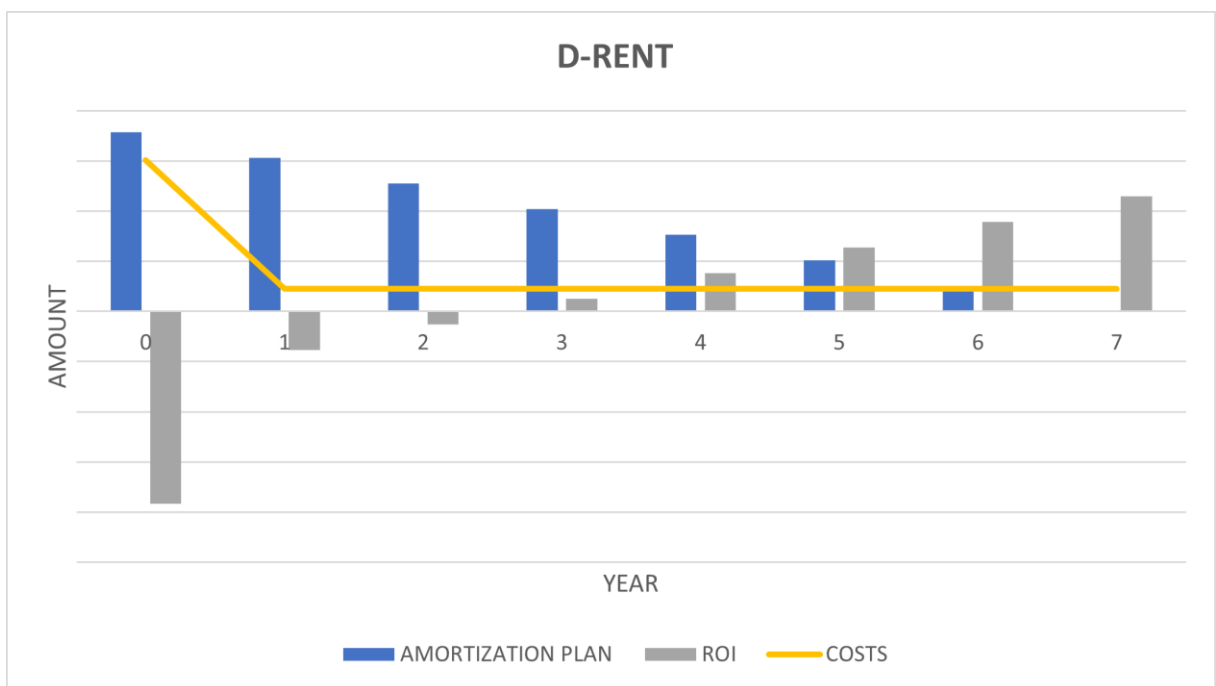


Figure 16: SLA risk distribution under D-Rent (own elaboration)



Figure 17: D-Rent profitability projection (own elaboration)



3. RESEARCH IN ACTION

3.1 BUSINESS MODEL INNOVATION TO SUIT A VBP STRATEGY FOR THE INTELLIGENT GUIDES

The purpose of this research is to explore and develop the possibilities that Danieli Service Guide Systems sub-unit (hereafter as Danieli) has with regard to the creation of an advanced service offering enabled by digital servitization, oriented at customer business support and optimization that can suit the final aim of understanding and implementing a value-based pricing strategy.

In the previous chapter we discussed the current business models adopted for the supply and sale of its new innovative intelligent guides. A particular focus has been put on the D-Rent as a starting point of analysis, being the only service offering already in place for the intelligent guides. Value-based pricing can be implemented only after a shift of the dominant business perspective from cost logic to value logic with the guiding principle being holistic maximization of customer value (Classen and Friedli, 2019), therefore after the establishment of a superior value proposition that supports a customer's value creation process. As we learned from chapter 1, in industrial contexts customer value emerges through consumption in a value-generating process, the value-in-use, which is determined by the customer use and situation in the customer business and processes (Terho et al., 2012). The requirement is a business model for the intelligent guides that must evolve from the D-Rent and be redesigned so that the focus becomes the integration of the smart products into more complex offerings of relational interactions to support higher levels of value co-creation in the customer's business by delivering value-in-use (Favoretto et al., 2022; Oliva and Kallenberg, 2003; Thomson et al., 2022). The D-Rent leverages on the customers' needs of OpEx and periodical product-support maintenance for technology to deliver a rented smart product that generates operational efficiency and advantages within the customer's process. But the service does not leverage the opportunities to deliver advanced value propositions that enable value-creation and capture. In the current situation, the smart products create value but the service is not enabler of value co-creation because the business model is still product-centric and transactional, limiting touchpoints and seller's contribution.

3.1.1 VALUE-BASED APPROACH FOR THE DEVELOPMENT OF A NEW ADVANCED SERVICE OFFERING

Remembering from the theoretical background, manufacturers can capture financial and strategic benefits by delivering new advanced and unique value propositions based on smart solutions (Huikkola et al., 2022; Oliva and Kallenberg, 2003), that enable value-creation through monitoring, control, optimization and autonomous function, and allow the provider to be compensated on the basis of the customer's value-in-use (Raja et al., 2020; Frandsen et al., 2022; Agarwal et al., 2022). Smart solutions are the integration of smart products and smart services, that solve strategically important customer specific problems with high interaction into the customer's environment (Raja et al., 2020; Frandsen et al., 2022; Agarwal et al., 2022; Stoppel and Roth, 2016). The intelligent guides consist of physical elements such as hardware and mechanical parts, intelligent elements such as software and sensors, connectivity elements such as ports and protocols enabling cloud connection, and data elements such as production data, malfunction data, and predictions based on data analysis (Huikkola et al., 2022). Therefore, by being smart products they have all the requirements to evolve toward smart solutions. The missing component is the service, and the challenge becomes developing the intangible service elements so that the smart components are leveraged to enable value co-creation through the delivery of a business support value proposition.

Being customer value-creation support and maximization the new advanced focus, a customer-centric value-based approach seems highly relevant for the development of the business model, value proposition, and ultimately of a VBP strategy (Liinamaa et al., 2016; Terho et al., 2017). Indeed, the superiority of value-based strategies is based on the essential process of understanding the sources of value for customers and designing offerings that meet customers' needs regarding that value, which subsequently lead to the opportunities of setting prices as a function of value (Hinterhuber, 2008). The first steps are therefore given by the value-based selling approach, which builds on understanding the customer's distinctive business model, processes, business goals, value drivers and usage situations associated with value creation (Frandsen et al., 2019; Almquist, Cleghorn and Sherer, 2018; Terho et al., 2017; Hinterhuber and Snelgrove, 2020). The key is articulating the business model and value proposition by taking into account customers' needs (Salesforce and Noventum, 2021).

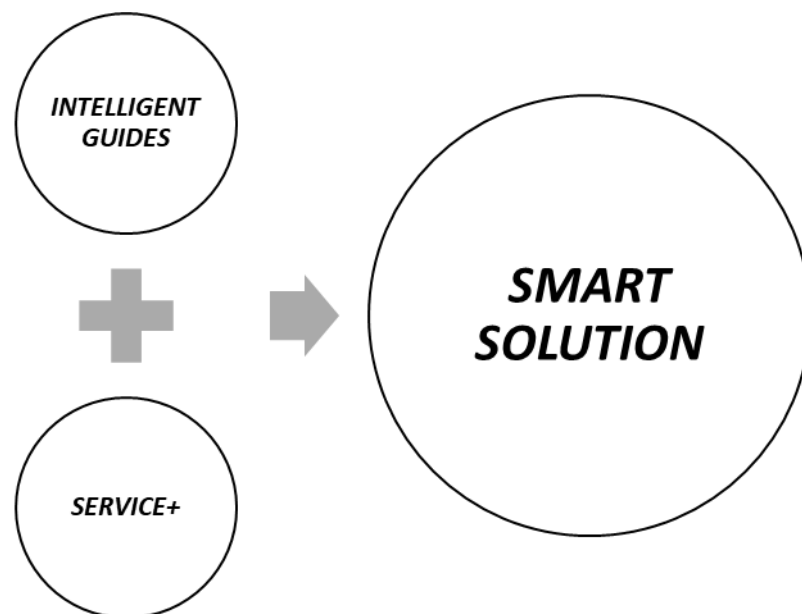
As described in paragraph 2.3.1, the intelligent guides have been conceived for solving the main problems and limitations related to traditional roller guides, resulting in product innovations that ultimately unlock additional process efficiency and optimization. It is

obvious that every form of efficiency in industrial contexts translates in additional profitability. Therefore, the operational smart capabilities of the intelligent guides are the products' drivers of additional value-creation within the customer's process, as schematized in Figure 14. More precisely, for both the general-level customer segments presented in paragraph 2.2 the relevance of the increased process-efficiency potential of the intelligent guides should be the same. For the intensive producers, the monitoring and semi-autonomous capabilities should aid the customers' efforts toward their business goal of maximizing process stability in order to fully exploit production capacity and economies of scale without interruptions in their long campaigns, so to achieve increased profit margins at market price parity through marginal production cost reductions. For the special steel producers, the same smart capabilities should help obtain a maximized quality stability through consistent setup precision in their short and diversified campaigns, so to achieve increased profit margins by producing higher quality outputs, costs and time optimizations, and minimized process failures and waste of expensive production inputs.

To sum up, the intelligent guides enable additional customer value creation and profitability; but only when they are well-functioning. Precisely by being embedded with digital technologies, the guides are now more sophisticated and, in turn, more delicate. Remembering the harsh conditions to which they are subject to during operations, the technological components could be damaged at any time, not only after guide's failure (that in one-shot sell and D-Rent would be covered by warranty), but also due to process failures like cobbles, which in the guides lifetime are many and that in the transactional sale and D-Rent would translate respectively in repeated CapEx and contractual penalty for the customer. By evolving and extending the D-Rent and D-Swap concepts toward holistic customer support, Danieli has the opportunity to support the customers' increased value creation not only by bearing the already recognized investment risk, but also by putting efforts in maximizing the guides' availability within the customers' environment. Availability becomes the service outcome since it is the mean of delivery of additional profitability. For this reason, the provider bears the customer's process risk, accounting for all the accidents that could break the guide or damage its technology that can't be solved by customer's usual maintenance; restoring the guides' digital technology requires the know-how and components that only the manufacturer has. Data access and monitoring allows the Jolly guide to be immediately deployed as substitution and the damaged guide would go back home for repairs and be refurbished for next rotation or necessity; data monitoring entails also the provision of seamless technical assistance by Danieli. The same is granted even in the case that machine failure is not tracked in its data. This full-service package will be called *Service+*. As

embedded in the offering, these activities already result in an abatement of the limitations of traditional contracting applied to D-Rent, structured with safeguarding functions that set transactional rights and obligations between the parties like product warranty; instead, they initiate the creation of a more reciprocal governance of the relationship, focusing on coordination and adaptation to changed circumstances (Liinamaa et al., 2016). Such a service translates also in the strong guarantee that the provider invests in maximizing the quality, reliability and durability of the smart products and that has the same interests of the customer, because warranty arguments are not envisaged in the relationship: Danieli bears also the quality risk because the more the machine failures, the more the costs of swaps and repairs. The integration of the smart products (that enable value creation) and of the smart services (that allow that value creation to be maximized in its availability) results in a new offering in the form of a smart solution (Figure 18).

Figure 18: Intelligent guides as smart solution (own elaboration)



3.1.2 ADAPTING THE REVENUE MODEL TO CAPTURE THE VALUE-IN-USE

Now, the value co-creation occurs when using the intelligent guides as value-in-use for the customer (Stoppel and Roth, 2015). Therefore, the customer's usage process can become the revenue stream, shifting from fixed transactions for product access or ownership to the sale of the usage or the output produced by the solution (Sassanelli et al., 2022), through a new pricing scheme as a relational process that applies usage as a new reference item, and translates in variable fees for capturing the customer value-in-use (Raja et al., 2020). This substantial modification of the revenue model can set the basis for a VBP implementation,

which requires that the value-capturing mechanism must be aligned to the timing and form of actual value realization by the customer (Frandsen et al., 2019). A pay-per-use revenue model represents itself an innovation in the business model, as it shifts alone the value proposition from products to services. Moreover, considering availability as an output, we are flexible in setting the revenue model between pay-per-use or pay-per-outcome (Stoppel and Roth, 2015; Gebauer et al., 2017). A fixed fee, as in the D-Rent case, would impede any discussion regarding value-sharing because the service wouldn't be aligned by default with customer's value-in-use of the offering. Here, instead, the customer must pay only for the actual service outcome received or, in other words, the actual solution consumption. Therefore, the payment mechanism must capture the value co-creation in the customer value-in-use with a measurement unit that refers to the solution usage availability or the outcome of that availability: a pay-per-functioning hour with a €/H metric because the value co-creation occurs only in the usage consumption for customer production; otherwise, because the solution usage supports an improved production output, the revenue model can be easily transformed into a pay-per-ton with a €/T metric (which is usually the customers' standard way of accounting OpEx), depending on the customer's preference and use situation. Thus, the measurement units refer to Danieli's contribution to the customer's value creation broken down to one unit of use. In addition, the shift of customer's market risk to the provider emerges from the fact that the solution use, by consisting of operational machines, is dependent on customer production and, in turn, customer's market demand.

3.1.3 DATA AS THE KEY ENABLER

The support to customers' value creation process through the new smart solution relies on digital technologies. Therefore, data becomes vital and data ownership becomes a key issue because especially Danieli's customers understand the value of data and protect it for safeguarding their know-how, and the provider must obtain the relevant data to run the solution effectively (Huikkola et al., 2022). A pay-per-functioning hour or pay-per-ton revenue model is feasible as long as the provider can accurately monitor the outcome of the solution and maintain access to it in the customer's environment. Through data it can be monitored the exact use of the intelligent guides, when a Service+ activity is needed to maintain availability, whether there was opportunistic behavior, and how much the customer must pay. Indeed, constant access to machine data provides the transparent computation of monthly fees based on the actual and variable customer-perceived value. The intensity-of-consumption of the offer is a customer-driven item and the customer alone determines the amount payable (Stoppel and Roth, 2015). Advanced value propositions oriented at

supporting the customers' profitability like this can impact existing hurdles to openness and conceptions to information rights, resulting in data-driven transparency between stakeholders and directly improving trust and value exchange (Agarwal et al., 2022). The application of these revenue models enhances the value proposition by demonstrating the true commitment to value maximization for customers, contributing through the provision of technological resources exclusively for customer exploitation in his value-creation process, with all the risks of the solution covered by the provider.

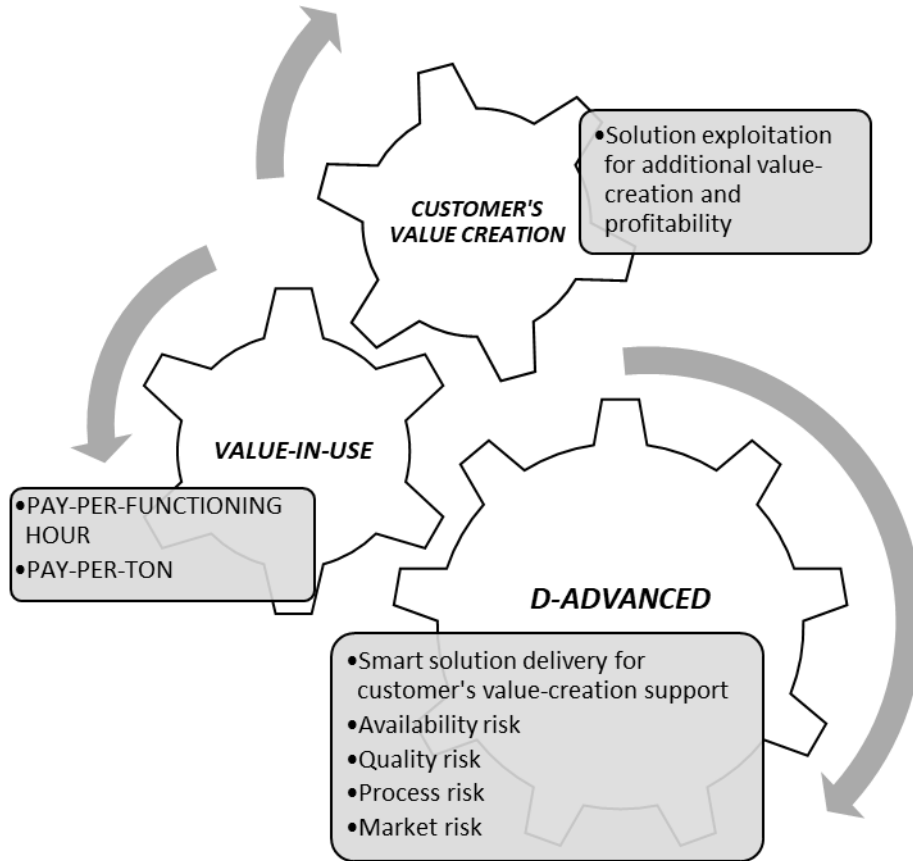
3.2 PROVIDING ADVANCED SERVICE OFFERINGS REQUIRES MUCH MORE RISK AWARENESS AND ESTIMATION

Delivering superior value through smart solutions requires bearing customer's risks as compulsory for setting the basis for sharing the value co-created (Terho et al., 2012): understanding risk, and potentially being able to reduce or reallocate it for the customer, is a significant value proposition (Frandsen et al., 2019). By committing to supporting the customer business, Danieli takes over much more risk since there is a specific outcome that must be delivered and the remuneration is based on how well it is achieved. By choosing a usage-based or outcome-based revenue model, it bears the responsibility for and the costs of capital expenditures, availability of the offer and related risks during the usage phase.

- First, the provider bears the CapEx and the investment risk for the provision of the smart solution.
- Second, the provider bears the availability risk because it is responsible for the operational availability. If the customer cannot use the intelligent guides, he cannot exploit the value-creation support, and doesn't pay.
- Third, directly linked with the second point, the provider bears the quality risk, meaning that has the incentive to improve quality, reliability and durability of the solution rather than expecting maintenance.
- Fourth, the provider bears the customer's process risk related to the solution damages, because the scope of supply is a partnership contribution to the customer's process, and the customer pays only for the contribution.
- Fifth, the provider bears the customer's market risk. The intensity-of-consumption of the solution is dependent on the customer's market demand. If the customer produces, he uses the intelligent guides and pays, if he doesn't produce, he doesn't pay.

Compared to the transactional SLA of the D-Rent (Figure 16), Danieli now becomes a business partner fully integrated in the customer's value-generating process, and we will name the new advanced service as D-Advanced (Figure 19).

Figure 19: Smart solution business model representation (own elaboration)



As a consequence, for the tangible realization of the new business model new procedures and processes are needed, in particular on a financial level, when it comes to estimating risks, costs, and revenue sources. Accounting for the investment and operation & maintenance costs connected to machine failure, wear and tear, opportunistic customer behavior or inappropriate handling during the duration of service consumption (repairs, logistics, etc.) is crucial as Danieli expands the supply of smart solutions (Linde et al., 2020). The intensity of product usage increases the overall smart solution costs, and vice versa. Indeed, as a first action, at contract beginning Danieli supplies an additional set of intelligent guides (compared to D-Rent) to be stored on customer site for emergency purpose, therefore compensate the process risk: these specific customers can be all around the world, leading to delivery times for the Jolly set to be up to one month; with an emergency set on-site, Danieli can grant a smoother availability after a sudden failure and, in turn, a more certainty of smooth revenues.

3.2.1 MARKET RISK LEADS TO INCREASED COST-BASED PRICING

Since customers pay for consumption, pay-per-use and pay-per-outcome revenues take longer to recover costs and generate a profit compared to traditional sales, because they are the result of the variable monthly fee for the actual and variable customer-perceived value. Moreover, compared to the D-Rent, the revenue model can capture the intensity-of-use of the customer which can lead to better results than with a fixed fee. Also the opposite holds true, indeed the service price must increase after the service sophistication in order to offset the additional market risk and unforeseeable amount of Service+ activities. Following the same cost-based logic of the D-Rent, the €/H or €/T measurement units are the result of the monthly amount of equipment amortization plus a markup divided by a conservative nominal expected monthly usage-hours (or tons produced); the markup for the D-Advanced price is decided to be 15% higher than that of the D-Rent. With such calculation the objective is to maintain the same ROI logic and to cover the new risks and costs.

In any case, given the new business model, the supplier is unable to precisely predict how costs and revenues will affect the contract's performance at the end of it. Because of a customer's low consumption or frequent damages, revenues could be less than expected and the specific contract for a customer could prove to be totally unprofitable afterward. Bearing customer's market risk is the toughest challenge because it is the least forecastable and the least suitable for preventive countermeasures. The only aid could come from contractual minimum thresholds of solution usage, therefore a minimum fixed monthly fee, which however would again refer to a more transactional approach.

A cost-based pricing strategy does not correspond to an exploitation of the increased value-capturing opportunities, but capturing value is crucial for the success of the new advanced offering associated with a high level of risk (Frandsen et al., 2022). Superior profitability and risk compensation for the D-Advanced could come exactly from capturing value by increasing focus on pricing since it is the key mechanism to share the value created between the customer and the supplier, and indeed an advanced service offering should be priced according to value-based strategies (Töytäri et al., 2017; Rapaccini, 2015; Frandsen et al., 2022).

3.3 VALUE-BASED PRICING STRATEGY IMPLEMENTATION

The intelligent guides as smart solutions are by design oriented at long-term customer-centric service-based provision of superior value-creation support to customers, and the measurement units of the revenue model refer to the customer's value creation realized by using the

resources delivered, therefore the profit formulas are coherent to allow the capture of a share of the value-in-use (Raja et al., 2020). These are the satisfied requirements for the VBP implementation, obtained through the VBS approach in the development of the business model. VBP strategy is enabled by VBS, which at its core consists in translating the supplier's offers into monetary terms and benefits that demonstrate their contribution to the customer's profitability (McDonald and Oliver, 2022; Terho et al., 2012). VBP has then space to become the firm's compensation on the contribution to the customer's profitability through the offering, and set a value determination as the main factor for setting the fee calculation (Frandsen et al., 2019; Raja et al., 2020; Hinterhuber, 2008) instead of supplier's finite costs.

3.3.1 THE FIRST REQUIREMENT: VALUE QUANTIFICATION

Value-capture processes involve the activities that enable providers and customers to determine how the additional value created should be efficiently distributed between provider and customer (Agarwal et al., 2022): most of all, pricing based on value co-created (customer-perceived value) requires understanding the outcomes of the value generated for the customer or, in other words, mandates the measurement of value (Töytäri et al., 2015) because the customer's ability and willingness to share the value co-created will increase if that value can be quantified, demonstrated, and documented using its distinctive metrics (Snelgrove, 2017).

At first, quantification concerns the ability to measure the service or solution performance in qualitative and quantitative ways (Frandsen et al., 2019). In our case, the solution's value outcomes result from the performance of the smart capabilities of the intelligent guides, which enable the increased efficiency in a customer's rolling mill in many KPIs deductible from Figure 14: uptime, quality and ton-per-hour are only the few most general-levels, which can be further decomposed in other many lower-levels. The first compulsory requirement is to quantify how the performance of each smart capability impact defined process KPIs, so that there is a measure, even if nominal and general, of the intelligent guides' impacts on customers' process. Later, the real value can be quantified with the customer involvement during sales process and negotiation that completes the calculation with its specific data or KPIs. Complete value-added estimations by Danieli on its own would be complicated and unprecise due to the relevant information asymmetry between provider and customer (Frandsen et al., 2019).

Unfortunately, as introduced in paragraph 2.4, Danieli has no knowledge of numerable performance of the intelligent guides, not even estimated, and this becomes a huge limitation because it makes impossible to craft a powerful quantified value proposition, makes the process of value quantification even more difficult and, in turn, also the VBS process, which

exactly works on demonstrating the solution’s profit contribution to the customer's business profitability in clear monetary terms (Liinamaa et al., 2016; Terho et al., 2017). Danieli is well aware of the capabilities and potential of the intelligent guides but does not know the magnitude to which the process efficiency is realized thanks to them.

To fill the gap, a survey on the efficiency gains experienced thanks to the intelligent guides was sent to all the past buyers. The questions were about quantifying the operational benefits experienced since the installation of the smart products on the impacted KPIs such as quality, tons produced and uptime, and the questionnaire was rolled out by Danieli’s salespeople directly linked with each customer. From the total of fifteen customers, the results have been of zero answers, even after solicitation. This exemplifies the findings of paragraph 2.1.1 regarding the limitation of interactions and inaccessibility to customer data in the after-sales, because the relationship is weak and customers, in this specific case, didn’t see any purpose in sharing their answers.

Nonetheless, afterwards some simpler and informal feedbacks regarding satisfaction were asked, which led to receive answers from seven out of fifteen customers that confirmed all Danieli’s recognition of the intelligent guides’ capabilities and efficiency potential (Table 3). These feedbacks serve as a strong reference for future customers and start penetrating the market with the unique smart products.

Table 3: Customer feedbacks on intelligent guides’ smart capabilities (own elaboration)

FEEDBACK	N. CUSTOMERS EXPRESSED
Cobble prevention	3
Increased output (uptime improvement)	2
Safety	2
Setup precision (stability/quality improvement)	3
Monitoring advantages	3
Flexibility (self-adjustment)	2

3.3.2 VALUE-BASED SELLING APPROACH AS THE CORE OF VALUE-BASED PRICING SUCCESS

Given the impossibility of quantifying the intelligent guides’ performance as a basis for VBP, the implementation of the new pricing strategy is only in the hands of salespeople, which need to leverage a VBS approach to make operational at their individual level the value orientation of the new advanced offering. Indeed, even if salespeople cannot precisely quantify the value

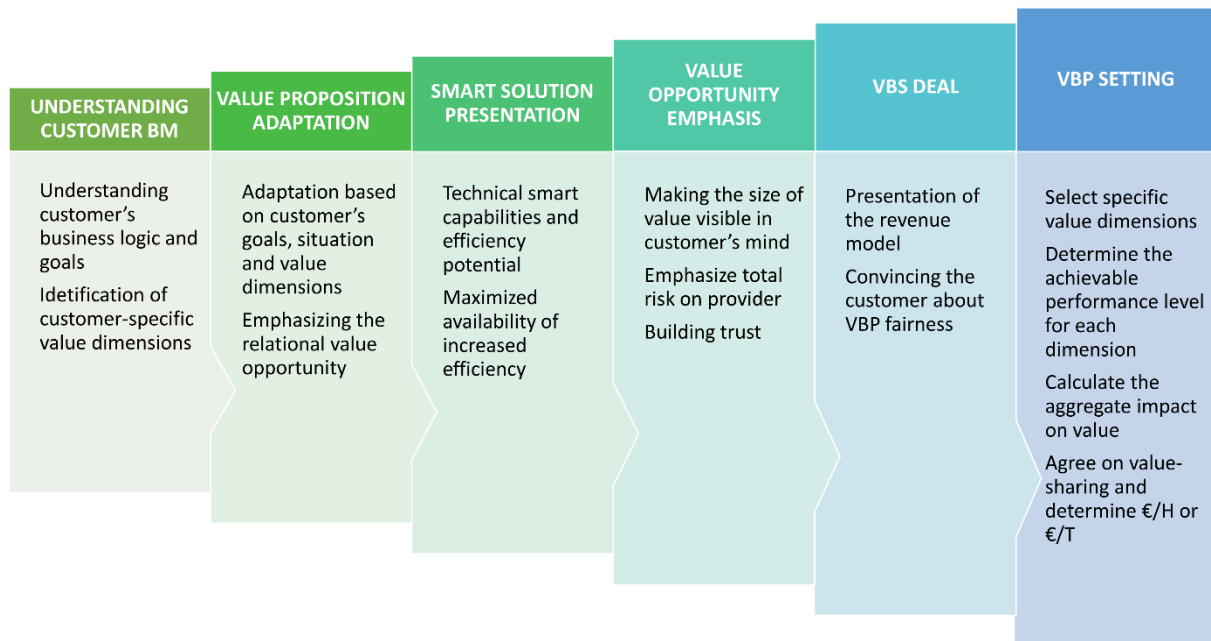
of their offerings, the basic requirement is to make the size of the value opportunity visible to the customers, which is more important than trying to quote the most precise numbers (Terho et al., 2012). Salespeople must be able to adapt the general-level superior value proposition to the specific business goals and conditions of the different customers, and demonstrate especially the value-in-use potential (Terho et al., 2017). The focus must be selling on value and not only innovative products.

The general-level value proposition to be used as a first marketing appeal can be as follows:

“Danieli’s Intelligent Guides solutions make you unlock superior plant efficiency, quality and know-how, all in a safe environment. Pay as you go with our €/T or €/H fee while you are responsible only for production. Danieli bears all the risks while taking care of the seamless availability of your smart equipment.”

Because the new business model is totally customer-centric, salespeople should be able to leverage on all its components (products, activities, risk abatement, payment mechanism) to demonstrate the high-value contribution to customers. And the properly targeted customers should be able to recognize the superior value proposition and perceive it as a must-have. Therefore, the sales process shifts from a product-based and transactional role toward a more strategic, customer-focused and relational process of solution sales (Storbacka et al., 2011): after convincing the customer about the advanced offering and the profitability contribution of the provider, the goal is to drive the negotiation toward openness and data sharing to set the €/H or €/T prices based on the value-in-use for the customer instead of the supplier’s-costs-in-provision, in order to grant a fair relationship between the parties and the sustainability of the solution given the total risks covered by Danieli. The assumption is that, even without quantified performance about the machines, customer involvement is sufficient to determine an aggregate quantity of value-added thanks to the solution, because the customer knows well his situation, process bottlenecks, KPIs’ impacts and, most of all, his financial figures. Therefore, the quantification process should be feasible by selecting the salient value dimensions potentially impacted by the intelligent guides to be quantified, establishing a baseline assessment for each dimension by auditing the current situation, determining the achievable performance level thanks to the intelligent guides for every value dimension and calculating the aggregate impact (Töytäri et al., 2015). Finally, the parties need to reach an agreement on the value-sharing distribution so to ultimately determine the €/H or €/T fees (Figure 22).

Figure 22: Strategic and relational VBS process for the intelligent guides as solutions (own elaboration)



Only the operational dimension of value is systematically quantified and leveraged as a basis of VBP (Töytäri et al., 2015), and the quantification process can fail at any stage: inexistence of baseline specific data, difficult value calculations or not credible aggregate value (Töytäri et al., 2015). Additionally, developing trust and reputation is especially important because the value-seller has to gain access and overcome potential distrust and reluctance to quantify value (Liinamaa et al., 2016; Raja et al., 2020).

VBP is also challenging because setting a reasonable price requires that the involved parties at the end agree on a price that reflects the customers' willingness to pay (Agarwal et al., 2022). Customer-perceived value is the difference between perceived benefits received and perceived sacrifices made by a customer which is also influenced by the importance of the supplier's contribution to the customer's process (Töytäri et al., 2015): the more the solution is crucial for the customer, the more its contribution to value-creation. Moreover, as we said reducing or reallocating risk for the customer can be a powerful value proposition (Frandsen et al., 2019), and in our case is one of the key points to be leveraged. Danieli's provision of a smart solution for customer's exploitation with all the risks taken over by the provider can positively affect the value-sharing ratio perceived as fair by the customer.

Another limitation can be too strong technical focus of buyers that can lead to the impossibility of evaluating advanced service offering characterized by innovative pricing schemes (Frandsen et al., 2019). When it comes to buying new Guide Systems' innovations the decision-makers are usually the plant directors, which first of all evaluate the technical

aspects, but that are also responsible and empowered enough to evaluate the economical appeal of new offerings. In general, they take every decision that concerns profitability improvements of their plants, thus we can expect that they are able to understand and evaluate also Danieli's innovative advanced offering for the intelligent guides.

4. VALIDATION OF THE NEW ADVANCED SERVICE

In this chapter it is tested the innovative business model and VBP strategy implementation for the intelligent guides by involving customers in the proof of concept. Hereafter is presented and discussed the empirical evidence regarding the conceptualizations of the previous chapters.

4.1 METHODOLOGY

An in-depth case-based market research in the form of qualitative interviews was conducted. The cases selected are Danieli's customers that already have one or both types of intelligent guides because they already know well the products and the need of technical explanations was avoided. Furthermore, this criterion prevents biases and conflicts of interest for the reliability of the answers because the contractual relationship is already defined and ongoing. Among the total population of fifteen customers regarding the intelligent guides, fourteen have purchased the products as CapEx and one has accepted the D-Rent since this latter has been developed only recently. Among these, six are intensive producers and nine are special steel producers.

The interview targets were the plant directors of each company since they are the typical decision-makers and buyers of the product categories such as the one of our case. The interview request was rolled out by the salesperson directly linked with each buyer in order to leverage the field relationships for maximizing customers' willingness to be interviewed. The final sample consists of five respondents: two of the special steel segment and three of the intensive segment. The other customers didn't manifest any reply to the request even after solicitation.

Table 4: Overview of the intelligent guides' customers

CUSTOMER	COUNTRY	SEGMENT	INTELLIGENT GUIDE TYPE	SALE CONTRACT	INTERVIEW Y/N
A	GER	INTENSIVE	RX	PURCHASE	14/12/2022
B	ITA	INTENSIVE	RX & WSG	PURCHASE	16/12/2022
C	ITA	SPECIAL	WSG	D-RENT	16/01/2023
D	ITA	SPECIAL	WSG	PURCHASE	24/01/2023
E	UK	INTENSIVE	RX & WSG	PURCHASE	26/01/2023
F	UK	SPECIAL	RX	PURCHASE	/
G	UK	SPECIAL	RX	PURCHASE	/
H	USA	INTENSIVE	RX	PURCHASE	/
I	USA	SPECIAL	RX	PURCHASE	/

L	CZ	INTENSIVE	RX	PURCHASE	/
M	CZ	INTENSIVE	RX	PURCHASE	/
N	FRA	SPECIAL	RX	PURCHASE	/
O	AUT	SPECIAL	RX & WSG	PURCHASE	/
P	SLO	SPECIAL	RX	PURCHASE	/
Q	SUI	SPECIAL	RX	PURCHASE	/

The interviews followed a semi-structured interview guide developed on the basis of the VBS process conceptualized in Figure 22: because the interview purpose was to test the assumptions developed in the previous chapter concerning the new advanced offering and VBP implementation, the questions aimed at validating each assumption by following a VBS process for having conversations on value, which is itself an important assumption of the research (Annex 1). In particular, the interview:

- starts with understanding customers’ business model and goals (questions 1 and 2);
- testes Danieli’s trustworthiness and reputation as a requirement for value-quantification access (question 3);
- testes the value-creation potential of the intelligent guides within the customer process (question 4);
- explores customers’ perspectives on having the guides-as-a-service and the related perceived-value at a general level (question 5);
 - for the only D-Rent customer (C), aims at understanding the reasons and perceived-value of such contract adoption (question 5c);
- testes the new advanced service offering and the related perceived-value and customer-business support (question 6);
- explores the openness and feasibility of customers to implement a VBP based on the value-added generated by the intelligent guides (question 7).

All the interviews were not recorded due to lack of opportunity but were subsequently transcribed verbatim from the notes taken during the meetings. The analysis followed an abductive process (mixing deductive and inductive aspects), comparing the findings with the concepts of chapter 3 and the theoretical background to draw the final conclusions.

4.2 FINDINGS AND NARRATIVES

In this paragraph the findings from the interviews are resumed and presented in a schematic form, which are later used as data for the analysis and discussion.

4.2.1 CUSTOMERS' PLANTS AND PRODUCTS

Table 5: Customers' descriptions of their plants and products

CUSTOMER	FINDINGS AND NARRATIVES
A	Bar mill and wire rod mill. They produce structural steel in coils, materials for stretching, ribbed bars with diameter range 8-40mm. Ribbed rods with diameter range 8-16mm. Rods with diameter range 5.5-13mm.
B	Wire rod mill with two lines of blocks and with train that works with double billet (rolling input) in horizontal layout.
C	<i>"We produce mainly special steel for high-end applications. More or less, we produce 30% bar and 70% wire rod. We are n.1 in the world in the production of these inox products. In terms of dimensions, properties etc., we have a very diversified production: almost 300 different products."</i>
D	<i>"At our quality wire rod plant, we produce high quality steel in wire rod. We have a wide range of product types in the dimensions and in the chemical composition."</i>
E	Multistrand plant for high production of 1.000.000 T/Y that rolls four billets simultaneously. Products with diameter range 5.5-13mm.

Findings show the high degree of variety typical of steelmakers in terms of their rolling mills' configurations, composition, productivity, and scope mentioned in paragraph 2.2.

4.2.2 BUSINESS MODELS AND OPERATIONAL GOALS

Table 6: Customers' descriptions of business model and goals

CUSTOMER	NARRATIVES
A	<i>"It is simply a matter of achieving a very good result on end products applying the latest technology as well as high safety standards. Key factors are minimizing costs and optimizing technological processes. We aim to make the rolling process more transparent and evaluable for further steps forward in terms of process stability and process monitoring, especially for not stopping the plant."</i>
B	<i>"The ultimate goal is to achieve uninterrupted production, starting from completely eliminating unplanned mill stops. Anything that can help us achieve the goal is absolutely valuable for us."</i>
C	<i>"We adopt a just-in-time logic; therefore, our lead time is usually very long, sometimes also six months. As a consequence, our goal is to reduce lead time by keeping quality maximized. This requires efforts in process optimizations that can also drive cost optimizations, but also a more precise control of the setup and of the process. Due to our product variety, we usually have 100/120 setup changes per month, 4 changes per day; 10%/12% of time wasted goes in stops for changes, 10%/11% wasted in doing setups. A better process control and stability leads to an improved lead time."</i>
D	<i>"We strive to optimize production capacity and maximize product quality because of our standards. We adopt a just-in-time logic, so we put efforts in optimizing setup changes which</i>

	<i>we manage to do quite fast, more or less 20 minutes per change. Our strategy in managing the just-in-time is to have a product wheel of 2 weeks. Moreover, we do quality controls every 20%/30% of our output. Obtaining good quality is challenging in terms of plant setup precision for process stabilization, and we try to monitor the most we can.”</i>
E	<i>“Our goals are to differentiate production to maximize Return on Assets and to maximize volumes to reduce costs. Especially, we aim at producing premium products for entering new markets but this is expensive so we are striving to reduce costs for wastage and reworks first. Our fundamental KPIs are T/Y, yield and ton-in-quality/tot sold, but we also look at environmental sustainability with energy savings as KPI.”</i>

Table 6 shows that the intensive producers (A, B, E) share the same general goal of maximizing output to obtain cost reductions through economies of scale; special steel producers (C, D) share the same general goal of maximizing quality and simultaneously reducing lead time by optimizing changes. As described in paragraph 2.2, this is already well-known by Danieli and the rest of plantmakers since it is the main market segmentation. The real differences between customers are in their unique working logics and lower-level goals that emerge from the specific details: customer A manifests focus on technological innovation, safety and process know-how; B strives for obtaining totally uninterrupted production because he produces few products; C’s mission is on improving time-related KPIs; D works hard in respecting its product wheel; E, as an intensive, is focused on minimizing wastage, entering the premium market and becoming more sustainable.

4.2.3 TRUST AND REPUTATION OF DANIELI

Table 7: Customers’ opinions about Danieli

CUSTOMER	FINDINGS AND NARRATIVES
A	<i>“Since the beginning we have always had good experiences and have always been very satisfied with both the performances and the support of Danieli. During this long cooperation, we have also got to develop and to test many new technologies together. We know that we will get good support at all times and that we can technologically continue to develop ourselves.”</i>
B	Long-time strong relationship, has mostly Danieli equipment and together they tested many technologies.
C	<i>“We have good trust in Danieli. Indeed, in the last two decades we changed all our equipment and machinery from competitor brands to Danieli technology.”</i>
D	Danieli is the preferred supplier for every demand it can satisfy. Long-time cooperation in technology testing, Danieli supplied all the latest innovations to make customer become one of the most automatized plants.
E	Recognizes Danieli as a valuable brand for its quality, technological innovation, and competent salesforce. But they rely on many different brands and Danieli is just one among their suppliers.

Danieli benefits of a strong reputation among its customers, observing its leadership position among the plantmakers obtained through technological innovation and product quality (paragraphs 2.1 and 2.2).

4.2.4 INTELLIGENT GUIDES’ VALUE-CREATION WITHIN CUSTOMERS’ PROCESSES

Table 8: Intelligent guides’ process impacts acknowledgements

PROCESS IMPACTS	CUSTOMERS EXPERIENCING IT
Optimized output production	A, C, D, E
Cobbles and failures prevention	A, B, C, D, E
Quality improvements/stabilization	A, B, C, D, E
Know-how	A, B, C, D, E
Reduced unplanned downtime	A, B, C, E
Safety	A, E
Reduced losses and wastage	C, E

The findings resumed in table 8 extend the previously received feedbacks of paragraph 4.3.1 about the intelligent guides’ smart capabilities. In particular, emerged some specific guides’ contributions to each customer’s unique business goals:

[A] *“With regard to the use of the billet welding machine recently installed, RX aids the continuous rolling and allows ongoing setup optimizations.”*

[B] WSG is especially valuable and must-have because it helps with their many issues regarding vibrations inside the block which are sensible for them.

[C] *“Most of all, it gives us monitoring on the material properties: we put a lot of time and resources in lab activities in order to fully understand our product types but when it comes to real rolling we can experience other behaviors from the materials. WSG absolutely helps us to increase strategic know-how. Being the master of stainless steel is our core business.”*

[D] *“Our plant is highly automatized so for us it is valuable to further extend it technologically.”*

[E] *“Because our plant is multistrand we are highly sensitive on our KPIs and intelligent guides improve them.”*

4.2.5 PERSPECTIVES ON GUIDES-AS-A-SERVICE

Table 9: EaaS in general from customer perspective

CUSTOMER	FINDINGS AND NARRATIVES
A	Perceives the maintenance of the guide as not costly and is not concerned about the risks for its

	technology during the process. He's sure he would get assistance if needed.
B	<i>"I want to be independent in the ownership. It is in our culture to deeply understand whatever we buy and be autonomous in managing it."</i> Until the process risk is his responsibility, he wants ownership. He relies on durability of the investment and technical assistance at need.
C	<i>"I went for the rent option first of all because it is an OpEx solution with which I can have diluted payments rather than CapEx; our accounting is already heavy enough with amortizations. Secondly, it gives me the guarantee to receive support from the provider in keeping a product standard in all its components and technology throughout its lifecycle. Also, the supplier has the responsibility for any software updates that can upgrade the guide."</i>
D	<i>"It depends on what the service provides me and how much it costs. I know that through a service I could get better support on the technological product, but I could also decide for a purchase plus a separated product-support service. I would evaluate costs and benefits of the different options."</i>
E	Is concerned about the risks for the guides' technology during the process and would perceive value in receiving support from the manufacturer. Repeating the investment in case of total damages is not an option, and currently believes that it would manage to solve any inconvenience by requesting technical assistance or opening warranty disputes.

A and B expressed a strong traditional mindset regarding product ownership and supplier-customer relationship. C, D and E show sensitivity to technological delicacy and perceive value in receiving guarantees about intelligent guides' potential. Moreover, C explained the importance of OpEx solutions and D and E emphasized the evaluation of purchasing plus the service separated.

4.2.6 REACTIONS TO THE NEW ADVANCED SERVICE OFFERING

Table 10: Evidence on the intelligent guides' smart solutions

CUSTOMER	FINDINGS AND NARRATIVES
A	Doesn't see any value in the risk reallocation because technology must be part of his plant, thus property. But would like to receive a servitized delivery of spare-parts to lower delivery times and storage costs (C-Stock).
B	Understands the importance of receiving seamless support on technology but product ownership is a must, therefore is not attracted by the D-Advanced and every asset should be part of his technology. The innovation should be reliable and durable more than previous series.
C	<i>"The features of the new offering have incredible value for me, and if the idea is feasible, it would be very coherent overall. For me the more the payments are variable and dependent on production the better it is; it is also in our goals to achieve a more precise accounting method of the real costs per ton and per product type, which is difficult with CapEx. Moreover, the fact of taking away from me the process risks is a huge value, which extends the value I am getting with the D-Swap. I perceive value also for the fact that the reliability of the guide is in your</i>

	<i>hands, because of course it is in my interest to achieve improved process stability and optimization, and I would have a guarantee that the product is conceived to work well, because otherwise I wouldn't pay. Your idea also helps building more transparency, which is a philosophy that we already have inside here. I see the €/H as winning."</i>
D	<i>"The pay-per-ton is an interesting solution because I wouldn't have CapEx, I would have significant guarantees and I would obtain technology. Very valuable characteristic is the variability of the payments which would be tied to my production; just now we are coming from a poor market demand. Nonetheless, if the investment would be high then the €/T makes sense, otherwise, with a low investment amount, not. The evaluation depends also on the market situation because the variability is really good with market uncertainty, but if demand is stable and high and I'm doing money then maybe I would think about purchasing as investment."</i>
E	Totally recognizes that the advanced offering would be oriented at supporting his business and would like to have the service. Perceives strong value and guarantees in receiving technological assets without risks with the purpose of achieving his efficiency goals. Believes that the provider would be a true partner oriented to his business. Intelligent guides' C-Stock must be part of the service to fulfil the scope.

Directly linked with table 9, A and B remain on a strong traditional position; C, D and E manifest a positive reaction to the new offering and perceive value from its key features of risk reallocation and innovative revenue model. D raised the argument that the evaluation is dependent on market situation.

4.2.7 OPENNESS TO AND FEASIBILITY OF VALUE-BASED PRICING

Table 11: Opportunity of VBP strategy

CUSTOMER	FINDINGS AND NARRATIVES
A	Estimated a €/H OpEx for RX consumables that would be willing to pay for receiving the C-Stock.
B	Without any quantified performance regarding the machines is impossible to negotiate on value and he's not able to estimate the value contribution from the guides. Detailed assessments regarding value contribution from new technology is not done. Provider should demonstrate the performance.
C	<i>"I believe the price based on value should be done on a quantified assessment. For sure we will do internally a quantified evaluation of the situation and the improvements thanks to the new guides in terms of efficiency; so with that exercise I would be able to state an €/H for the service. We know that we can reach X€ per month of lowered costs from increased output also thanks to the guides. In any case I think maybe it wouldn't be so difficult to do it even without precise operational numbers, because I could give a value also to the risk reallocation, relationship value and fairness."</i>
D	<i>"I see the potential of a value-based €/T only on solution packages consisting of many guides, for sure not on the supply of guides for just one stand. Right now, we are using the WSG only</i>

	<i>on the twin module block, and in this case your service wouldn't be enough crucial in my value creation. If the solution is critical, we can estimate value-sharing."</i>
E	Would be totally available in setting a VBP and sees a PBC as perfect for the relationship. Believes fair to set the payment based on a fixed minimum threshold and a value-based remuneration based on the achievement of specific levels of KPIs. Already did an assessment to quantify the value impacts and contribution of the guides that would be the starting point for VBP.

B, C and E especially emphasized the key requirement of value quantification as a basis for VBP; B in particular reported the importance of quantified performance as a starting point of measurement. C and D stated the ability to estimate value-added even without performance figures, while E already did the assessment. Additionally, D underlined the dependency of value-based approaches to the solution complexity.

4.3 DISCUSSION

The findings of the research overall support the assumptions made in chapter 3. As was expected by their design and as had already been discovered from feedback of Table 3, the operational smart capabilities of the intelligent guides are enablers of additional value creation and profitability for customers, in terms of process efficiency and optimization (Table 8), and this applies to both customer segments (Table 4) and to any type of rolling mill and plant (Table 5). The intelligent guides help customers in their operational and business goals and have been adopted because their potential is understood by buyers. Each customer has particular areas of improvement that can be different between one and the other: they monitor specific KPIs and they exploit the intelligent guides exactly for achieving planned targets that translate in increased profitability (Table 6).

Moreover, the customers of the sample have also more intangible or unmeasurable missions that they considered when buying the new products. For example, moving towards more automatized and autonomous plants (D), significantly improve mill floor safety, becoming more sustainable (E), increase scientific metallurgical know-how (C), and support the maximization of other investments and technology (A). These are other important and unique drivers of value perception for customers, that are part of a more abstract and broader customer-vision compared to the more focused process-efficiency targets, but that are equally considered when evaluating the size and the value tag of the opportunity offered.

4.3.1 PURCHASING IS A STANDARD AND D-SWAP IS OPTIONAL

Apart from A, which is not much concerned about the risks for the technological components of the intelligent guides, and from B, which is not inclined in evaluating a structured service and relies on reactive assistance on-demand, customers recognize the value of receiving a specific product-support service for the new assets (Table 9) because, as for every important purchase, the ROI must be maximized and repeating the investment is never contemplated. What didn't retrieve good success is the overall rent value proposition: respondents clearly stated that the guides are seen as part of their plant technology and core business, especially because they are always entitled to do the high-frequency ordinary maintenance and because the guides are directly employed for production. This means that the OpEx argument of a rent fee doesn't overcome the propension to ownership of these more traditional customers; indeed, they would always evaluate and financially compare the options with a stronger preference for investing. Therefore, the D-Swap should be structured to be added to the guides purchase as an optional in order to extend the transaction with additional yearly revenues per customer and strengthen the relationship. Anyway, the only D-Rent customer (C) expressed the motivation for its contract type and exemplified a less traditional mindset regarding ownership and the benefits of OpEx for accounting. It confirmed that the value of the rent is in receiving a more complete support from the supplier, with more guarantees on the product potential, on the relationship and on receiving technology at state-of-art, which offset the dependency to recurrent service payments.

4.3.2 INNOVATIVE OFFERINGS FOR INNOVATIVE CUSTOMERS

Extending to the D-Advanced (Table 10), the most traditional respondents with a strong purchase-to-own approach (A, B) again are reluctant to the advanced service. They show strong technical focus and disinterest to any service offering. The value proposition can become superior and deliver more value but won't in any case substitute the other offering types or be more powerful if the customer is not willing to engage in a closer relationship, outsource asset ownership or adopt innovative offerings. From all the others, the new business model was confirmed as highly valuable even if they were reluctant to a general EaaS option, extending their interest of a basic refurbishment service. In particular, the risk reallocation component is the core of the value proposition's coherency and maximizes their opportunity to increase efficiency; indeed, respondents C and E, where E even doesn't have a strong relationship with Danieli (Table 7), would recognize strong support oriented to their business from the provider and a true partnership approach, and actually commented it as a must-have.

“The fact of taking away from me the process risks is a huge value, which extends the value I am getting with the D-Swap. I perceive value also for the fact that the reliability of the guide is in your hands, because of course it is in my interest to achieve improved process stability and optimization, and I would have a guarantee that the product is conceived to work well, because otherwise I wouldn't pay.” (C).

Most of all, huge appeal is proven to come from the fact that the payments would be tied only to the actual service consumption, which entails the shift of the market risk to Danieli. Customers exactly emphasized that the new revenue model would allow them to have payments based on their production, therefore optimizing cash flows and financial stability which, by being high-investment companies, is a sensible topic and an additional internal goal for them: *“For me the more the payments are variable and dependent on production the better it is; it is also in our goals to achieve a more precise accounting method of the real costs per ton and per product type, which is difficult with CapEx.”* (C); *“Very valuable characteristic is the variability of the payments which would be tied to my production; just now we are coming from a poor market demand.”* (D). Nonetheless, respondent D reintroduced the investment opportunity evaluation, in the sense that the market situation influences the choice of the offering type, and that the most advanced value proposition would be overcome by an opportunity to purchase and own the assets, reconfirming the observation at the beginning of previous paragraph. This also suggests that the innovative payment mechanism could be applied for the development of an innovative leasing solution with €/H or €/T for CapEx sale.

Finally, customer E suggested that he would expect the C-Stock (Table 1) regarding the intelligent guides' spares and consumables to be integrated into the D-Advanced to maximize the business model's coherency and advanced service's scope, which is a right missing detail in the concept of integrating products and services for the delivery of superior solutions that completely fulfil a customer's problem. Consequently, the offering of the intelligent guides as smart solutions of Figure 18 is redesigned with the new integration (Figure 23): now the smart solution totally covers the operational customer need in the field of guides, leaving no components outside the purpose of holistic customer value creation support. Furthermore, the discussion till now leads to an adjusted design of the offerings as required by the sample, with the optional D-Swap also for the traditional purchase (Figure 24). The sample as representative of the market, makes it obvious that customers have clear needs, situations and preferences that drive their contract type choice. There can't be only one business model for the supply of the new products and even the more advanced offering can't substitute the existing others; instead, the supplier must be prepared in having different type of commercial

offerings for satisfying the different customer preferences, that are mostly transactional. Given the appreciation of two out of five respondents, the D-Advanced can be a frontrunner in contaminating the market with more innovative and smart business models, as aligned with Danieli’s digital servitization mission.

Figure 23: Intelligent guides as smart solution (own elaboration)

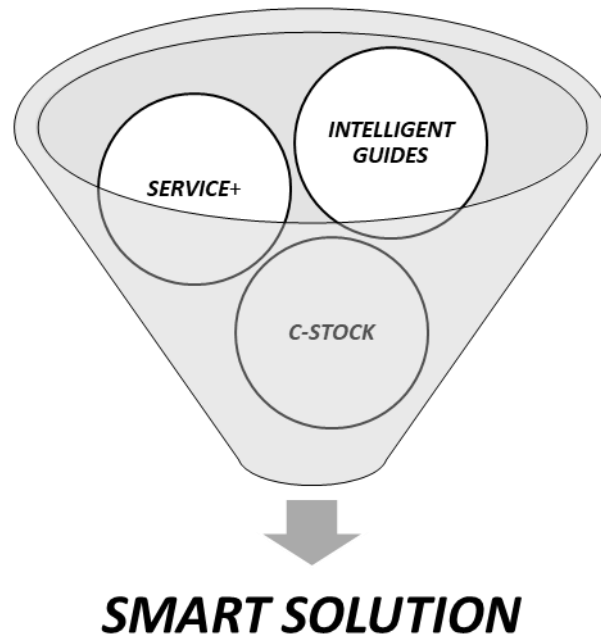
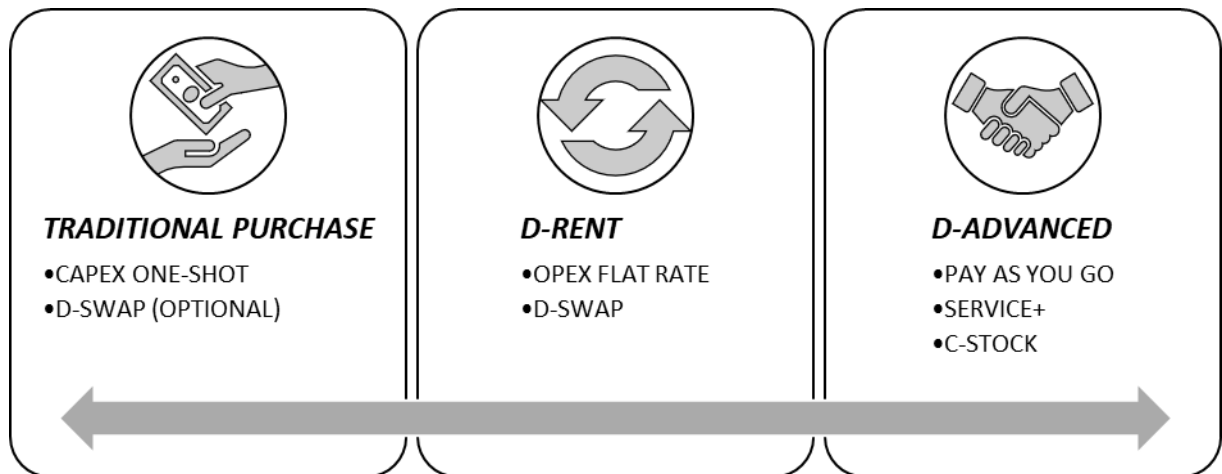


Figure 24: Offering types (own elaboration)



4.3.3 VALUE-BASED PRICING POSSIBILITIES

The findings of Table 11 were obtained exactly by implementing the VBS process of Figure 22 throughout the interviews. Understanding the customers’ business processes and goals served to obtain the relevant case-specific details to be leveraged for adapting the D-Advanced value proposition and addressing the value-in-use potential to each unique

customer. Through this approach and the essential contribution power of the advanced offering's design allowed to create openness and have conversations on value delivered and value-sharing, even without having precise impact numbers. The process was aided by the strong relationship trust and reputation of Danieli (Table 7), which is an essential requirement for establishing confrontation on high-level topics such as value-in-use; customers are the ones with strong bargaining power and would be quick and easy for them to refuse to talk about value from the supplier. Indeed, VBS needs to emphasize a partnership approach and Danieli can get advantage from the fact that is a renowned quality manufacturer leading the industry and that Danieli Service has always delivered high levels of customer care (Table 7). Therefore, these aspects influence the customers in perceiving the advanced service as designed for their needs and oriented toward their business; particularly the customers that reacted positively to the D-Advanced topic expressed recognition of the fairness of a VBP because the value proposition effectively conveys the provider's contribution to the customer's business (C, E). Because the value outcome comes from the offering availability, customers are willing to pay the maximized availability with a share of the value it generates.

4.3.3.1 VALUE QUANTIFICATION IS CRUCIAL

Respondents by themselves expressed the fundamental requirement of a value-quantification process to set an aggregate of value to be imputed to the intelligent guides (Table 11). The assumption was that, even without quantified performance about the machines, customer involvement is sufficient to determine an aggregate quantity of value-added thanks to the solution, because the customer knows well his situation, process bottlenecks, KPIs' impacts and, most of all, his financial figures. Respondent B didn't support this assumption and actually claimed that they don't do internal assessment on small-size technology as the intelligent guides, and therefore it is provider's duty to demonstrate the contribution to the customer with quantified performance. This is a case where, despite the openness, the quantification process would not even start due to lack of data. Indeed, it is not expectable that every potential customer willing the D-Advanced has methodological internal value assessments in place. Nonetheless, the VBS process of understanding the customers' situations by itself is sufficient to spot relevant customer-specific value dimensions or KPIs that can be used as reference point for mutual estimations (Table 6): for example, from the general-level KPIs impacted by the intelligent guides mentioned in paragraph 3.3.1, the easiest to estimate and maybe most important is uptime because strictly linked to guides' role and production quantity, and customers could have even other related lower-level KPIs that can give an indication of value, as the case of C; for E value could be quantified on wastage

reduction. Plant directors, by understanding the potential of the intelligent guides for their process, can estimate an achievable value-added outcome on those dimensions. Indeed, respondent D confirms the assumption, C too confirms and gives a tangible target that they are reaching thanks to the guides; E even already did internal value assessments of the guides' merit to the efficiency improvements obtained but didn't share the data because the interview was for research purpose and there wasn't a real offer to negotiate about. Therefore, value quantification is feasible even without quantified machine performance but needs to be enabled by the provider through the VBS process, by selecting the customer-specific salient value dimensions to measure that for sure the customer is monitoring and evaluating (Table 6).

4.3.3.2 VALUE-SHARING RESTS ON SALESPEOPLE HANDS

What remains unknown is the value-sharing ratio between the parties, and here again any quantified performance by the provider could help in setting benchmarks for orienting the VBP process, because it could give metrics of the provider's contribution which would influence the remuneration. It follows that the potential size of the value captured depends only on salespeople capabilities, apart from customer fairness beliefs influenced also by Danieli reputation and customer-specific relationship. We understand again the centrality of the VBS process in managing every step.

To draw a picture of a tangible VBP potential for our advanced service, let's take the example of the only quantified value available, case C (Table 11), which luckily is also the D-Rent customer and simplifies the analysis. Compared to the X€ monthly amount of value increase imputable to the guides' contribution that he measured on a plant productivity KPI (T/month), its current D-Rent monthly fee is the 6% of that value; if the VBP could capture even only 1% more, the impact on the yearly revenues would be an increase of 17% compared to current performance. Actually, in the D-Advanced case, that 7% would be broke down to the unitary €/H or €/T metric, that anyway can capture the intensity of consumption of the customer leading to better-than-forecasted revenues. Simultaneously, worse performance could come from the market and process risk sustained by the provider but note that X€ takes into consideration only one value dimension impacted by the guides, and the customer reported that it would be able to extend the value quantification. Also, we accounted for only 7% of that value as price base which is much conservative considering that the solution for E would cover all the fast-finishing block, that consists in a key rolling mill function. A little more realistic value-sharing of 10% of the aggregate would widely compensate the market risk and process risk leading to superior profitability with estimated yearly revenues increase of 67%

compared to D-Rent. Furthermore, that much value-based increase would not be feasible on a rent fixed monthly fee, because as we previously discussed the customer would always compare the OpEx fee with the CapEx, and the higher the fee the more it is clear that the supplier pays back its investment faster, so a less appealing offering. At the contrary, it is precisely with the business model of the D-Advanced, which is aligned with customer's value-in-use, that the VBP is feasible also for the customer, because it recognizes that the fee is variable and tied only to the smart solution contribution for its business performance, without risks; both provider and customer play an active role in co-creating value which is then shared.

All this considered, a VBS process executed effectively should have significant chances of successfully obtaining a superior VBP, and the potential seems promising for any customer choosing the smart solution. Since customer-perceived value is the difference between perceived benefits received and perceived sacrifices made by a customer, VBS exactly aims at maximizing the former and minimizing the latter, because the value proposition is coherent, so to increase the willingness to pay of the customer. Therefore, addressing the value-in-use potential must leverage all the advanced service components, especially the risk reallocation which has proven to be the main factor of recognition of business-support orientation. All the risks taken over by Danieli while supplying resources for customer exploitation, thus the mutual orientation, must be emphasized in order to positively affect the distribution of value perceived as fair by the customer. Indeed, it is confirmed by C *"I could give a value also to the risk reallocation, relationship value and fairness."* Therefore, the VBS process coherently implemented would lead to a visible size of value contribution through the quantification process which could be later captured successfully by leveraging on the provider's efforts in supporting that value co-creation. Regarding this, customer D highlighted the criticality of the solution for the process as determinant for enabling a VBP and, especially, for believing that it contributes to the customer's profitability: *"I see the potential of a value-based €/T only on solution packages consisting of many guides, for sure not on the supply of guides for just one stand. [...] in this case your service wouldn't be enough crucial in my value creation."* It directly follows that it also influences the value-sharing. This implies that a VBP strategy should be applied only to medium- and big-size solutions, and that for small ones the pricing strategy should be cost-based because the customer could not perceive a relevant value-creation support or there could even be the impossibility of value quantification if the offering is too irrelevant within the plant.

4.3.3.3 PERFORMANCE-BASED CONTRACTING

Finally, findings from customer E (Table 11) reconfirm the feasibility of VBP strategy emphasized by the fact that he already did value quantification on the new guides, and respondent suggested a performance-based contracting as application of the value-sharing, characterized by a fixed monthly fee and value-based remuneration only at achievement of targets on customer-specific KPIs. For the role and function within the customer process of our smart solution, the PBC is not the best suited VBP strategy: operationally, it is true that the intelligent guides enable additional value creation but the advanced service entails striving for maximizing the availability of that efficiency and being remunerated only for the success in doing that. It is not a case where Danieli is responsible for entirely managing the guides in the customer's organization and therefore is not directly involved in the achievement of targets. Danieli contributes to the customer's value-creation process by delivering a maximized opportunity to reach superior profitability, which is manifested even in the case of not-achieved targets because if there is guides' availability, then the contribution is executed. For more complex solutions that entail operating customer processes or functions the PBC would be aligned with the more realistic role in pursuing a target on a KPI. Furthermore, through a PBC Danieli wouldn't benefit from the transparent role of data as value-delivered counter; the smart solution can only track customer exploitation of the intelligent guides, and with PBC the provider would always be dependent on data provided by the customer at the end of specific periods, in turn relying on trusting the customer for its remuneration

CONCLUSIONS

This research demonstrates that Danieli Service can successfully exploit the digital servitization potential to develop new innovative service-centered business models, that deliver and capture superior value.

Digitally-enabled advanced offerings can support a customer's value-generating process, consequently creating opportunities to provide new and unique value propositions based on smart solutions, that allow the provider to be remunerated on the basis of the customer value-in-use through innovative revenue models.

In our case, the intelligent guides are enablers of process efficiency and optimization for the customers; therefore, by offering the outcomes of the guides instead of the products, Danieli can commit to supporting the customers' value-creation processes. To do so, the smart products are integrated with smart services into a more complex offering of process optimization outcome-based services, a smart solution. Now the provider is not selling the intelligent guides' functionalities but is selling their efficiency and effectiveness within the end-user's process. Then, by innovating the revenue model toward the alignment of the payments with the actual service consumption by the customer, value-in-use, the offering completely becomes an advanced service oriented at customer-business support, the D-Advanced.

The disruption of the new business model doesn't come without risks. By committing to supporting a customer's business, Danieli sustains all the risks concerning the resources invested (customer-process risk), and all the risks concerning the customer's variable service consumption (market risk). But new profitability opportunities open up. Because the D-Advanced is realized in the form of Danieli's contribution to the customer's profitability as a business partner, there are all the conditions for the provider to be remunerated on the basis of the value co-created through the resources delivered, value-based pricing, and not on the basis of the costs incurred for the same delivery. It becomes a matter of fairness and coherency.

It is always easy for customers to reject such an option and to appeal to the traditional value-exchanges of supplier-customer cost-based relationship within the value-chain, indeed a more powerful, relational, and strategic sales approach is required, the value-based selling process, which exactly builds on demonstrating the solution's contribution to the customer's profitability. Having succeeded in this step, the challenge lays on quantifying the value co-created and agreeing on the value-sharing ratio. Regarding this, Danieli suffers from an important limitation: its lack of data regarding the specific performance of the intelligent guides prevents the negotiation to be driven by an even power balance, because the provider

doesn't have metrics to quantify its contribution to the customer's process. Consequently, the value-based pricing potential and success rests only on salespeople hands, which need to run the value-based selling process effectively and leverage the key advanced service features regarding customer-business support.

The research conducted by involving customers in the proof of concepts reassures that the buyers are willing to negotiate on value for the D-Advanced, and are able to estimate the quantification of the value co-created because they know well their process and its improvement potential. Nonetheless, it is clear also that the success of the distribution of value is Danieli salespeople' responsibility, and that is influenced by value-selling power, trust and solution's complexity. But the considerations made on the received quantified value co-created lead to prove the superiority of value-based pricing and its feasibility only on advanced service offerings.

Given Danieli Service's mission and vision into becoming a business optimization provider, this research on the intelligent guides can be the starting point in exploring new possibilities oriented toward the digital servitization for the current *intelli-products*. The own-brand technological products will be all embedded with digital technologies and this project fuels the double purpose of growing in terms of digital awareness and market contamination for the future.

The value of this research comes especially from the integration of an academic path and a real-life application case. This experience allowed from one side to contaminate an innovative company with state-of-the-art research, and from the other to initiate a master's degree student to the real-life challenges of business innovation. Theory needs to be adapted to the specific cases, and collaborations like this only enrich and maximize the success of innovation. Foremost, it gives students the opportunity to apply the theoretical knowledge and skills developed throughout the study path and acquire some first, fundamental awareness and competencies required by job market. Finally, it can give the opportunity to find a high-level job, as in this case.

ANNEXES

Annex 1: Interview guide

- 1) *Could you describe your plant and what type of products you produce?*
- 2) *What are your business and operational goals?*
- 3) *What is your opinion about Danieli?*
- 4) *What brought you to adopt the intelligent guides?*
- 5) *What do you think about having the smart guides-as-a-service compared to standard purchase?*
 - a) (For D-Rent customer) *What drove you to decide for the D-Rent?*
- 6) *We believe that the service outcome should be the maximized availability of the intelligent guides, since it is with their availability that you can get increased profitability. For this reason, Danieli should bear you process risk, accounting for all the accidents that could break the guide or damage its technology that can't be solved by your maintenance. The Jolly guide would immediately be sent as substitution and the damaged guide would go back home for repairs. At the same time, you would have the guarantee that the supplier would invest in maximizing the quality and reliability of the product, and there wouldn't be the need to open warranty disputes over the inconvenient. Moreover, since with this service concept the scope would be the holistic support of your operations, we think of innovating the payments mechanism so that you would pay only for the actual contribution received, therefore only for the actual service consumption: a pay-per-functioning hour or pay-per-ton because you get benefits only in the product's availability and utilization for production.*

What are your perceptions and considerations about it?
- 7) *Considering everything that has been said and the value you perceive you would get from this potential business-support service in terms of avoided costs and process efficiency, and of risks reallocation to the provider, do you think you would be willing and able to set remuneration based on the value co-created through the guides that you think it would be fair for both the parties?*

REFERENCES

Oliva, R. and Kallenberg, R. (2003), *Managing the transition from products to services*, International Journal of Service Industry Management, Vol. 14 No. 2, pp. 160-172. DOI 10.1108/09564230310474138

Snelgrove, T. (2017), *Future view: evolving the measurement of best customer value from using a total cost of ownership to total profit added methodology*, Journal of Creating Value, Vol. 3 No. 2, pp. 210-216. DOI: 10.1177/2394964317726450

Hinterhuber, A. and Snelgrove, T. (2020), *The present and future of value quantification*, Journal of Creating Value, Vol. 6 No. 2, pp. 295-303. DOI: 10.1177/2394964320967521

Hinterhuber, A. (2008), *Customer value-based pricing strategies: why companies resist*, Journal of Business Strategy, Vol. 29 No. 4, pp. 41-50. DOI 10.1108/02756660810887079

Frandsen, T., Raja, J., Feldballe, O. and Neufang, I. F. (2022), *Pricing digital services in industrial firms*, Copenhagen Business School, CBS. P+S+D Integration Booklet Series.

McDonald, M. and Oliver, G. (2022), *Six actionable steps to preparing financially quantified value propositions*, Journal of Creating Value, Vol. 8 No. 1, pp. 113-130. DOI: 10.1177/23949643221091667

Almquist, E., Cleghorn, J. and Sherer, L. (2018), *The B2B elements of value*, Harvard Business Review.

Classen, M. and Friedli, T. (2019), *Value-based marketing and sales of industrial services: a systematic literature review in the age of digital technologies*, 11th CIRP Conference on Industrial Product-Service Systems. 10.1016/j.procir.2019.02.141

Liinamaa, J., Viljanen, M., Hurmerinta, A., Ivanova-Gongne, M., Luotola, H. and Gustafsson, M. (2016), *Performance-based and functional contracting in value-based solution selling*, Industrial Marketing Management, Vol. 59, pp.37-49. <http://dx.doi.org/10.1016/j.indmarman.2016.05.032>

Terho, H., Haas, A., Eggert, A. and Ulaga, W. (2011), *'It's almost like taking the sales out of selling'-Towards a conceptualization of value-based selling in business markets*, Industrial Marketing Management, Vol. 41, pp. 174-185. DOI: 10.1016/j.indmarman.2011.11.011

Raja, J. Z., Frandsen, T., Kowalkowski, C. and Jarmatz, M. (2020), *Learning to discover value: Value-based pricing and selling capabilities for services and solutions*, Journal of Business Research, Vol. 114, pp. 142-159. <https://doi.org/10.1016/j.jbusres.2020.03.026>

Frandsen, T., Østergaard Boa, S. and Raja, J. Z. (2019), *Pricing structures for solutions: an exploratory study within the oil and gas industry*, International Journal of Production Research, Vol. 57 N. 22, pp. 6977-6992. DOI: 10.1080/00207543.2019.1572933

Rapaccini, M. (2015), *Pricing strategies of service offerings in manufacturing companies: a literature review and empirical investigation*, Production Planning & Control: The Management of Operations. DOI: 10.1080/09537287.2015.1033495

Mulari, L., Marek, M., Lyly-Yrjänäinen, J., Laine, T. and Enlund, P. (2020), *Communicating the Customer Perceived Value of a Preventive Maintenance Solution: Implications for Management Accounting Capabilities Development*, Proceedings of the 15th International Forum on Knowledge Asset Dynamics (IFKAD 2020), pp. 805-821. ISBN 978-88-96687-13-0. ISSN 2280-787X

Jaspert, D. and Thoma, P. (2021), *Performance measurement of smart services in mechanical engineering*, Twenty-seventh Americas Conference on Information Systems, Montreal.

Töytäri, P., Keränen, J. and Rajala, R. (2017), *Barriers to implementing value-based pricing in industrial markets: a micro-foundations perspective*, Journal of Business Research, Vol. 76, pp. 237-246. <http://dx.doi.org/10.1016/j.jbusres.2016.04.183>

Perry A., Rustema H. and Gilday M. (2021), *Evolving field services and asset management to boost service revenues*, Research Initiative by Salesforce and Noventum.

Stoppel, E. and Roth, S. (2015), *Consequences of usage-based pricing in industrial markets*, Journal of Revenue and Pricing Management, Vol. 14 No. 3, pp. 140-154.

Favoretto, C., Mendes, G. H. S., Oliveira, M. G., Cauchick-Miguel, P. A. and Coreynen, W. (2022), *From servitization to digital servitization: how digitalization transforms companies' transition towards services*, Industrial Marketing Management, Vol. 102, pp. 104-121. <https://doi.org/10.1016/j.indmarman.2022.01.003>

Huikkola, T., Kohtamäki, M. and Ylimäki, J. (2022), *Becoming a smart solution provider: reconfiguring a product manufacturer's strategic capabilities and processes to facilitate business model innovation*, Technovation. <https://doi.org/10.1016/j.technovation.2022.102498>

Ploner, F., Brisch, K. M., Beuter, C., Mehdiانpour, M. and Knab, R. (2020), *Pricing of digital products and services in the manufacturing ecosystem*, Deloitte.

Classen, M. and Friedli, T. (2021), *'It's not like we can charge for everything': revenue models to capture value from smart services in Pacific Asia*, *Asia Pacific Business Review*, Vol. 27 No. 3, pp. 405-430. DOI: 10.1080/13602381.2021.1894770

Storbacka, K., Sääksjärvi, M. and Polska, P. (2011), *Management practices in solution sales – a multilevel and cross-functional framework*, *Journal of Personal Selling and Sales Management*, Vol. 31 No. 1, pp. 35-54. DOI: 10.2753/PSS0885-3134310103

Töytäri, P., Rajala, R. and Brashear Alejandro, T. (2015), *Organizational and institutional barriers to value-based pricing in industrial relationships*, *Industrial Marketing Management*, Vol. 47, pp. 53-64. <http://dx.doi.org/10.1016/j.indmarman.2015.02.005>

Gebauer, H., Jennings Saul, C., Haldimann, M. and Gustafsson, A. (2017), *Organizational capabilities for pay-per-use services in product-oriented companies*, *International Journal of Production Economics*, Vol. 192, pp. 157-168. <http://dx.doi.org/10.1016/j.ijpe.2016.12.007>

Parida, V., Wincent, J., Sjödin, D. and Kohtamäki, M. (2014), *Mastering the transition to product-service provision: insights into business models, learning activities, and capabilities*, *Research-Technology Management*. DOI: 10.5437/08956308X5703227

Linde, L., Frishammar, J. and Parida, V. (2020), *Revenue models for digital servitization: a value capture framework for designing, developing, and scaling digital services*, *IEEE Transactions on Engineering Management*. <https://doi.org/10.1109/TEM.2021.3053386>

Sassanelli, C., De Carolis, A. and Terzi, S. (2022), *Initiating an industrial machinery producer to digital servitization: a case study*.

Terho, H., Eggert, A., Ulaga, W., Haas, A. and Böhm, E. (2017), *Selling value in business markets: individual and organizational factors for turning the idea into action*, *Industrial Marketing Management*, Vol. 66, pp. 42-55. <http://dx.doi.org/10.1016/j.indmarman.2017.06.015>

Reinartz, W. and Ulaga, W. (2008), *How to sell services more profitably*, *Harvard Business Review*.

Stoppel, E. and Roth, S. (2017), *The conceptualization of pricing schemes: from product-centric to customer-centric value approaches*, Journal of Revenue and Pricing Management, Vol. 16, pp. 76-90. DOI: 10.1057/s41272-016-0053-1

Thomson, L., Kamalaldin, A., Sjödin, D and Parida, V. (2022), *A maturity framework for autonomous solutions in manufacturing firms: the interplay of technology, ecosystem, and business model*, International Entrepreneurship and Management Journal, Vol. 18, pp. 125-152. <https://doi.org/10.1007/s11365-020-00717-3>

Huang, F., Chen, J., Sun, L., Zhang, Y. and Yao, S. (2020), *Value-based contract for smart operation and maintenance service based on equitable entropy*, International Journal of Production Research, Vol. 58 No. 4, pp. 1271-1284. DOI: 10.1080/00207543.2019.1617450

Kumar Agarwal, G., Simonsson, J., Magnusson, M., Sundtoft Hald, K. and Johanson, A. (2022), *Value-capture in digital servitization*, Journal of Manufacturing Technology Management, Vol. 33 No. 5, pp. 986-1004. DOI: 10.1108/JMTM-05-2021-01

