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Dynamic Pricing Model Factors: Configure-to-Order Product and Business-to-Business Sales Perspective

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Purpose: Dynamic pricing is a pricing strategy in which product prices are dynamically adjusted based on factors relevant to the pricing model. This study aims to fill a research gap in understanding the dynamic pricing of Configure-to-Order (CTO) products in the business-to-business (B2B) sales context. The primary objective is to understand the dynamic pricing model factors that influence the pricing of CTO products.

Study design/methodology/approach: This study involved a qualitative exploration of mechanical industry product pricing through an extensive literature review and thematic analysis of rich data mainly obtained through semi-structured interviews.

Findings: The findings suggest that the widely discussed pricing model challenges significantly affect configure-to-order (CTO) pricing models. CTO-specific challenges stem from product complexity, high customisation, and unique configurations, which make pricing more intricate. This study clarifies the dynamic pricing model factors relevant to the business-to-business CTO product context in the mechanical industry and highlights how configurability shapes these factors. This unique aspect of CTO products introduces additional dimensions to pricing considerations, which require tailored approaches for effective implementation.

Originality/value: The original contribution is provided by identifying the dynamic pricing model factors for business-to-business configure-to-order products in the mechanical industry context.

Introduction

The price-setting process in industrial companies can be challenging because some pricing orientations rely heavily on intuition, whereas others require a strong knowledge foundation (Liozu & Hinterhuber, 2012). Product pricing is vital for companies because it relates to company revenue and profitability (Qi et al., 2024a), market position (Forman & Hunt, 2005), customer perception (Bhide & Akarte, 2024), sales volume (Qi et al., 2024b), and brand (Burke et al., 2018). Even sustainability demands may affect product pricing (Ghosh et al., 2020). Hence, product pricing is crucial for long-term business success.

Traditional pricing involves a strategy in which the price remains stable for a specific time without significant changes (Kotler & Keller, 2011). In contrast, dynamic pricing is a flexible pricing strategy in which the price of a product is adjusted based on the data analytics of the driving factors (Kopalle et al., 2023). Dynamic pricing requires that continuous price changes be executed as it is about finding an optimal product price for any given time (den Boer, 2015). Dynamic pricing allows businesses to maximise revenue and remain competitive in fluctuating

markets (Narahari et al., 2005). To apply dynamic pricing, it is necessary to understand the relevant drivers, business dynamics, and aspects of applying dynamic pricing to a specific product type.

Configure-to-order (CTO) products have characteristics that can affect pricing. These characteristics include the complexity caused by customisation (Myrodia & Hvam, 2014a; Wings & Harkonen, 2023), cost of components or modules (Jensen et al., 2015), lead times in production (Olhager & Van Donk, 2024), volume discounts (Gunasekaran & Ngai, 2005), flexible pricing based on configuration, delivery time, and customer-specific requirements (Peeters & van Ooijen, 2020), and variability in costs factored into the price (y Vilas & Vandaele, 2002). These characteristics contribute to CTO product pricing being more complex than that of standard products.

Complexity is also a special characteristic in business-to-business (B2B) sales of CTO products because products are tailored to customer needs and make the selling context complex (Kramer & Krafft, 2023). Selling requires technical expertise and a deep understanding of both the product and the customer's operational requirements (Rangarajan et al., 2022). Extensive consultation and coordination are often required among multiple stakeholders, making the sales process collaborative (Lauzi et al., 2023). Additionally, the decision-making process is more complex, entailing longer sales cycles owing to the high investment and potential strategic importance (Aras et al., 2022; Ohiomah et al., 2020). Therefore, CTO sales entail significant complexity in the B2B context. In the mechanical industry, high capital investments, maintenance, and lifecycle considerations (de Oliveira et al., 2015; Schuh et al., 2006), regulatory compliance (Shekarian et al., 2024), and potentially some other additional specifics may further add to the complexity. This highlights the role of industry specifics and product understanding when considering product pricing.

Dynamic product pricing can be beneficial for CTO products for several reasons. Demand-based pricing enables prices to be adjusted based on real-time customer demand and customisation (Kopalle et al., 2023). Dynamic pricing also enables reactions to cost variability to reflect changes in material, component, or labour costs (Xiao et al., 2015). This enables charging premiums for high customisation or unique configurations (Kopalle et al., 2023). It also enables dynamic responses to competitor pricing and market conditions (Chen & Chen, 2015). Dynamic pricing considers willingness-to-pay to maximise revenue based on customisation (Kumar et al., 2018). It also links inventory management by aligning prices with the availability of components and production capacity (Li & Zheng, 2023). Nevertheless, previous direct discussions on dynamic pricing in the CTO context are somewhat limited.

It is necessary to understand the pricing model factors that affect dynamic pricing, as they help optimise pricing to maximise revenue, maintain competitiveness, align with customer expectations, and ensure profitability (Channa & Pitafi, 2023; Zakaria et al., 2024). These factors enable accurate, fair, and sustainable pricing for highly variable CTO products (Myrodia & Hvam, 2014a, 2014b; Peeters & van Ooijen, 2020) and are essential for fostering profitable and sustainable B2B relationships (Raj et al., 2022). The pricing model factors include cost structures (Juuti et al., 2023; Ramesh et al., 2021), market demand (Liang et al., 2021), competition (Zhou & Gupta, 2022), customer segmentation (Meng et al., 2023), and external aspects such as economic conditions, regulations, and seasonality (Ruggeri et al., 2024; Zhao et al., 2021). Nevertheless, pricing model factors do not seem to be directly addressed in the Configure-to-Order context in general, particularly for mechanical industry products.

This study aims to fill this gap in the discussion on the dynamic pricing of CTO products in the business-to-business B2B sales context. The specific aim is to understand the dynamic pricing model factors for CTO products. This is in the context of B2B sales of mechanical industry

products. Value- and cost-based aspects were considered. The aim was divided into the following research questions (RQs):

RQ1: What are the pricing model challenges for mechanical industry products?

RQ2: What are the potential dynamic pricing model factors, data sources, and practical implementations in the context of mechanical industry products?

The aim was approached through a literature review and analysis of qualitative data obtained through industrial interviews.

Literature review

Pricing can be influenced by factors such as customer-perceived value, product features, demand, and production costs (Neubert, 2022). Additional considerations include competitor pricing, a company's brand value, profitability targets (Lancioni, 2005), and manufacturing capacity (Hall et al., 2009). Companies employing dynamic pricing can automatically adjust prices in real-time, allowing them to respond quickly to changes in market conditions. Additionally, dynamic pricing can increase sales and profitability by enabling customised pricing for different customers and reducing the risk of unprofitable transactions (Faruqui & Wood, 2008). Furthermore, it has the potential to increase operating income by up to 50 % compared with traditional pricing models (Zhang et al., 2014).

Dynamic pricing is often linked to demand (Asghari & Shahabi, 2018), allowing companies to capitalise on real-time changes in demand (Bajari & Benkard, 2005). Common methods of measuring demand include sales data analysis, competition analysis, and customer surveys (Seele et al., 2021). For example, Hallberg (2017) describes a case in which dynamic pricing based on machine capacities was successfully applied in the packaging industry. Dynamic pricing schemes are also called for in electricity supply and demand management (Rösch et al., 2021). The discussion covers product types, such as digital products (Hou et al., 2024), perishable products (Kayikci et al., 2022), or services (Kumari & S, 2024). However, direct discussion on mechanical industry products or physical products, in general, seems limited.

Dynamic pricing is often value-based (den Boer, 2015). However, measuring value can be entirely subjective and often requires a deep understanding of customer needs and market conditions. (Hinterhuber & Liozu, 2017). Value-based pricing focuses on justifying value to the customer, which can help differentiate companies from competitors using cost-based pricing in a positive way (Töytäri et al., 2015). When utilising value-based pricing, companies can assess customers' willingness to pay (WTP), enabling customer-specific pricing strategies (Homburg et al., 2005). Ideally, one should be able to define the WTP for competitors' products, as this can inform the evaluation of the competitive landscape (Dost & Geiger, 2017).

Data are required for value-based pricing. In some cases, companies can utilise external data sources to build a better picture of overall demand (Gupta & Pathak, 2014). Indicators used to estimate demand include the price volatility of raw materials and basic products, as well as various economic indicators (Zhang et al., 2014).

In dynamic pricing, it is important to strike a balance between margin optimisation and customer satisfaction. A simple approach to accounting for cost reductions is to lower product prices accordingly, keeping the relationship between cost and price stable. Another option is to maintain higher prices and leverage cost reductions to increase operating profits, although this can lead to customer dissatisfaction (Friedman & Lewis, 1999). However, studies have shown that the latter approach is generally more effective, as it can reduce future upward price pressures and customer reactions. In this case, customers can remain satisfied because price fluctuations are less pronounced (Neubert, 2022).

In dynamic pricing, customers' experience of fairness can be greatly influenced by how sellers justify the prices of the products they offer and the factors affecting them. For instance, fluctuations in production costs can be explained by comparing them to general fluctuations in the prices of raw materials and other essential products at the global level (Priester et al., 2020). In this context, sellers can demonstrate to customers that the price of the product has changed because the costs of the raw materials required for its production have also increased (Zhang et al., 2014).

Trading in the corporate market is often more complex than trading in the consumer market for a variety of reasons. Business customers typically purchase products or services in larger volumes and with more intricate contracts than individual consumers (Töytäri et al., 2015). The needs and requirements of companies can also differ significantly depending on factors such as industry, size, location, and strategic goals (Leung et al., 2019). Moreover, the decision-making process for corporate clients is often lengthy and complex, involving multiple stakeholders (Eisenhardt & Zbaracki, 1992). This can often lead to protracted negotiations and complicated contract processes, where price is a key consideration, but other factors such as product quality, delivery time, payment terms, and flexibility must also be taken into account (Zhang et al., 2014).

Trading in the corporate market typically requires extensive cooperation between customers and suppliers. Consequently, corporate markets are often characterised by long-term partnerships where trust, commitment, and norms evolve based on repeated interactions (Morgan & Hunt, 1994). Long-term cooperation can foster increased trust and engagement, which may reduce customers' price sensitivity. However, this can also lead to heightened customer expectations and more precise price comparisons, which may increase price sensitivity (Jap & Mohr, 2002). Dynamic pricing can be an effective way to address price sensitivity, offering customers more flexible pricing options that remain competitive compared to those of rivals (Netzer et al., 2008).

The effectiveness of dynamic pricing depends on the operating environment in which it is implemented. Introducing a dynamic pricing model can require significant changes to traditional business practices, which may hinder its widespread adoption in certain sectors and regions (Dutta & Mitra, 2017). Accurate data on the factors influencing dynamic pricing are essential; without it, pricing may not be reliable. Effective data governance and management are critical in this regard. To accurately determine product costs, companies may need to implement productisation (Dubois et al., 2024; Harkonen et al., 2024; Wirtz et al., 2021), commercial and technical product structures (Lahtinen et al., 2021), a comprehensive corporate-level data model, and properly leveraged business information technology (Hannila et al., 2020).

Consequently, some companies may need to improve their data management capabilities to enhance their pricing strategies. The absence of dynamic pricing capabilities can negatively impact a company's profitability, especially in times of economic shock (Bazzi & Blattman, 2014). Furthermore, static pricing may overlook potentially relevant factors, such as manufacturing capacity (Fleischmann et al., 2003), and substantial manual effort is required to maintain up-to-date price lists (Neubert, 2013). Therefore, adopting a dynamic pricing model may be essential for companies to remain competitive in the future.

Hannila et al. (2022) emphasised that a data-driven culture must be established to enable data-driven decision-making. Product data definitions should not only consider technical aspects but also incorporate the sales process, along with delivery and service processes (Silvola et al., 2019). High-quality data are essential for informed product portfolio management (PPM) decisions. Active PPM involves managing vertical product portfolios across different lifecycle

phases (Tolonen, 2016). This approach to PPM may be useful for supporting dynamic pricing practices. Table 1 summarises and briefly explains the pricing model challenges.

Table 1: Pricing model challenges

Pricing model challenge	Explanation	References
Fluctuating costs	Cost variability in raw materials, components, labour, or manufacturing costs. Supply chain dependencies may influence cost variability.	(Díaz & Guedes Soares, 2023; Xiao et al., 2015; Zhong et al., 2021)
Complexity of Customization	Tailored solutions or specialised configurations might be challenging to price due to the complexity.	(Dellaert & Stremersch, 2005; Kopalle et al., 2023)
Variability in demand	Potential price adjustments to respond to fluctuating market demand.	(Kumar et al., 2024; Ruggeri et al., 2024)
Perception of Value	The value of advanced features or specific configurations might be necessary to communicate to justify prices.	(Guo et al., 2024; Neubert, 2022)
Competing products	Competitive pricing and maintaining profitability in a market with competing products.	(Chen & Chen, 2015; Dost & Geiger, 2017; Zhou & Gupta, 2022; Lancioni, 2005)
Economic situations	Adaptation of pricing to economic situations.	(Bazzi & Blattman, 2014; Ruggeri et al., 2024; Zhang et al., 2014; Zhao et al., 2021)
Regulatory and Compliance Costs	Acknowledging regulatory and compliance costs in pricing.	(Joshi et al., 2001; Wu et al., 2024; Zhao et al., 2024)
Length of Product Lifecycle	Accounting for durability, maintenance costs, and total ownership costs.	(Pedneault et al., 2021; Schuh et al., 2006)

Finding: *The generally discussed pricing model challenges may affect mechanical industry product pricing. These challenges are likely to impact the development of CTO pricing models, even if direct discussion does not seem to exist in the context of the CTO or mechanical industry.*

Methodology

This qualitative study investigates dynamic pricing factors for mechanical industry products, with a focus on configure-to-order (CTO) products in a business-to-business (B2B) context. Data were collected from a Finnish mechanical industry company, which primarily serves other businesses. It produces highly customisable products to meet diverse customer needs. These CTO products are characterised by lengthy delivery processes, with lead times ranging from six months to a couple of years due to their production complexity and customers ordering patterns.

This study began with a literature review to establish a foundational framework that was further developed throughout the research. A Scopus database search revealed that discussions on dynamic pricing for CTO products in the B2B context are scarce. Only one result (Siddiqui & Raza, 2015) was found, but it did not address the study's specific focus. This gap highlights the

need for further exploration of dynamic pricing for CTO products in the B2B context. The search used the following query:

ALL ("configure to order" OR "configure-to-order" OR "cto" AND "business to business" OR "business-to-business" OR "b2b" AND "dynamic pricing") AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "sh") OR LIMIT-TO (DOCTYPE , "re"))

Additional searches were conducted using Google Scholar to complement the Scopus search. These searches focused on terms such as *"Dynamic pricing", "Configure-to-Order", and "Mechanical industry"*. Relevant content was selected based on expert judgement to gain a broader, context-independent understanding, prioritising journal articles over other sources.

Empirical data were collected through 11 semi-structured remote interviews (Bryman & Bell, 2015), which were recorded and transcribed for analysis. Interviewees represented various roles within the company, including product development, sales and production planning, product management, IT management, data analytics and sales. Key themes and issues were identified from the transcripts, with additional insights gathered through informal discussions with industry experts. Conclusions were drawn using inductive reasoning and further analysis.

Results

Pricing Model Challenges

The current pricing has significant room for improvement, primarily due to its reliance on cost-based pricing. This approach is criticised for not fully considering value-based factors, such as the customer value of products and market competition. As one interviewee put it, *"The customer value of products is simply not taken into account enough, especially regarding additional product features."* The excessive focus on costs often leads to overlooking product value, with prices driven primarily by the company's costs and margins. This limits the company's ability to address customer individuality and competitors' positioning, ultimately reducing competitiveness. Shifting to a more value-based pricing model could help the company better capture and leverage the value its products offer, improve competitiveness, and strengthen customer relationships.

While value-based pricing has its challenges, several cost-based factors should be more effectively integrated into the pricing model. Though the company's pricing is cost-driven, interviewees felt it lacks elements that could improve efficiency, such as production capacity and material costs. Production capacity, in particular, was seen as an area where the company could achieve higher efficiency by utilising it more effectively in pricing.

Interviewees highlighted the need for greater transparency in pricing models, particularly for sales teams and customers. They emphasised that providing salespeople with clearer insights into pricing policies and the rationale behind margin decisions would enhance their confidence and ability to engage with clients effectively.

The company's pricing was seen as insufficiently responsive to market changes. Interviewees felt that slow reactions hindered the company's ability to track market shifts effectively. They suggested that pricing should automatically adjust to these changes, ensuring it stays current and competitive.

There was also a general sense that the company only reacted to past events, making pricing adjustments only after costs were impacted. As one interviewee noted, *"Changes in pricing are usually not made until sales stagnate or margins disappear."* It was recommended that the company adopt a more proactive approach, such as adjusting prices in anticipation of shifts in steel indices before suppliers update their prices. This would help to avoid large, sudden price

changes and improve cost forecasting, especially given the time gap between an offer and product production.

Identified dynamic pricing factors

Table 2 summarises the seven most significant pricing factors identified through the interviews, highlighting their potential relevance for dynamic pricing.

Table 2. Key pricing factors relevant to dynamic pricing.

Pricing factor	Description	Criteria
Production capacity	Describes the enterprise's current production capacity situation	Factory production capacities, sales and production forecasts, product configuration
Logistic capacity	Describes the company's logistics capacity	Capacity of ordered transports
Economic situation	Describes the global economic situation and its development	Prices of raw materials, energy, labour and logistics, market indices, market trends, macroeconomic factors
Location	Describes the impact of the customer's geographical location	Customs duties, currency, incentives, culture, transportation costs, effects on product configurations
Customer value	Describes the assessment of the product's value to the customer	Product and feature value, delivery time, eco-friendliness
Customer analysis	Describes the evaluation of customers from the company's perspective	Customer segmentation, potential, customer relationship, presence of competitors
Competitive situation	Describes the competitive situation in the market	Product competitiveness, region, industry, brand, competitors' situation

Production capacity was identified as a key area of interest. It refers to the number of products the company can produce within a given timeframe. Interviewees noted that current pricing doesn't respond to production shortfalls. For example, *"Pricing does not respond to falling below sales forecasts so that reserve production capacity would be used through additional sales; instead, flexibility in production is relied upon to address the issue."* To address this, it was suggested that pricing could account for factory capacity, sales/production forecasts, and product configurations. This would allow for dynamic pricing based on available capacity based on the complexity of the configuration.

Logistic capacity was discussed in terms of utilising unused transport space, like empty cargo container spaces. While the idea is to use this space to lower costs, interviewees pointed out challenges in measuring excess capacity for pricing purposes. It was generally agreed that logistics optimisation, such as packaging design improvements, should be considered in product design rather than directly in pricing.

Global *economic situation*s, such as fluctuations in raw material prices (e.g., steel, energy), labour costs, and logistics, were considered essential for dynamic pricing. As one interviewee noted, *"When costs decrease, improved margins are celebrated, but it is not always considered that sales may stall if prices are not also adjusted downwards."* To integrate the economic situation into pricing, it was suggested that indices, futures, and supplier agreements be used to monitor fluctuations and their impact on product prices.

A customer's geographical *location* affects product pricing due to customs duties, exchange rates, incentives, transportation costs, the impact on product configurations, and even cultural factors. While customs duties and exchange rates are already considered, interviewees noted that these updates are often manual and infrequent. Incentives for smart production equipment in specific regions and cultural factors influencing discount expectations were also discussed. However, cultural factors were seen as difficult to incorporate directly into the pricing model.

Customer value is defined by how much a customer is willing to pay for a product and its features. Understanding this value allows the company to optimise margins. Interviewees emphasised that customer value is maximised when a customer finds a product expensive but still chooses to purchase it. This value can be assessed through product features, delivery time, and eco-friendliness, aided by data from CRM systems and sales insights.

Customer analysis involves segmenting customers based on similarities, which helps assess factors such as purchasing likelihood and customer potential. It was noted that pricing could be adjusted based on customer segments (e.g., small businesses vs. global corporations). By understanding customer characteristics and relationships, the company can decide whether to adjust pricing to increase purchase probability.

The *competitive situation* is crucial for dynamic pricing. One interviewee emphasised that to succeed, the company must leverage competitors' weaknesses. Competitive factors include product competitiveness, regional and industry factors, and brand strength. For example, competitors in specific regions or industries (e.g., the energy sector) or the company's brand value could influence pricing decisions. Implementing a dynamic pricing model based on the identified factors requires reliable data. Figure 1 illustrates the elements of dynamic pricing.

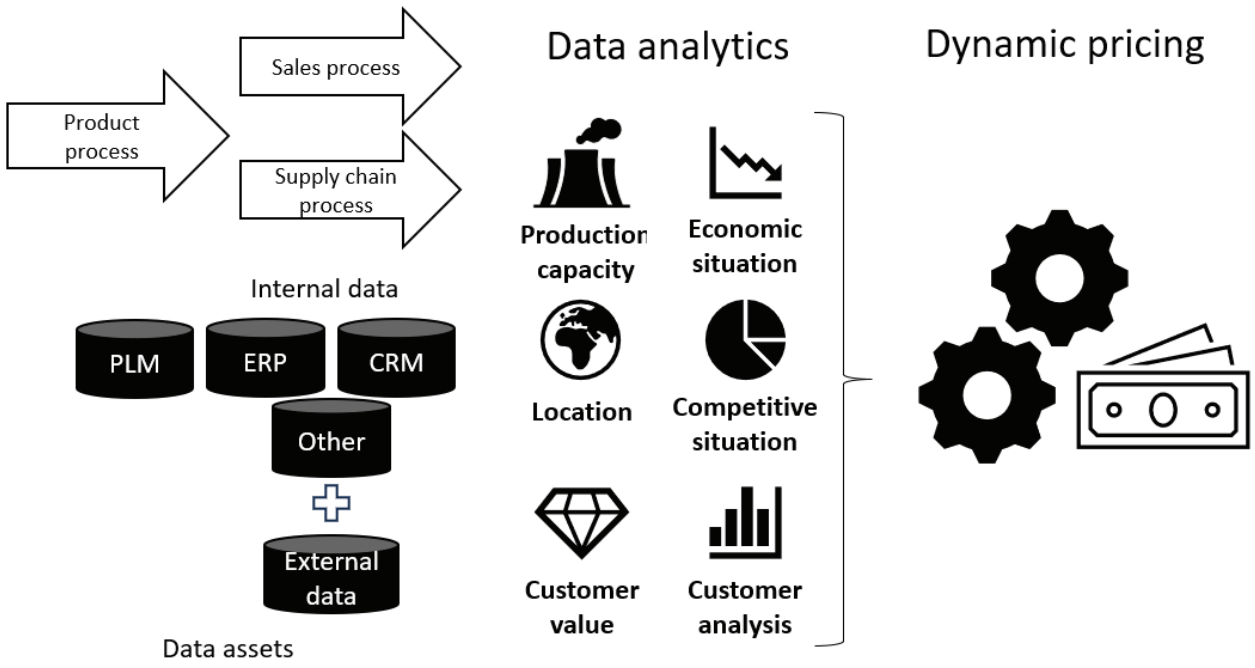

Figure 1: Elements of dynamic pricing.

Data sources and practical considerations for implementing dynamic pricing

Dynamic pricing and potential data sources for the pricing factors were discussed based on insights from company representatives. Some pricing criteria were identified as factors that could change no more than once a month.

The company's ERP system, which includes the manufacturing execution system (MES), serves as the primary data source for *factory production capacity*. Capacity management is integrated into production planning solutions within ERP. However, not all factories may necessarily currently have data in a format suitable for dynamic pricing implementation, and this should be accessed before proceeding.

Demand can be predicted more accurately for products with longer delivery times. However, the planning horizon for the CTO products is shorter. Sales and production teams collaborate

closely, resulting in planned and actual orders, which are stored in the ERP system. According to the interviewees, capacity should be considered more comprehensively across the supply chain, including installation capacity, as this could differentiate the company in the market.

Logistic capacity was initially considered a potential dynamic pricing factor but was later deemed irrelevant for pricing purposes within the company. The *economic situation,* including the prices of raw materials, energy, labour, logistics, and market indices, was identified as a critical factor. For example, data on raw materials can be sourced externally in addition to existing supplier agreements and price lists.

Regarding the product and feature value criteria of the *customer value* factor, the interviewees emphasised the importance of understanding the situation on a customer-specific basis. It is crucial to ensure that product features align with customer needs. Incorporating customer value into dynamic pricing requires collaboration between product management and sales to balance profitability and manufacturability. Profitability and modularity are key to effectively directing decisions in dynamic pricing.

To gather data for the product and feature value criteria, an interviewee suggested analysing the product configurations of delivered products while considering specific product families and segments, as well as work done by sales. A connection between technical and commercial product structures is necessary to enable AI to identify suitable data. This approach may face data challenges and highlight areas for development in product management.

It was suggested that delivery time, as part of customer value, could leverage a separate service system for installation capacity data, whereas ERP could be used for manufacturing capacity. Regarding eco-friendliness, for instance, products are analysed for carbon dioxide emissions. One interviewee believed that eco-friendliness data could likely be sourced partly from ERP and partly from PLM.

In the case of *location*, currency rates are linked to ERP. However, transportation costs are not automatically available. It was suggested that salespeople should consider customers' specific circumstances. Regarding the *competitive situation*, the product competitiveness criterion was viewed as one that requires case-by-case analysis.

One interviewee suggested that dynamic pricing should be integrated into the product portfolio management system. Active portfolio maintenance should account for dynamic pricing attributes, which should be incorporated into broader monitoring of product profitability. The established dynamic pricing parameters would then serve as data for the pricing process. However, the current level of maturity is not sufficient, although some elements are in place. Comprehensive profitability management, including cost reviews, should be conducted at least monthly. Additionally, dynamic pricing should include approval thresholds, ensuring that decisions on potential discounts are made at the appropriate level of the organisation based on the discount amount.

Conclusions

Generally, a well-designed pricing model provides companies with many benefits. While a traditional pricing model remains static, a dynamic pricing model allows for the adjustment of prices based on factors by applying data analytics. The findings indicate that the generally discussed pricing model challenges are likely to impact configure-to-order pricing models. CTO product complexity, high customisation, and unique configurations are among the CTO-specific challenges. However, previous studies do not seem to have discussed dynamic pricing models for this type of product directly, nor the pricing model challenges in general. The findings further indicate that dynamic pricing in the mechanical industry can optimise revenue

by considering factors such as production and logistics capacity, economic conditions, customer value, and competitive positioning. By leveraging a combination of internal data sources (such as ERP, MES, and CRM) and external data (market indices, currency rates, and competitor pricing), companies can make data-driven pricing decisions that reflect real-time market dynamics. However, to ensure success in practical implementation, clear thresholds, transparent processes, and close coordination between product management, sales, and data teams are necessary for effective implementation. Data availability and possibilities for integration also affect implementation.

This study makes an original contribution by identifying dynamic pricing model factors for configure-to-order products in the context of the mechanical industry. The original contribution also involves indications of the role of technical and commercial product structures and productisation in the dynamic pricing of CTO products. For example, consistency in perceiving cost structures and the connection of structures to support AI in identifying the necessary data. These also enable the integration of dynamic pricing and product portfolio management.

Scientific and managerial implications

The study contributes to the body of knowledge by extending the understanding of dynamic pricing model factors into the underexplored contexts of configure-to-order (CTO) products and the mechanical industry. It addresses existing gaps by incorporating CTO-specific complexities, such as high customisation and unique configurations, into theoretical discussions. The findings advance dynamic pricing research by adapting existing frameworks (e.g., Kopalle et al., 2023; den Boer, 2015; Narahari et al., 2005) to better account for product configurability, demonstrating the feasibility of applying dynamic pricing models in industries characterised by CTO products. While the findings align with prior studies (Gunasekaran & Ngai, 2005; Olhager & Van Donk, 2024; Peeters & van Ooijen, 2020; Vilas & Vandaele, 2002), they introduce novel insights into the added complexity of CTO products. By integrating technical and commercial product structures and productisation (e.g., Dubois et al., 2024; Harkonen et al., 2024; Jensen et al., 2015; Juuti et al., 2023; Lahtinen et al., 2021; Myrodia & Hvam, 2014a; Wings & Harkonen, 2023; Wirtz et al., 2021) the study highlights the role of modularity and configurability, offering actionable strategies and contributing to research on productisation and lifecycle management. Furthermore, it emphasises the unique challenges of B2B sales environments for CTO products, where long sales cycles, collaborative decision-making, and customer-specific requirements necessitate adaptive pricing approaches, building on prior discussions (e.g., Kramer & Krafft, 2023). The study's indication of the potential to integrate dynamic pricing with product portfolio management systems (e.g., Cooper et al., 2024; Lahtinen et al., 2021; Tolonen et al., 2015) is particularly novel, suggesting that pricing flexibility can enhance portfolio profitability and proactive decision-making. Additionally, the study underscores the critical role of data integration across sources (e.g. Hannila et al., 2022) in enabling effective dynamic pricing, emphasising the need for high-quality data and AI-driven refinements for managing pricing complexities. Overall, the findings provide a foundation for future research at the intersection of dynamic pricing, product configurability, lifecycle considerations, and the evolving role of data-driven decision-making.

The managerial implications of this study emphasise actionable strategies for the practical implementation of dynamic pricing in CTO product environments. Key considerations include ensuring robust data availability and integration by utilising both internal (data systems) and external (market indices, competitor pricing) data sources, as well as leveraging automation and defined thresholds to prevent erratic pricing decisions. To overcome barriers such as data fragmentation and limited system interoperability, managers can employ advanced tools like cloud-based integration platforms to facilitate seamless data flow between disparate systems.

Additionally, data visualisation and dashboard tools can provide real-time insights into pricing factors, enabling more informed decision-making.

Automation is critical for managing pricing complexities. Managers should consider adopting AI-driven pricing tools that dynamically adjust prices based on predefined algorithms that account for factors like production capacity, economic conditions, and customer value. These tools can be integrated with existing data systems to ensure consistency and scalability. Furthermore, predictive analytic tools can be used to forecast demand fluctuations and market trends, helping managers proactively adjust pricing strategies.

To engage sales teams effectively, companies should implement training programs and pricing simulations to familiarise staff with the rationale behind dynamic pricing models and empower them to communicate effectively with customers. Establishing transparent pricing policies and creating centralised pricing rules can further build confidence among sales teams and relevant stakeholders.

Increased understanding of the roles of technical and commercial product structures and productisation can benefit dynamic pricing efforts by enhancing modularity and scalability. Managers are encouraged to link dynamic pricing with product portfolio management (PPM) systems, using integrated frameworks to align pricing strategies with lifecycle considerations. Regular reviews of pricing performance, combined with scenario analysis, can help refine strategies and ensure alignment with market demands.

By addressing the identified challenges through specific tools and approaches, managers can significantly enhance the effectiveness of dynamic pricing and improve competitiveness and profitability in complex B2B environments. Table 3 includes potential information outputs for some of the identified pricing factors.

Table 3. Potential information outputs for some of the identified pricing factors.

Pricing factor	A potential information output
Production capacity	The percentage of free manufacturing capacity for a specific period and factory
Economic situation	A score representing the ideal pricing direction based on the criteria
Customer value	A case-specific estimation of the willingness to pay
Competitive situation	A score representing the ideal pricing direction based on the criteria

Limitations and future research

The limitations of this study include the fact that the results were not reproducible because the interviews were conducted with selected interviewees. The number of interviews and limited industrial coverage might also pose some limitations. Naturally, the interviewees' perspectives relate to their realities, potentially affecting the possibilities of implementing the identified pricing factors in another CTO context. Implementation of dynamic pricing entailing risks relating to the clarity necessary for understanding data quality, salespeople's behaviour, and such may pose some limitations. This study did not cover addressing these risks.

Aside from addressing these limitations, future studies are necessary to cover the dynamic pricing of CTO products in the B2B market further. For instance, the data sources for the evaluation criteria of dynamic pricing factors could be covered in depth. The link to the PPM process can also be studied in detail. In addition, the link between productisation and dynamic pricing could be studied further. The influence of dynamic pricing on data management can also be studied further. The development of AI may also introduce interesting research paths in the area of dynamic pricing in the context of CTO and B2B.

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