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COMPETITIVENESS IN THE WOOD INDUSTRY: A QUALITY FUNCTION DEPLOYMENT BASED MODEL FOR ALIGNING CUSTOMER EXPECTATIONS WITH STRATEGIC CAPABILITIES

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Abstract: *This study introduces a Quality Function Deployment-based competitiveness model for the Hungarian wood industry, integrating internal performance dimensions with external customer expectations. The model is built on international research comparisons and customer survey data collected from wood industry firms, clients and stakeholders. Some competitiveness factors were identified and weighted using expert judgment and global benchmarks. Findings highlight that quality, value creation, and reliability are the most impactful factors, while export capacity and supply chain stability are weaker areas. The proposed framework provides a practical tool for strategic planning and contributes to industry-specific competitiveness research.*

Key words: *innovative thinking, efficiency, optimisation, transparency competitiveness, quality.*

1. Introduction

1.1. General Aspects

In today's rapidly evolving market environment, shaped by continuous technological advancement and the effects of globalisation, companies face increasingly complex challenges in maintaining their competitiveness. The swift transformation of customer demands, alongside constant pressure for innovation and capital investment, imposes significant burdens on organisations across all sectors. In such a dynamic landscape, competitiveness is no longer limited to growth or expansion – it has become synonymous with adaptability and long-term viability. Maintaining a

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sustainable competitive advantage requires not only strategic agility but also operational excellence across all core functions.

Competitiveness is a multi-dimensional concept that integrates various theoretical and practical approaches from different disciplines. The objective of this study is to develop a comprehensive competitiveness assessment model that serves both as a theoretical framework and as a practical tool for unbiased evaluation. The model incorporates the Quality Function Deployment (*QFD*) methodology, which enables a structured alignment between customer expectations and internal capabilities of firms. This integration allows for a weighted, data-driven prioritisation of strategic actions based on market-driven criteria such as efficiency, quality, and value creation.

1.2. Theoretical Foundations of Competitiveness and the *QFD* Model

The concept of competitiveness has been the subject of extensive academic debate, with diverse interpretations across disciplines. Early approaches, such as Botos [6], emphasised the price-quality ratio and the associated service components as primary factors of competitiveness. In contrast, Grant [22], Porter [46, 49], and Vörös [61] focused on the strategic alignment of business choices as a key to achieving and sustaining competitive advantage. Other authors have highlighted additional dimensions, including efficient resource allocation [22, 53], customer orientation [12, 17, 45], and cost leadership [8, 11].

The multidimensionality of competitiveness becomes particularly evident in frameworks that emphasize organisational competencies [4, 5, 13, 50, 55, 57, 58] and intangible, inimitable resources [2, 3, 20, 24]. Further perspectives highlight the importance of adaptability [13, 14, 21] and innovativeness [39, 43, 54] as critical capabilities for long-term success.

While numerous models offer partial explanations, one of the most influential theoretical positions is that competitive advantage stems from two primary sources: cost efficiency and differentiation through uniqueness [2, 3, 8, 11, 20, 23, 47, 48].

Nils [43] proposes a framework based on three key capabilities: the ability to sell, the ability to attract, and the ability to innovate. This triadic model aligns well with Troján [60] and Porter [48], who argue that competitive advantage is inherently temporary and dynamic, requiring continuous renewal and adaptation. To ensure sustainable development of capabilities such as marketability, cost-efficiency, diversification, and innovation, the framework proposed by Henderson [26] remains highly relevant. According to Henderson, limited and gradual strategic intervention facilitates traceability and enhances organisational responsiveness, enabling both flexibility and resilience in times of change. In this context, the Quality Function Deployment (*QFD*) methodology provides a valuable tool for linking customer expectations with internal capabilities, supporting data-driven prioritisation and the integration of quality and strategic intent into enterprise decision-making.

2. Research Methodology

2.1. Study Area

This study employs a mixed-method

research design based on primary data collected in February 2025 from 107 for-profit member companies of the PANFA AIK industrial cluster in Hungary, profiling their characteristics and operations. In addition to the national-level evaluation, this research integrates insights from global studies on the wood industry, particularly regarding customer behaviour and expectations. International benchmarks were incorporated to position the Hungarian wood industry within a broader, global context. Furthermore, in 2025, customer survey was conducted to assess the specific expectations and priority rankings of Hungarian clients. The analyses provided an in-depth understanding of domestic firms, while the integration of global best practices and customer preference data ensured that the assessment reflects not only national realities but also international standards. The prioritisation of competitiveness factors is therefore grounded in both global research evidence and localised customer expectations.

The research objective was to assess firm-level competitiveness within the wood industry by identifying and quantifying the strategic importance of various internal and external performance factors. The covered key dimensions of competitiveness include efficiency, innovation, technological advancement, export activity, and relational capital.

The collected data were processed using descriptive statistical methods based on expert judgment regarding each factor's contribution to firm competitiveness. The results were then incorporated into a Quality Function Deployment (*QFD*) matrix, which allowed for the alignment of market-driven requirements with internal capabilities.

To enhance the visual interpretation of the findings, a radar chart was developed across weighted dimensions. This visualisation provided a holistic view of relative strengths and weaknesses and enabled the identification of strategic development priorities for firm.

2.2. The Role of the QFD Model in Weighting Competitiveness Factors

Quality Function Deployment (*QFD*), also referred to as the "House of Quality," provides a structured method to map customer expectations to organisational capabilities. One of its key advantages lies not only in identifying customer requirements but also in enabling their prioritisation by incorporating internal technical and organisational features. In the wood industry, characterised by capital intensity, long investment cycles, and constantly shifting market demands, there is a growing need for a model that evaluates competitiveness not solely on cost-based or strategic grounds, but also in terms of dynamic capabilities and adaptive potential. The *QFD* methodology allows for the systematic linkage of customer demands to strategic and technological attributes, thereby assessing how internal performance drivers contribute to customer satisfaction. The model is particularly useful in identifying correlations – positive or negative – among key performance factors, enabling the refinement of strategic priorities and resource deployment.

By aligning the weighted customer expectations with firm-specific capabilities, the *QFD* model supports an informed evaluation of the competitive potential of wood industry enterprises. While core concepts such as efficiency, innovation,

and productivity remain universally important across industries, their implementation and measurability are often shaped by sector-specific attributes. In the wood industry, sustainability in forest management and optimal material utilisation are paramount due to the biological nature of the raw material. Moreover, assessing competitiveness is further complicated by the wide variation in business models across industry participants. A firm with high turnover may still operate at a loss, while a smaller enterprise might achieve profitability and sustainable competitive advantage through operational efficiency. These differences can distort market perceptions, particularly when comparing firms of different sizes and resource bases.

It is therefore critical to distinguish among primary wood processing, trading, and manufacturing enterprises, as well as those with vertically integrated operations that span multiple activities. Each of these organisational types has distinct objectives, resource needs, investment levels, and customer relationship models. Consequently, individual performance indicators – such as revenue or export volume – are insufficient to accurately assess competitiveness. Competitive advantage is generally driven by either cost leadership or differentiation. While cost leadership often results from operational efficiency, such efficiency is typically grounded in internal, non-public information. Differentiation, on the other hand, may stem from unique, tacit organisational knowledge that is difficult for competitors to replicate.

In evaluating firm-level competitiveness, it is important to avoid a narrow, indicator-driven focus. As Hayes and Pisano [25] warn, concentrating solely on one or two metrics risks overlooking critical performance factors. D'Aveni [16] aptly notes that "tomorrow's competitors do not appear on most companies' radar screens," underscoring the danger of ignoring latent but strategically significant variables. Competitiveness can thus be understood along both quantifiable and non-quantifiable dimensions. The former includes numerical metrics such as revenue, company size, financial performance, and public data; the latter consists of intangible components such as value creation, organisational knowledge, non-replicable capabilities, and innovation potential. These elements collectively form the true structure of competitiveness. Therefore, meaningful benchmarking should follow the principle of comparing "like with like," accounting for organisational size, contextual conditions, and market positioning.

Further complicating the assessment of competitiveness is the fact that it arises from the interaction of numerous firm-specific factors, many of which are not directly measurable. Recent research and sectoral analyses [18, 19] affirm that competitiveness today is no longer merely a synonym for growth and development potential; rather, it increasingly serves as a strategy for corporate survival. This complexity justifies the use of a multi-dimensional evaluation framework capable of integrating both tangible and intangible competitiveness indicators – a task for which *QFD* provides a robust methodological foundation.

The fundamental aim of the QFD methodology is to systematically map the relationship between customer requirements ("*Whats*") and firm-level performance, including technical and organisational capabilities ("*Hows*"). The

synthesis of the primary research findings, the development of the competitiveness model, and the structuring of customer preferences allowed for the definition of the *QFD* matrix's foundations.

According to the study, the most critical customer expectation ("*What*") is high quality, encompassing durability and defect-free performance. Reliability is also a key factor, particularly as it relates to on-time delivery and warranty commitments. Other important decision criteria include perceived value-for-money and added value. In terms of product functionality, customisation options and design features play a significant role. Interestingly, environmental awareness currently appears less influential in customers' preference structures, while innovation and novelty have a moderate impact on purchasing decisions. Similarly, factors such as technological capacity, production reliability, and logistical flexibility serve more as supporting than decisive elements in the perception of competitiveness.

On the supply side, the technical and organisational "*How's*" include efficiency as a central pillar of competitive weighting. Research findings suggest that achieving sustainable operations and resource management is closely tied to continuous improvement in operational efficiency. This, in turn, influences long-term cost-effectiveness and the enterprise's ability to maintain competitive positioning. On the demand side, quality and reliability emerge as the most influential factors shaping purchasing decisions. As such, they should be treated as strategic priorities and integrated across multiple corporate dimensions, including product development, service delivery, and customer relationship management. Additional contributors to customer-perceived value include design, innovation, efficient logistics, and the use of modern technologies. These elements together form a complex system, where technical performance factors directly affect customer satisfaction and ultimately determine a firm's market competitiveness. These components constitute the core of the QFD matrix, which can be used by companies to guide strategic development efforts.

The QFD matrix illustrates how customer requirements ("*What's*") are linked to the technical and organizational performance factors ("How's") that support them. The matrix includes key customer expectations derived from the 2025 primary survey, alongside the internal technical and organisational features that serve as company responses. The strength of these linkages is also visualised within the matrix, indicating the degree to which a given technical factor contributes to fulfilling specific customer expectations.

The Quality Function Deployment (*QFD*) model and its relationship matrix provide a valuable framework for mapping the interdependencies between customer expectations and internal performance characteristics. Its application becomes particularly relevant in the context of weighting competitiveness factors. The matrix reveals that dimensions such as quality, efficiency, and reliability tend to receive dominant weightings, whereas innovation, digitalisation, sustainability, and relational capabilities are often marginalised – despite the fact that these may constitute the true drivers of long-term competitiveness.

The matrix not only highlights the linkages between customer-oriented dimensions and internal operational features but also reinforces the underlying

hypothesis: competitiveness is a complex, multidimensional construct that cannot be fully captured through a single methodological lens. Isolated or narrowly focused measurements offer only a partial view, whereas a weighted competitiveness model can mitigate such distortions by integrating multiple performance dimensions into a coherent evaluative structure.

Based on the results of the primary research conducted in 2025 [27], the key factors influencing customer decision-making in the examined sector have been clearly identified. These expectations correspond to the "*What*" components within the framework of the Quality Function Deployment (*QFD*) methodology – that is, they represent core customer requirements whose fulfillment is of primary importance. The aim of the research was to explore the relationship between these customer expectations and the technical and organisational characteristics of enterprise operations (the "*How*" components), in order to determine which operational features, contribute most effectively to meeting customer needs.

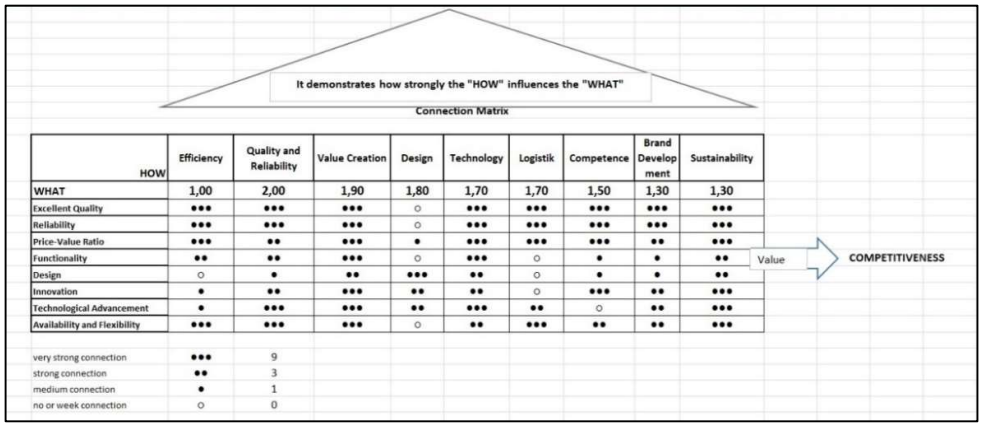
Data derived from the Manufacturing Execution System (*MES*) applied during the primary research highlighted that, in the case of the analysed wood industry companies and their operational processes, efficiency – rather than productivity – plays a more decisive role. This finding justifies assigning a weight of 1.0 to efficiency as a fundamental requirement in the proposed competitiveness model.

Building upon the foundation of efficiency, a set of core factors were identified that form the backbone of the competitiveness model. These factors are also supported by both theoretical literature and empirical evidence. Among them are quality and reliability, as well as the continuous creation of value and the enhancement of added value [6]. Innovation and design enable companies to maintain uniqueness and differentiation from competitors [40, 44, 55]. Technological advancement and the optimization of logistics processes are also indispensable for timely and precise market responsiveness.

Other crucial elements include diversification and inimitability [2, 3, 20, 24], which reflect the uniqueness of strategic resources and the difficulty competitors face in imitation. Closely related to these are market adaptability, as well as the continuous development of human capital and organisational competencies [4, 5, 13, 51, 56, 58, 59]. Internationalisation is essential for expanding growth opportunities and managing market risks, while supply chain stability plays a critical role in minimising disruptions and ensuring reliable operations. These components are further reinforced by brand building [9], which contributes to long-term reputation, customer loyalty [52] and value creation. Finally, sustainability is becoming an increasingly important source of competitive advantage, particularly in light of growing environmental regulations.

Based on the calculations of the relationship matrix, value creation, quality, and technology received the highest priority scores among the competitiveness factors in the context of customer perception. This indicates that these factors play a strategically critical role in maintaining and enhancing the company's competitiveness in order to meet customer expectations.

Relationship matrix Table 1



HOW	Efficiency	Quality and Reliability	Value Creation	Design	Technology	Logistik	Competence	Brand Development	Sustainability
WHAT	1,00	2,00	1,90	1,80	1,70	1,70	1,50	1,30	1,30
Excellent Quality	●●●	●●●	●●●	○	●●●	●●●	●●●	●●●	●●●
Reliability	●●●	●●●	●●●	○	●●●	●●●	●●●	●●●	●●●
Price-Value Ratio	●●●	●●	●●●	●	●●●	●●●	●●●	●●	●●●
Functionality	●●	●●	●●●	○	●●●	○	●	●	●●
Design	○	●	●●	●●●	●●	○	●	●	●●
Innovation	●	●●	●●●	●●	●●	○	●●●	●●	●●●
Technological Advancement	●	●●●	●●●	●●	●●●	●●	○	●●	●●●
Availability and Flexibility	●●●	●●●	●●●	○	●●	●●●	●●	●●	●●●
very strong connection	●●●	9							
strong connection	●●	3							
medium connection	●	1							
no or week connection	○	0							

Correlation calculation within the relationship matrix Table 2

HOW	Efficiency	Quality and Reliability	Value Creation	Design	Technology	Logistik	Competence	Brand Development	Sustainability
WHAT	1,00	2,00	1,90	1,80	1,70	1,70	1,50	1,30	1,30
Excellent Quality	9	9	9	0	9	9	9	9	9
Reliability	9	9	9	0	9	9	9	9	9
Price-Value Ratio	9	3	9	1	9	9	9	3	9
Functionality	3	3	9	0	9	0	1	1	3
Design	0	1	3	9	3	0	1	1	3
Innovation	1	3	9	3	3	0	3	3	9
Technological Advancement	1	9	9	3	9	3	0	3	9
Availability and Flexibility	9	9	9	0	3	3	3	3	9
	41,00	46,00	66,00	16,00	54,00	33,00	35,00	32,00	60,00
	41,00	**92,00**	**125,40**	28,80	**91,80**	56,10	52,50	41,60	78,00

Following these, sustainability and logistics ranked next, demonstrating their substantial impact on customer satisfaction and market adaptability. These are followed by competence and brand building, while design received the lowest overall score, suggesting a comparatively lower perceived importance from the customer's perspective.

The results confirm that value creation based on operational efficiency and continuous quality assurance forms the foundation of competitive performance, which is further reinforced by technological advancement. In this framework, sustainability, logistics, and brand building serve as stabilising and supporting elements. Accordingly, companies should primarily focus on enhancing value creation and improving quality, while also pursuing the coordinated development of supporting factors to ensure sustainable long-term competitiveness.

2.3. Visual Interpretation of QFD Matrix Results Using a Radar Chart

The primary objective of the *QFD* (Quality Function Deployment) model developed during the research was to identify the technical, strategic, and operational factors (*HOWs*) that contribute most

significantly to fulfilling customer expectations (*WHATs*). These factors were weighted based on customer priorities and the strength of correlations, enabling the quantification of their relative importance. To support visual analysis, a radar chart was constructed, clearly illustrating the ranked significance of each factor.

According to the chart, *value creation* received the highest total score (66 points), followed by *sustainability* (60 points) and *technology* (54 points). These priorities are strongly aligned with customer expectations, where sustainable operations and advanced technological capabilities play a crucial role in delivering value. The next most influential factors were *quality and reliability* (46 points) and *efficiency* (41 points), both of which are consistent with customer research findings. In particular, customers placed the greatest emphasis on quality, which requires a high level of internal efficiency to be achieved.

On the other hand, factors with lower scores included *logistics* (33 points), *brand development* (32 points), and *design* (16 points), indicating that these currently exert less direct influence on purchasing decisions. Nonetheless, from a long-term strategic perspective, investment in these areas remains justified. Customer feedback also revealed a relatively low level of brand loyalty – buyers frequently switched brands in response to minor service delays – highlighting the importance of strengthening logistics and reliability.

The radar chart not only visualises the relative importance of the various factors but also provides *strategic guidance for the targeted allocation of corporate resources.* This form of visual representation facilitates the interpretation of complex relationships and supports informed managerial decision-making. Based on the analysis, companies can identify development priorities that generate the greatest customer value, thereby enhancing their long-term market position (Figure 1).

Fig. 1. *Radar chart*

Hypothesis: Due to the lack of a unified conceptual framework and the presence of significant methodological differences, the measurement and prioritisation of individual factors are insufficient for objectively validating or ranking true competitiveness within the wood industry. Consequently, isolated indicators may fail to provide an accurate representation of competitiveness as a whole.

2.4. Establishing the Competitiveness Model

The specific characteristics of the wood industry – such as low value-added mass production, strong dependence on imported materials, and energy-intensive processing – justify the prioritisation of efficiency in the competitiveness model. Reports from the Hungarian Central Statistical Office [35] and the industry-specific journal FATÁJ [18, 19] confirm that manufacturing, operational, and logistical efficiency – collectively referred to as corporate efficiency – are key to the survival of actors in the wood sector. Efficiency directly influences cost levels, cycle times, reliability, and service quality. According to FATÁj report data [19], the net sales revenue of domestic furniture manufacturers declined after 2016, followed by a slow increase from 2018, culminating in significant production value growth by 2022 [18, 19], in which efficiency played a critical role. The 2022 Competitiveness Report by the Hungarian National Bank [15] indicates that while the productivity of Hungarian *SMEs* is increasing, there is still a considerable gap in international comparison. In the wood industry, enhancing productivity is especially important due to strong price competition and limited possibilities for enforcing price premiums. Maintaining competitiveness therefore requires improvements in production and operational efficiency, which justifies assigning efficiency the highest weight (1.0) in the model.

2.4.1. Quality and Reliability – 2.0

According to the author's research conducted 2025, 90% of customers cited quality, reliability, and durability as their most important purchasing criteria. The findings also show that customers increasingly rely on peer reviews in their decision-making. Positive customer evaluations not only increase the likelihood of repeat purchases but also enhance corporate reputation. The survey revealed that if customer trust is lost, 30% would not be willing to regain it under any circumstances, and another 50% would only give the company a second chance under strict warranty conditions. Thus, corporate competitiveness depends not only on product advantages but also on customer perceptions and the continuous maintenance of corporate credibility. A 2025 report by GlobalData [30, 31] found that 93% of furniture buyers in the UK consider quality the primary purchasing factor. Additional expert studies reinforce that durability and reliability are key criteria. For example, Furniture/Today [28] reported that 91% of Apartment Therapy readers consider durability and quality to be of utmost importance. In a 2022 U.S. consumer study [10], 77% cited quality, 76% durability, and 69% design as top priorities.

2.4.2. Value Creation – 1.9

Value creation is a key determinant of competitiveness, as the combination of innovation, technological sophistication, and logistical efficiency generates added value that directly enhances customer satisfaction and loyalty. It not only optimises internal processes but also creates market advantages through customer-centric value enhancement. The significance of value creation is reflected in the long-term viability of companies that offer unique products, services, and experience-based customer relationships, which serve as sustainable sources of competitive advantage [47, 52].

The 2025 primary customer research clearly demonstrated that customers prioritise value-for-money, added value, and the perceived quality of value creation. Respondents indicated that a product or service should deliver tangible added value on both functional and experiential levels. Therefore, value creation is not limited to operational efficiency but also yields direct market advantages by boosting customer satisfaction and loyalty.

2.4.3. Design and Innovation – 1.8

The 2025 primary customer survey in the Hungarian furniture market clearly indicates increasing customer demand for quality, functionality, and sustainable design. The market for multifunctional furniture is rapidly growing, supported by data showing that in 2024 [32], specialised design services in Hungary generated €51.3 million in revenue – a 22% increase from the previous year. This reflects the growing demand for higher-level design, closely linked to innovation. Timely responsiveness to evolving consumer needs through innovation is crucial to maintaining market advantages, making product updates, new functionalities, and eco-conscious material use essential.

Innovative design not only enhances product appeal (e.g., through customisability and modularity) but also contributes to long-term competitiveness. This aligns with Schüller's [55] assertion that innovation is one of the most important indicators of competitiveness. The 2025 Cluster Economic Potential study reported that 110 cluster members introduced 286 innovations over the past five years – 61% related to new technologies and 42% to improved products. In the past decade, 21 industrial property rights were filed, of which 17 remain valid, many held by the University of Sopron and key industry players.

International research also confirms the strategic role of design and innovation. According to the Design Management Institute, design-driven companies outperformed the market by 211% over 10 years, generating 228% more shareholder return (e.g., Apple, Nike, IKEA). McKinsey [41] found that design-centric companies achieved 32% higher revenue and 56% greater shareholder return over five years compared to industry averages. Innovation is thus not merely an opportunity, but a necessity – justifying its weighting of 1.8.

2.4.4. Technology – 1.7

Advanced manufacturing capabilities, automation, computer-aided design, and intelligent production and logistics systems significantly influence corporate efficiency, cost-effectiveness, and flexibility. Technological advantages enable process optimisation, reduced cycle times, and more efficient use of materials and

resources, contributing to lower production costs and consistent product quality [7].

Industry 4.0 solutions – Including IoT, artificial intelligence, and automated control systems – substantially enhance corporate adaptability, even in rapidly changing markets [36, 42]. According to the McKinsey Global Institute [41, 42], advanced manufacturing technologies can reduce costs by 30-50%, increase productivity by 20-30%, and lower defect rates by 10-20%.

However, the 2025 primary customer research shows that customers assess product value based on durability and quality, rather than technological sophistication. While technology is essential for corporate efficiency, it is less visible or appreciated from the consumer's perspective, hence its assigned weight of 1.7.

2.4.5. Logistics – 1.7

Although logistics is critical for efficient operations, it does not inherently create market value in terms of customer satisfaction. However, modern and well-organised logistics systems play a key role in ensuring sustainable and effective corporate functioning. Today, logistics is not merely a cost-reduction tool but a strategic asset that contributes to profitability and competitive advantage.

The furniture industry faces specific challenges – such as working with natural raw materials, long replenishment cycles, broad customer expectations, and tight production and delivery deadlines – that make companies particularly vulnerable to disruptions in material and information flows. This elevates the importance of logistics.

The 2025 furniture sector research results [28, 29] show that customers prioritise delivery accuracy, inventory availability, and flexibility. While these are not distinguishing factors, they are considered essential expectations. Their absence leads to immediate dissatisfaction, but their presence does not significantly enhance satisfaction. This aligns with the “must-be” category of the Kano model [37] which helps organise customer needs and prioritise service development. The Kano model is closely linked to the Quality Function Deployment (*QFD*) framework, which aligns customer requirements (the “*what*”) with technical solutions (the “*how*”) and facilitates prioritisation.

International literature also underscores the strategic importance of logistics. According to McKinsey [42], digitised supply chains can reduce costs by 20-30% and significantly shorten lead times. OECD [45] research shows that improved logistics performance can increase export potential by up to 10%. These findings confirm that logistics carries substantial weight in the competitiveness model. Its impact is direct and short-term but can yield long-term advantages only if integrated with other factors such as innovation, technology, and efficiency.

2.4.6. Diversification and Inimitability – 1.6

Corporate competencies, integrated knowledge, and technological or logistical advantages play a crucial role in the development of competitive advantage. These capabilities enable value creation through diversification. Diversification represents a strategic approach that is particularly effective when based on

coherent and hard-to-replicate resources, potentially yielding significant competitive benefits. A study published by Chang and Wang in the Journal of World Business [33] highlighted that related product diversification positively impacts the performance of international firms, while unrelated diversification tends to have a negative effect. The synergy of diversification and brand building enhances overall firm performance, particularly when it involves the integration of organisational knowledge [9]. According to Barney's Resource-Based View [2], sustainable competitive advantage can only be achieved through resources that are valuable, rare, and difficult to imitate or substitute. Porter's [47] framework on competitive advantage also identifies differentiation strategy as a key area.

Together, diversification and inimitability represent a complex and high-level strategic value [2, 3, 20, 23, 48, 49].

2.4.7. Market Flexibility and Adaptability – 1.6

In the furniture industry, where customer preferences, design trends, material innovations, and interior styles change rapidly, market adaptability is of particular strategic value [61]. Firms that can respond efficiently to these shifts – whether through product development, customised offerings, or production flexibility – gain a competitive edge and are more likely to sustain long-term success [57]. While flexibility is not the most critical customer-facing factor, it remains an essential internal strategic capability that may not be directly perceived by consumers but is vital for corporate resilience.

2.4.8. Human Capital and Corporate Competence – 1.5

Human capital and corporate competencies are key determinants of competitiveness. Firm-specific know-how, employee expertise, and practical experience – especially when combined with advanced technologies – directly influence productivity, quality, customer service, and customer experience. These factors collectively contribute to internal efficiency, flexibility, and adaptability. Beyond ensuring organisational stability, corporate competencies form the basis of innovation capabilities [63, 64]. The medium-level weighting reflects variance depending on firm type and market positioning. In premium and bespoke product segments, human competence is vital, as it supports the creation of unique, hard-to-replicate value. In contrast, companies operating with automation and mass production may partially substitute human competence, thereby reducing its strategic relevance [1].

2.4.9. Internationalisation and Export Orientation – 1.5

Internationalisation and export activities are major competitiveness factors for furniture manufacturers, as they contribute to revenue growth, brand recognition, and risk mitigation. This assessment stems from the fact that while exporting is a valuable strategic option, it is not a universally applicable objective. Some producers – particularly small and micro enterprises – prioritise the domestic market. According to the FATÁJ industry report [19] and the Hungarian Central Statistical Office [35], in 2023, approximately 54% of total furniture

production in Hungary was exported, with the top 100 companies exceeding 80% export ratios [19]. This supports the relevance of export orientation and international presence. Additionally, it helps mitigate demand fluctuations, stabilise customer portfolios, and contributes to long-term sustainability [39, 53]. From a customer perspective, international presence fosters trust, especially when the brand is seen as unique and reliable. Globally available products may enhance loyalty and repurchase intent, as international success signals quality and stability [38].

2.4.10. Supply Chain Stability – 1.4

Business continuity and product availability are essential. While not the most decisive factor, supply chain stability responds dynamically to environmental disruptions, especially in extreme situations. Supply chain disturbances have considerable implications for the furniture industry. In 2023, Furniture Today [28, 29] reported a potential $3.4 billion revenue loss due to delivery delays and stock shortages, with nearly half of customers cancelling orders after a two-week delay. The delivery experience directly affects customer satisfaction, and approximately 50% of customers are willing to switch brands in the event of delays. Although critical and vulnerable, supply chain stability is not exclusive and can be supported by alternative sourcing strategies. Technology-enhanced supply chains enable demand personalisation and proactive market responsiveness, mitigating the bullwhip effect.

2.4.11. Brand Building – 1.3

According to the 2025 primary customer survey [28], purchasing decisions were more influenced by satisfaction and perceived value than by brand recognition. Hence, branding received only a moderate weight. This is corroborated by Furniture Today [29], which reported brand loyalty rates of just 10%, indicating that brand name alone is not a decisive factor. A 2022 Fabunio study also found that multinational retail chains were more influential than specific brands, with 71% of respondents not identifying a favourite brand, and the remaining 29% providing spontaneous answers.

While experiential customer value is essential, customers do not always associate it with the brand itself. A positive customer experience reinforces loyalty and commitment but is not synonymous with branding. According to a 2024 Supply Chain Brain survey [34], 77% of customers would abandon a brand after a poor delivery experience. Customer value is primarily shaped by experience, which drives brand attachment and long-term loyalty [52]. Brand loyalty fosters emotional connections, but brand building is not a strategic priority for all firms in the furniture sector. Although its effects are delayed, brand building offers long-term advantages through market differentiation. For premium firms, however, branding and experience management are critical, as they support market position, international presence, and sustained brand loyalty.

2.4.12. Sustainability – 1.3

Sustainability and environmental awareness are gaining strategic importance in corporate agendas and consumer choices (Table 3). The weight of 1.3 reflects that although not yet dominant, their significance is steadily increasing—particularly for achieving long-term competitive advantage. Firms currently stand to benefit from integrating environmental responsibility and sustainability into their manufacturing and product development processes.

Despite this, the 2025 customer survey indicated that sustainability played a minor role in purchase decisions. Price remains the primary consideration, and eco-friendly features are still secondary. Nevertheless, there is a slow but perceptible shift towards more conscious consumer behaviour. However, this applies only to the furniture industry, as other sectors may prioritise their connection with the environment.

Weighting of the competitiveness measurement model Table 3

Parameters	Value
Efficiency	1.0
Quality and reliability	2.0
Value creation, added value	1.9
Innovation and design	1.8
Technology	1.7
Logistics	1.7
Diversification and inimitability	1.6
Market flexibility and adaptivity	1.6
Human capital and corporate competence	1.5
Internationalisation and export orientation	1.5
Supply chain stability	1.4
Brand building	1.3
Sustainability	1.3

2.5. Purpose and Applicability of the Weighting System

The primary objective of the developed weighting system was to determine the extent to which specific competitiveness factors contribute to overall corporate performance and competitiveness. By identifying the elements that generate the highest added value, the model supports more efficient and profitable business operations. It enables the detection of priority areas where targeted development can yield significant strategic benefits. The system is designed to demonstrate the performance potential of a given resource under defined conditions, allowing for objective cross-company comparisons.

Moreover, the model can be used as an internal audit tool to identify weaknesses, map operational inefficiencies, and define strategic priorities. It also has external applicability, as it can be employed for evaluations based on publicly available

financial or industry-specific data. The system facilitates benchmarking between companies, supports the efficiency assessment of R&D expenditures, and can guide firms in aligning their strategies with long-term objectives.

Due to its flexible structure, the model can be tailored to a firm's specific strategic orientation. It serves as a transparent decision-support tool that provides a clear overview of corporate performance, making it particularly valuable for investment decisions and grant application processes. Additionally, the model is time-resilient and adaptable to evolving industry trends, ensuring long-term usability and relevance.

3. Discussion and Conclusion

This paper proposes a *QFD*-based framework to evaluate and enhance competitiveness in the wood industry, integrating both customer-oriented expectations and internal organisational performance. It should be emphasised, however, that these findings are most directly applicable to the furniture sector within the wood industry. Even within this segment, the relative importance of competitiveness drivers may vary depending on firm size, market positioning, and product specialisation. In other areas of the wood industry, such as wood composites or engineered wood products, different criteria and performance factors often take precedence, reflecting diverse market expectations and technological requirements. The model is grounded in secondary data collected from 107 Hungarian wood industry firms in 2025, complemented by a customer survey and global research insights related to customer behaviour and strategic priorities. By synthesising empirical data and expert input, the framework identifies and prioritises key strategic factors, offering a systematic diagnostic and planning tool for decision-makers in the sector.

The study highlights that quality, reliability, and value creation emerged as the most influential competitiveness drivers, surpassing even innovation and technological advancement in their impact on firm-level performance. At the same time, the findings reveal recurring vulnerabilities among the surveyed firms, particularly in export capacity, supply chain stability, and the level of internationalisation.

To visualise firm-level strengths and weaknesses, a radar chart was developed across all weighted competitiveness dimensions, allowing for a holistic and comparative assessment. The use of Quality Function Deployment (*QFD*) enables the alignment of market-driven requirements with internal capabilities, promoting a proactive, capability-driven approach to strategic development.

The proposed framework provides practical value for wood industry firms aiming to build long-term competitiveness through informed resource allocation and targeted development strategies. It encourages a shift from reactive decision-making toward proactive capability development, rooted in a clear understanding of both external market demands and internal constraints. In addition to its exploratory nature, the study delivers a validated, industry-specific framework with high potential for adaptation in related manufacturing sectors.

Future research could extend the model by incorporating international comparative

datasets, conducting longitudinal case studies, or applying advanced causal analysis techniques such as Structural Equation Modeling (*SEM*) or Partial Least Squares (*PLS*). As global competitiveness increasingly relies on sustainability, adaptability, and knowledge-based capabilities, the *QFD*-grounded weighting model developed herein offers a structured and objective framework for identifying and prioritising competitiveness drivers.

By embedding efficiency-oriented and customer-focused thinking, the model not only supports immediate performance improvement but also contributes to the long-term strategic sustainability of wood industry firms. Its practical utility lies in guiding managerial decision-making, optimizing resource deployment, and defining development pathways that foster resilience in the face of dynamic market conditions.

Ultimately, the findings of this research contribute both to the theoretical redefinition of competitiveness and to the provision of a concrete, measurable, and industry-relevant toolkit for corporate practice – regardless of sectoral or geographical boundaries.

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