Crafting the Future: Developing and Evaluating a Digital Mindset Competence Model for the Industrial Craft Sector

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Keywords: Digital Mindset, Design Science Research, Industrial Craft Sector, Digital Competence.

Abstract: The recent development of digitization has significantly influenced various sectors of the economy, and the Industrial Craft Sector is no exception. The transition to digital technologies and processes is inevitable and holds the potential for increasing efficiency and creating competitive advantages. This research used the Design Science methodology to develop a Digital Mindset Competence Model. This model comprises eight dimensions specifically tailored to the requirements and challenges of the Industrial Craft Sector. These dimensions aim to promote and strengthen the digital mindset among professionals in the Industrial Craft Sector. To ensure the validity and relevance of this model, experts from the Industrial Craft Sector were involved in a qualitative methodology. The combination of scientific methodology and practical experience ensures a comprehensive perspective and guarantees the applicability of the developed model. The results of this research underscore the importance of digital transformation in the Industrial Craft Sector and the necessity of a digital mindset. The developed Digital Mindset Competence Model provides a targeted approach to promoting digital competencies in the Industrial Craft Sector and guides future developments in this area. It becomes evident that an appropriate digital mindset is essential to optimally leverage the potentials of digitization in the Industrial Craft Sector and successfully navigate continuous change. This scholarly contribution contributes to raising awareness of the significance of a digital mindset in the Industrial Craft Sector. It forms a basis for further investigations and practical applications within digital transformation.

1 INTRODUCTION

Digitalization is a critical challenge that craft businesses must actively promote to remain competitive and not lose touch with the rapidly evolving business world (Timchuk & Evloeva, 2020). Craft enterprises provide specialized craft activities and offer products or services based on technical knowledge and tradition. They cover a broad spectrum, from repair and maintenance work to manufacturing customized products (Abel, 2007). Although craft businesses know digitalization (Rohleder & Schulte, 2020; Veltkamp & Schulte, 2020), its importance is often not sufficiently recognized (Welzbacher et al., 2015). Digitalizing the Industrial Craft Sector is necessary to enable efficiency gains, optimize work processes, and improve customer communication (Aghimien et al.,

2022). This requires employees and managers to develop the essential skills and knowledge to use new technological tools and processes, which can improve productivity, innovation, and competitiveness (Nikmehr et al., 2021). A fundamental problem in the Industrial Crafts Sector is the development of digital skills and attitudes (Ezeokoli et al., 2016; Kocak & Pawlowski, 2022). To successfully implement digital transformation in the Industrial Craft Sector, a model that captures the level of an organization's digital mindset is needed. Appropriate measures can be defined and adapted only by understanding the digital mindset (Kratochvil et al., 2021). Although digital mindset concepts and models exist in the literature (Hildebrandt & Beimborn, 2021; Aliabina, 2020; Young et al., 2020), these mainly focus on general sectors and are less specific to the Industrial Craft Sector. Only a few studies specifically address

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digitalization, digital skills, and digital mindset in the Industrial Craft Sector (Ezeokoli et al., 2016; Aghimien et al., 2022; Parusheva, 2019; Kocak & Pawlowski, 2023). This study addresses the following research question:

How can a Competency Model for a Digital Mindset in the Industrial Craft Sector be Developed and Assessed?

The study aims to develop and evaluate a model of digital competencies and attitudes specifically tailored to the needs of the Industrial Craft Sector. It aims to close a research gap and expand the theoretical understanding of the application of digital technologies in traditional sectors. This will provide new insights into specific industries' digitalization processes and address the Industrial Craft Sector's unique challenges. The developed model will help craft enterprises improve their digital skills and attitudes, optimize work processes, and increase productivity. This is essential for competitiveness and full exploitation of digitalization's benefits. It also promotes innovation, enables the development of new products and services, and supports adaptation to changing market demands. To answer the research question, the design science approach (Hevner & Chatterjee, 2010; Peffer et al., 2007) was chosen to develop the model and evaluate it qualitatively with experts from the craft sector (Myers, 2019). First, the theoretical part and the development of the model are presented, followed by a detailed description of the methodology.

2 THEORY

The Industrial Craft Sector comprises independent activities in material processing aimed at meeting the individual needs of companies (Abel, 2007). According to the Crafts Code, craft enterprises are service, production, and commercial businesses (Buschfeld et al., 2011). Since there is no EU-wide definition, this description is used. The work process in the construction industry is also strongly characterized by craftsmanship and is considered industrial craft (Diego et al., 2020). The global digital revolution is propelling the Industrial Craft Sector towards a promising future with digital transformation. Enhancing digital technologies can potentially revolutionize the sector, offering more efficient services and operations. Understanding the different phases of digital transformation and developing specific strategies for each phase is crucial, paving the way for a brighter future (Vial, 2019). The Industrial Craft Sector embraces

digitalization globally, with researchers playing a crucial role in advocating for technological progress. This shift is seen as an opportunity, with technological advancements being harnessed in the sector. Researchers' efforts are steering the construction industry toward digital transformation, inspiring a wave of change (Yang et al., 2022). Although the Industrial Craft Sector is open to digital transformation, it rarely shows initiative (Rohleder & Schulte, 2020; Veltkamp & Schulte, 2020; Welzbacher et al., 2015). Digital technologies can be a decisive success factor, but the Industrial Craft Sector is reluctant to start the digital transformation (Vasiliki et al., 2020). This reluctance is due to numerous organizational, technical, and individual barriers and a lack of skills and attitudes (Yang et al., 2022; Kocak & Pawlowski, 2022). Consequently, the Industrial Craft Sector has not yet fully exploited the potential of digital transformation (Sriyolia et al., 2021). Industrial Craft Companies should develop a clear digital strategy to overcome organizational barriers and adapt internal processes accordingly (Vogelsang et al., 2019). Leadership should receive digital transformation and change management training to promote acceptance and implementation (Kocak & Pawlowski, 2022). Implementing modern IT infrastructures and regular updates is crucial. Partnerships with technology providers can help overcome technical hurdles and ensure access to the latest technologies (Rohleder & Schulte, 2020). Training employees in new technologies and fostering a digital mindset are essential (Veltkamp & Schulte, 2020). Mentoring programs and peer learning can also help build confidence in digital technologies (Oesterreich & Teuteberg, 2016). A tailored training framework that integrates digital skills, attitudes, and personality traits is urgently needed (Ezeokoli et al., 2016). Continuing education programs should promote technical, social, and emotional competencies to develop holistic digital competence (European Construction Sector Observatory, 2020). Another aspect is adopting a digital mindset (Pammer et al., 2021; Kocak & Pawlowski, 2022). A digital mindset describes "patterns of thinking embodied in people's cognitive processes, filters, and core beliefs, composed of cognitive mechanisms and knowledge structures that influence and promote the use and application of digital technologies and the management of their consequences in the context of individuals, organizations, or society." From this, it can be inferred that, in addition to attitudes, competencies also play an essential role in realizing the digital mindset. This paper uses the definition by Hildebrand

and Beimborn (2022). Theories suggest that by applying and building a digital mindset, bridging the digital gap within the organization, and developing lasting innovative capabilities, organizations can foster the growth of innovative developments locally, among competitors, and across industries (Fisher, 2022). Therefore, it can be concluded that digital capabilities combine a digital mindset, knowledge, competencies, and attitude (Gekara et al., 2017). A tailored framework that integrates digital skills, attitudes, and personality traits is urgently required to establish a digital mindset in craft organizations, as specific personality traits are crucial for shaping a digital mindset (Ezeokoli et al., 2016; European Observatory, 2020). Existing models, such as those by Bredendiek Knorr (2020), focusing on openness, agility, proactivity, creativity, customer orientation, and fault tolerance, and by Hildebrandt and Beimborn (2021), emphasizing thinking patterns like risk-taking and resilience, lack specific dimensions and are designed for general organizations. Kocak and Pawlowski (2021) identified relevant digital skills and attitudes for managers and employees but did not explicitly investigate craft enterprises; thus, analyzing these existing models helps address the digital transformation challenges in the Industrial Craft Sector. These approaches were used to develop the Digital Mindset Competence Model for the Industrial Craft Sector. The digital transformation in the Industrial Craft Sector has significant potential. However, it is currently hindered by organizational, technical, and individual barriers, which can be overcome through a clear strategic approach, regular training, promotion of a digital mindset, and the development of tailored training programs to enhance digital competence and technology acceptance, ultimately leading to successful digital transformation by applying and adapting proven models to the sector's specific needs.

3 DEVELOPMENT OF THE DIGITAL MINDSET COMPETENCE MODEL

The Digital Competence Mindset Competence Model was developed using the design science approach (Hevner & Chatterjee, 2010; Peffer et al., 2007) and began with a systematic literature review and concept matrix analysis (Webster & Watson, 2002) to identify and analyze existing models in the industrial craft sector. The second phase involved using a concept matrix and units of analysis to examine further

academic approaches to digital mindset models, dimensions, competencies, and technologies, facilitating the adaptation of innovative approaches for the industrial crafts sector. Aliabina (2020) used a quantitative approach to study digital culture, competence, and knowledge in banking, retail, and telecommunication sectors, noting strengths like a large sample size and sector diversity but lacking detailed descriptions and validation procedures. Young et al. (2020) and Knorr (2020) examined digital learning aptitude, literacy, and entrepreneurial mindset, providing detailed descriptions and identifying interrelations among variables. However, neither study lacked formal scientific methodologies or evaluated models. Kollmann's (2020) research on digital execution, skills, and mindset highlighted lifelong learning and openness to new technologies but also suffered from a lack of formalized models and scientific methodologies, similar to Hildebrandt & Beimborn's (2021) literature review on digital innovation and thinking, which identified thinking patterns but lacked a scientific methodology, evaluation framework, and detailed descriptions. In the Industrial Craft Sector, Kocak and Pawlowski utilized a mixed-method approach in their 2023 study, exploring Technological and Professional competencies. Strengths included the application of a taxonomy and the classification of competencies and attitudes. However, the study lacked a formal model and an unspecified scientific methodology. The qualitative research conducted by Kocak & Pawlowski in 2021 within the general sector focused on Communication and Information Processing Competencies. Strengths encompassed the classification and sorting of factors. Inadequacies in the research were identified, including lacking a formal model, scientific methodology, and detailed descriptions of elements (Neeley & Leonardi, 2022). While strengths were found in recognizing essential factors like customer centricity and digital competence, the research often lacked a structured approach and comprehensive factor descriptions (Salvetti et al., 2022). Similarly, Joseph et al.'s 2022 study lacked specific dimensions and characteristics, borrowing factors from other models without providing a formal framework or detailed methodology. In Lessiak's 2020 literature review, growth orientation and collaboration emphasis were explored, supplemented by qualitative interviews. Strengths included the development of a model, the description of main dimensions, and the classification of sizes. Inadequacies encompassed the lack of a common taxonomy, undefined sub-factors, an unevaluated model, and no information about the

analysis of items in the questionnaire construct.

The summarized studies present various approaches to understanding the digital mindset, highlighting unique methods, domains, and dimensions. Many studies, such as those by Aliabina (2020), Kollmann (2020), Kocak & Pawlowski (2023), and Joseph et al. (2022), lack a developed model and standardized scientific methodology like ADR or DSR, affecting reliability and comparability. Studies like Young et al. (2020) and Salvetti et al. (2022) focus only partially on digital mindset dimensions, potentially overlooking crucial aspects, while Kocak & Pawlowski (2021) and Salvetti et al. (2022) lack a classification of characteristics or a model, hindering systematic understanding. These gaps underline the need for a comprehensive digital mindset competency model, providing a structured framework, detailed dimensions, standardized methods, and a specific taxonomy for the industrial crafts sector to understand better, cultivate, and assess essential digital competencies. The approaches of Kocak and Pawlowski (2023) and Bredendiek and Knorr (2020) were used to develop the digital mindset and competence model. For the development of the dimensions, Information processing Competence, Communication Competence, Technological Competence, Personal Competence, and Personal Traits were taken from Kocak & Pawlowski (2021), as they have already classified many competencies, attitudes, and personality traits for the Industrial Craft Sector. Bredendiek and Knorr (2020) adopted the dimension of entrepreneurial orientation, as many competencies identified in the literature are necessary to drive digital transformation in the industrial craft sector.

Teamwork, cooperation, collaboration, customer relationship, and technical communication competencies are essential in the Industrial Craft Sector due to the team-based nature of the work and the high priority on customer communication (Kocak & Pawlowski, 2023). Essential personality traits include openness (Bredendiek & Knorr, 2020), communication, flexibility, curiosity, and compromise (Kocak & Pawlowski, 2023), which are crucial as artisans often have limited time due to numerous orders. Additionally, agility, result-oriented mindset, openness to learning, self-restraint, and self-confidence (Bredendieck & Knorr, 2020; Kocak & Pawlowski, 2023) were integrated into the digital attitude dimension, and critical faculties, taking responsibility, and lifelong learning (Kocak & Pawlowski, 2023) were added to the personal competencies dimension, reflecting the continuous need for learning and adapting to new technologies in

the digital transformation. In total, we have eight main dimensions for our Digital Competence Mindset Competence Model:

Communication Competence (CC). Ability to communicate effectively, both verbally and nonverbally, in personal, professional, and digital contexts (Salleh, 2008).

Information Processing Competence (IPC). Ability to gather, understand, evaluate, organize, and use information from various sources, critical for making informed decisions in the digital era (Tahvanainen & Luoma, 2018).

Entrepreneurial Orientation (EO). Ability and willingness to identify opportunities, take risks, drive innovation, and strive for growth (Xu & Xu, 2012; Tahvanainen & Luoma, 2018).

Technological Competence (TC). Capability to effectively use, understand, and manage technological tools and systems across professional, educational, and personal contexts (Tahvanainen & Luoma, 2018).

Development Competence (DC). Ability to continuously learn, adapt, and foster personal growth, crucial in the era of digitalization (Kocak & Pawlowski, 2021; Tahvanainen & Luoma, 2018).

Personal Competence (PC). Ability to interact harmoniously with others, essential in social, professional, and individual contexts (Tahvanainen & Luoma, 2018).

Digital Attitude (DA). Mindset towards embracing digital opportunities and adapting to modern demands (Hildebrandt & Beimborn, 2022; Kocak & Pawlowski, 2021).

Personality Traits (PT). Traits that influence attitudes and reactions, shaping individual interactions and actions (Mekhaznia et al., 2021).

Figure 1: Digital Mindset Competence Model.

Description of the Digital Mindset Competence Modell Factors

The Digital Mindset Competence Model for the Industrial Craft Sector has eight dimensions. Bloom's

subdimension descriptions were partly taken from various sources or formulated according to an established taxonomy (Krathwohl, 2002). A total of 57 sub-dimensions were identified and defined. The table below shows the first two sub-dimensions for each central dimension.

Table 1: Description of the Sub-Factors.

Sub-factors	Description
Enthusiasmus (PT)	The trait of possessing passionate zeal, a heightened interest in a specific topic or task (Von Ohain, 2019)
Accuracy (PT)	The trait of appreciating the thoughts, feelings, and behavior of myself or others
Communication (CC)	Ability to communicate constructively, effectively, and consciously (Kocak & Pawlowski, 2022)
Digital Communication (CC)	Ability to use online tools such as email, social media messaging, and texting to reach others (Bordi, Okkonen, Mäkiniemi, & Heikkilätammi, 2018).
Flexible Mindset (DA)	Property to adapt to change and, above all, the anticipation of future innovation (Kocak & Pawlowski, 2022)
Visioning (DA)	Attitude to imagine the future, plan, develop a vision, turn ideas into reality, and create future scenarios to guide efforts and actions (Mihardio & Sasmoko, 2019).
Decision Making (EO)	Ability to make decisions whose outcome is not specific (Kocak & Pawlowski, 2022)
Quality Management (EO)	Ability to develop and implement quality planning, assurance, quality control, and improvement. (Kim, 2020).
Data collection (IPC)	Ability to collect and measure data from multiple sources to get a complete and accurate picture of an area.
Evaluating data, information, and digital content (IPC)	Ability to analyze, compare, and critically evaluate the credibility and reliability of data sources, information, and digital content. To analyze, interpret, and critically evaluate the data, information, and digital content (Riina et al., 2016)
Technology Application (TC)	Ability to utilize digital technologies to improve the strategic positioning of a company.
ICT-Safety (TC)	Ability to monitor and control confidential information (Kemendi, 2021; Riina, Yves, Staphanie, & Van Den Brande, 2016).
Programming Skills (DC)	Ability to know and apply the syntax and code of a programming language (Riina, Yves, Staphanie, & Van Den Brande, 2016).
Work with AI (DC)	Ability to know and use different programming languages, signal processing techniques, and neural

	network architectures (Schuur, Rezazade Mehrizi, & Ranschaert, 2021).
Innovation Skills (PC)	Ability to identify opportunities to improve performance by changing methods, processes, products, and services (Kocak & Pawlowski, 2022)
Creativity (PC)	Ability to develop different ideas and opportunities to create value, combine knowledge and resources to achieve valuable effects, research, and experiment with innovative approaches (Kocak & Pawlowski, 2022)

Five Stage Model

In addition to the Digital Mindset Competence-Model developed in this phase of the design science research methodology, we also developed a stage model to help Industrial Craft Companies assess the current stage or maturity level of digital mindset in their company. The stage model represents five stages. Within the Digital Mindset Competence Model framework, various development stages are described that reflect the change in the digital mindset in organizations. These stages are explained below:

Table 2: Description of the Five-Stage Model.

Stage	Description
Stage 1: Digital Newcomers	Digital newcomers are organizations that lack the characteristics of the digital mindset competency model and need to develop an essential awareness of the importance and impact of digital transformation.
Stage 2: Digital Starters	The Digital Starter phase begins the learning process where the importance of digital transformation is gradually understood, with initial signs of a digital mindset and competencies emerging. However, many additional skills and attitudes are still needed to reach an advanced level.
Stage 3: Digital Intermediate	The "Digital Intermediary" phase shows a deep understanding of digital transformation and a comprehensive digital mindset but still requires continuous growth to fully develop all necessary skills and attitudes.
Stage 4: Digital Professionals	"Digital professionals" have a highly developed digital mindset, mastering and applying all relevant characteristics for a successful digital transformation.
Stage 5: Digital Pioneers	The "Digital Pioneer" is at the top of the digital competence model, mastering its attributes, embodying the highest level of digital competence, and serving as a role model by putting digital principles into practice.

The competence levels are determined by summarizing and averaging items from established

instruments across eight dimensions, then dividing the total mean values by the number of items to obtain the final competence level.

4 METHOD

The present study is based on the DSR approach (Design Science Research) (Peffer et al., 2007; Hevner & Chatterjee, 2010) and follows a qualitative research methodology (Myers, 2019) that addresses current problems not comprehensively discussed in the existing literature. The applied research methodology begins with a systematic literature review (Webster & Watson, 2002), the starting point for developing the research question and methodology. This process enables a thorough analysis of existing knowledge. It identifies research gaps, leading to the definition and description of key concepts and variables relevant to studying the digital mindset in the industrial craft sector.

Our study is based on organizational culture theory, which posits that collectively shared beliefs, values, norms, and practices significantly influence the behavior and performance of an organization's members (Schein, 1990). This theory is applied to a Digital Mindset Competence Model for Industrial Craft Organizations, where establishing a culture that emphasizes digital competence and a willingness to learn promotes employees' digital skills and engagement, thereby overcoming barriers and supporting successful digital transformation (Mohammadi, 2020; European Construction Sector Observatory, 2020). Furthermore, the core theory of the work is based on information theory, which requires craft organizations to ensure their members possess the necessary digital skills and technological knowledge to manage digital tools effectively, contributing to the improvement of organizational culture (Ezeokoli et al., 2016; Fisher, 2022).

Problem Identification

The digitization process has now become an omnipresent phenomenon and extends to almost all sectors of the economy, including the Industrial Craft Sector. The companies involved in the Industrial Craft Sector show a fundamental openness and interest in digitization. Still, it is striking that they rarely take proactive steps and attach comparatively little importance to digitization in their companies (Überbacher et al., 2020). This reluctance is in marked contrast to the dynamic nature of digital transformation, which nowadays represents a decisive competitive advantage. A critical issue limiting Industrial Craft Enterprises in their efforts to embrace digitalization is the existence of many digitalization barriers (Aghimien et al., 2022; Kocak & Pawlowski, 2022). In particular, the digital competencies of employees and the implementation of a digital mindset within the organization stand out as critical challenges (Kocak & Pawlowski, 2022). Regarding digital competencies, many Industrial Craft Companies lack sufficient expertise in using digital tools and technologies. Efficient use of digital resources and implementation of digital innovations can be hindered by employees' lack of digital skills and knowledge, requiring targeted training and qualification measures. Additionally, embedding a digital mindset in traditionally minded Industrial Craft Businesses is challenging due to a lack of understanding of digitization opportunities and resistance to adapting business models, necessitating cultural change and fostering innovation and flexibility to remain competitive and future-ready.

The Objective of a Solution, Design and Development, and Demonstration

Understanding the required digital skills and attitudes is essential to driving digital transformation in the Industrial Craft Sector, enabling the development of targeted measures. A model for digital competence and mindset quantifies the degree of digital mindset, forming the basis for future training programs, and is developed through a thorough literature review to identify existing concepts. These concepts are analyzed using a concept matrix, a proven methodology according to Webster and Watson (2002). This analysis identifies relevant approaches and forms the basis for structured model development, presented systematically using a virtual Miro Board to illustrate the model's intricate relationships. A methodical approach with critical questions and evaluation questionnaires ensures a comprehensive understanding and aims to validate the model's effectiveness and alignment with the Industrial Craft Sector needs. Implementing this digital skills model strategically accelerates digital transformation by systematically recording and quantifying digital skills and attitudes, enabling targeted measures to prepare the Industrial Craft Sector for future challenges.

Evaluation and Communication

A qualitative research methodology was chosen for the evaluation because it offers profound insights into the complexity of human behavior and social phenomena that cannot be adequately captured using quantitative approaches alone (Myers, 2019). The

philosophical basis of this work is the interactionist approach, which aims to develop a deep understanding and subjective experience (Myers, 2019). The qualitative methodology is based on grounded theory, which builds an approach by collecting data without prior assumptions to develop patterns and concepts from the data. We conducted semi-structured interviews with experts that dominated this study (Myers, 2019). These experts set the framework for evaluation and answered questions about comprehensibility, completeness, impact, and potential additions to the main dimensions, sub-dimensions, and the 5-step model. Expert interviews, conducted in person or virtually, are integral to the results and communication in this scientific work.

Sample

A homogeneous sampling method was used to select individuals with similar characteristics, focusing on experts from the craft sector and academic circles with relevant specialist knowledge. The experts were chosen based on their technical, process-related, and explanatory expertise in their field and the context of digitalization to ensure diverse perspectives. Considering a homogeneous population (Guest et al., 2006), a sample size of about 12 participants is recommended for qualitative interviews, while phenomenological studies usually envisage 3-10 interviews. The sample size of the current research was N=10, with experts selected based on their experience and expertise in crafts and digitalization. The study was conducted from January to October 2022-2023, with each interview lasting approximately 1.5 hours. Six male and four female experts took part in the interviews. Of the ten experts, seven had two years of professional experience, two had more than five years of experience, and one had three years of experience. The average age of the experts was 29 years *(M= 29.9)*. Most experts were from the industrial craft sector (5 out of 10), with others from a university specializing in digital transformation in craft organizations, industrial construction and production, the energy sector, and geotechnics and environment. Their professional positions varied widely, including research assistants, civil engineers, environmental engineers, auditors, project managers, and specialized electrical and geological engineers experienced in digital transformation.

Procedure and Data Analysis

In the study's first phase, the Industrial Craft Sector experts evaluated the Digital Mindset Competence Model to ensure its comprehensibility and completeness and suggested additional dimensions. They also reviewed the five-stage model to assess its maturity and the clarity of each stage's definitions and descriptions. All interviews, which lasted approximately one and a half hours, were recorded and transcribed to evaluate the competencies, attitudes, and personality traits, focusing on clarity, importance, and potential improvements.

Construct and semantic validity were tested for reliability, with construct validity reflecting experts' interpretations and semantic validity categorizing similar text meanings (Bryman et al., 2008). Using Mayring's (2015) method for qualitative analysis, the study followed Myers's (2019) approach, incorporating participant feedback, confirmation tests, deductive coding, and selective coding to categorize data and address the research question. Finally, the transcripts were analyzed using a structured content analysis, testing construct, and semantic validity to ensure significance and reliability, with construct validity reflecting experts' interpretations and semantic validity categorizing similar text meanings, supported by participant feedback and confirmation checks, following Myers's (2019) approach (Bryman et al., 2008).

5 EVALUATION OF THE DIGITAL MINDSET COMPETENCE MODEL

The results of an expert survey confirm the general acceptance and comprehensibility of the model presented, which is tailored to its applicability in the Industrial Craft Sector. Several experts (E1, E5, E8) emphasize that the dimensions and sub-factors of the model (E2, E3, E8) are particularly well suited to skilled trades professions. A vital advantage of the model is promoting a digital mindset, which supports companies by simplifying work and communication between employees and customers (E5). In addition, digitalization makes cost savings possible (E5). One expert emphasizes the need to implement the concept in craft businesses to drive digital change (E2). Another expert points out that the relevant dimensions can vary depending on the sector, with different aspects possibly being at the forefront in the construction industry rather than in other industrial craft sectors (E3). About the dimensions, it is argued that apart from personality traits, all other skills and attitudes are crucial for a digital mindset (E3). It is recommended that additional information on the

model be provided and the terminology be illustrated with verbs (E6, E9). The integration of information processing skills is considered particularly important (E9). The experts see a significant benefit of the model in improving interaction and communication within the craft organization (E1). The five-level model for assessing digital skills is considered relevant, but it should be noted that some terms should be clarified, such as "entrepreneurial skills" and "entrepreneurial orientation" (E9). The experts' opinions show that the model covers many important aspects but still has room for improvement (E4, E9). The importance of the model for the industrial craft sector is particularly emphasized, as it is seen as a contribution to promoting digitalization in companies (E9). Finally, a common taxonomy for the five-step model is proposed (E2, E9, E10). At the same time, one expert considers entrepreneurial skills irrelevant to the model, as she sees them as innovation in the company and not essential for a digital mindset (E5). Communication and flexibility are highlighted as crucial skills, mainly because of teamwork and the importance of communication in craft organizations (E2). Another expert notes that personal skills are appropriate but somewhat complex (E10). Finally, one subject matter expert reiterates the concept's validity and argues that adopting a digital mindset will help craftspeople manage tasks more efficiently and facilitate communication within the workforce and with customers (E5).

5.1 Results of the Claritiy, Importance, and the Impact of the Factors

In the academic context, two codes were developed for the category "Clarity": "Description" and "Assignment of characteristics to categories." Experts (E5, E9) recommended revising definitions such as personality traits and digital mindset. The coding "Assignment of characteristics to categories" identified various factors that should be integrated into the corresponding dimensions. In particular, it was suggested that emotional intelligence be assigned to personal skills, with Expert 9 considering adaptability as a personality trait that should be integrated into this dimension. Other characteristics, such as intercultural competence, were assigned to personal competence, while teamwork was given to communication competence, knowledge sharing to digital mindset, and critical thinking to entrepreneurial orientation (E9). In the "Priority or importance" category, the experts (E6) emphasized that communication skills, cultural aspects, and openness are crucial to driving digital change in

industrial craft businesses. The experts also analyzed the interactions between the factors. It was highlighted that transparency has a positive effect on different ways of thinking (E9), adaptability has positive effects (E1), and communication skills have positive impacts on cooperation, collaboration, and willingness to take risks (E5, E9). Expert 9 emphasized that emotional intelligence has a positive influence on trust. Problem-solving skills, in turn, promote factors such as critical thinking, creativity, innovative thinking, and motivation (E9). Regarding adverse effects, the view was expressed that openness could impair conflict resolution (E9). One expert (E2) said that flexibility was essential in the construction industry to work on weekends. Communication was a critical characteristic of digitalization (E2, E3), as was openness, as open people tend to be willing to learn new information (E2). Another expert emphasized the importance of cybersecurity, as digitalization brings challenges such as hacker attacks and data protection (E10). An additional essential aspect is the culture of error in organizations, as mistakes should be seen as learning opportunities for the future (E7).

6 DISCUSSION

This study develops and evaluates a digital mindset competence model tailored to the Industrial Craft Sector using the design science approach and involving experts from the Industrial Craft Sector. After a literature review analyzed using a concept matrix, the model is based on Kocak and Pawlowski's (2023) and Knorr's (2020) methods. The study meticulously traversed the steps outlined in the design science methodology, culminating in the refinement and enhancement of the model based on the acquired results. The imperative of developing a Digital Mindset Competence Model designed explicitly for the Industrial Crafts Sector is underscored by the escalating digitalization and technological metamorphosis in today's professional milieu. The Industrial Crafts Sector, traditionally characterized by manual dexterity and experiential knowledge, grapples with the challenge of harnessing the potential of digitalization. A specialized competency model facilitates the identification of requisite skills and attitudes indispensable for artisans to navigate successfully within a digitalized milieu. The pertinence of the Digital Mindset Competence Model for the Industrial Crafts Sector lies in its capacity to augment individual competitiveness and empower proficient craft organizations to navigate digital

transformation proactively. This advances efficiency and quality in the craft processes and fortifies the industry's competitive stance holistically. In our study, we conducted an exhaustive literature review, expanding upon the findings of Kocak and Pawlowski (2021). A focal point of our research was the investigation of existing digital mindset concepts, with diverse concepts and models subjected to comprehensive analysis for understanding and comparison. The outcomes of this analysis underscore that, despite the existence of digital mindset concepts, no specific models were identified for the Industrial Crafts Sector (Aliabina, 2020; Hildebrandt & Beimborn, 2021; Knorr, 2020; Kollmann, 2020; Kocak & Pawlowski, 2021). While these analyzed concepts offer valuable insights into digital mindsets, there exists a conspicuous need for a Digital Mindset Competence Model tailored to the requisites of the Industrial Crafts Sector. These findings accentuate the relevance of our research, which endeavors to establish a practice-oriented and industry-specific foundation for fostering a digital mindset in the Industrial Crafts Sector.

The results confirm the model's comprehensibility and completeness for the Industrial Crafts Sector, although some factors needed re-categorization into the correct dimensions, which was successfully done. The stage model was refined through improved definitions and terminology, enhancing iteration. Experts highlighted the significance of communication skills, cultural competencies, and openness, which are crucial for successful digitalization. The model adapts individual competencies and organizational requirements, bridging traditional craftsmanship and digital innovation.

The Digital Mindset Competence Model encompasses eight dimensions, further subdivided into factors. While literature encompasses concepts and models (Hildebrandt & Beimborn, 2022; Knorr, 2020; Kocak & Pawlowski, 2021) developed for the general sector, these models lack the dimensions crucial for the digital mindset. In contrast, our model encompasses digital attitudes, digital competencies, personality traits, entrepreneurial orientation, and personal competencies, all pivotal for the digital mindset. Another distinctive contribution of our work lies in the detailed descriptions of the factors, employing a standard taxonomy to elucidate elements within respective dimensions, some of which are echoed in the literature (Hildebrandt & Beimborn, 2021; Kocak & Pawlowski, 2023). An additional contribution is our five-stage model, which facilitates determining organizational levels by applying the

model in craft organizations. This model is instrumental in guiding further research to develop measures tailored to the craft sector—a level model not present in existing literature on digital mindset models in the craft sector. This research significantly fills the industrial crafts sector gap by developing and evaluating a digital competencies and attitudes model tailored to its unique needs and challenges. It provides novel insights into digital technology implementation in traditional sectors. Using a design science approach and a mixed methodology, the study offers precise guidelines for industrial craft enterprises to enhance their digital skills and attitudes, which are essential for maintaining competitiveness and realizing the potential of digitalization.

Implementing the developed model will optimize work processes, increase productivity, and improve customer communication, leading to excellent customer and employee satisfaction. Developing digital skills and a digital mindset enhances daily efficiency and innovation in craft businesses, allowing them to create new products and adapt to market changes. While the study offers valuable insights, it has limitations, such as the need for further evaluation of factor descriptions and customization for various facets of craftsmanship. Future work should include developing survey items, conducting structural equation modeling to understand factor correlations, and exploring the model's impact on job performance and digital organizational culture in the Industrial Crafts Sector.

7 CONCLUSION

This study aims to develop and evaluate a digital mindset competence model for the Industrial Crafts Sector using the design science approach to address practice-relevant problems and contribute to knowledge development. Experts from various Industrial Crafts sectors with digitalization experience evaluated the model for completeness, understandability, and correct allocation of factors. The results indicated that some terms and definitions need modification, particularly in the model and the five-stage framework. The model serves as the first approach for identifying the digital mindset and skills in Industrial Craft Sector and was improved through expert evaluation. Future research should include further evaluation, ideally through focus group discussions within specific areas of the Industrial Crafts Sector.

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