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COMPETENCIES FOR THE DIGITAL TRANSFORMATION

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Abstract: *The digital transformation, triggered by a dynamic development of new technologies and systems, such as the Internet of Things, Big Data and Cloud, has caused significant changes in the professional world, as well as in the nature of the tasks and job roles in the workplace, which in turn is a prerequisite for new managerial and specialist competencies. Companies are faced with the challenge of implementing digital innovations in order to remain competitive and at the same time to prepare their staff for the new digital change and the competencies that go with it. The spectrum of required new competencies ranges from basic knowledge of technological and digital developments to competencies for introducing digital change in the organization and communication with employees. Due to the dynamic development, particularly in the area of artificial intelligence, there is a need to identify, categorize and develop new competencies. The aim of this work is to identify relevant competencies for specialists and managers that are required due to the implementation and application of artificial intelligence. In this way, appropriate competency models can be expanded for the target group and used for competency development, personnel selection or performance assessment.*

Keywords: *competence, artificial intelligence, competence development, digital transformation, leadership development*

INTRODUCTION

The rise of artificial intelligence (AI) has made a significant impact on the modern professional world. AI technologies such as machine learning and neural networks are already transforming numerous jobs today and will play an even greater role in the future (Hasenbein 2023, 3). Not only large technology companies, but also organizations of all sizes and lines of business are facing the challenges and opportunities of using AI. A study by Fraunhofer IAO predicts that AI will become more important in all areas of business, especially in activities that deal with data analysis, which will require new roles and skills (Dukino et al. 2019, 30–31). According to the World Economic Forum Future of Jobs Survey, almost 75% of the companies surveyed plan to introduce AI in the next five years (World Economic Forum 2023, 24).

In 2023, around 12% of German companies used AI, with large companies using these technologies more frequently than small and medium-sized companies. The most common applications include accounting, IT security and the automation of the work process (Destatis 2023, 1).

The main reasons for hesitant adoption of AI systems are a lack of knowledge, incompatibility with existing hardware and software, data protection and cost concerns (Destatis 2023, 1). These hurdles highlight the need to qualify employees at an early stage and develop the skills required to deal with AI technologies (Stowasser/Suchy et al. 2020, 2). Studies show that the demand for technology-related and social skills will increase significantly by 2030 (McKinsey 2018, 1–4).

To meet the demands of digital transformation and the integration of AI, companies should modernize their technological infrastructure and ensure that their employees have the necessary skills. Competency models are crucial here, as they systematically record existing competencies and enable targeted development measures. These models not only support personnel development, but also recruitment, performance assessment and career planning (North et al. 2018, 21–23).

Overall, the introduction of AI technologies requires a comprehensive transformation of the professional world, which includes both technological and social dimensions. Companies and employees must continuously develop in order to keep pace with the changes and make the most of the potential of AI.

RESEARCH METHODOLOGY

The research approach for this publication is a comprehensive literature analysis of competency requirements for specialists and managers in the context of the use of artificial intelligence in companies and organizations. The literature research includes books, specialist journals, research papers and online articles, as well as websites that were used in the analysis of recent developments. The sources examined consist of studies on digital skills and skills development, as well as sources on specific leadership skills in the context of digitalization or digital transformation and specific skills for the application of artificial intelligence. On the basis of the anaysed literature sources, the first step was to examine the requirements for specialists and managers that arise as a result of theo digital transformation and in particular the use of AI, and then to identify the corresponding competency requirements. The focus here is on competencies for management tasks; role-specific specialist competencies have not been taken into account.

RESULTS
AI IN THE CORPORATE CONTEXT

In the course of digital transformation, artificial intelligence (AI) is used to automate processes based on collected data and to promote data-driven decisions. This transformation permeates all areas of a company – from strategy and business procedures to corporate culture. Companies are required to redesign their business models in order to meet the changing demands of society and to ensure their competitiveness (Hasenbein 2023, 36–38).

The combination of AI and digital transformation offers a promising future for business and society. Companies that use these technologies skillfully can strengthen their competitive position, drive innovation and promote long-term growth (see table 1) (Platform Industry 4.0 2021, 3–5).

Table 1. Possible scripts for AI application (Dukino et al. 2020, 16, 17)

Business area	Possible Application (forecast)	Possible Application (classification)	Possible Application (recommendation)	Possible Application (decision)	Possible Application (implementation)
Marketing	-	Brand-safe delivery of digital advertising, customer segmentation, new customer approach	Up and cross selling content optimization and content recommendation	Creation of decision templates/reports	More easily accessible website information, content translation
Sales and Distribution	Demand forecast, Product sales forecast, business opportunities	Know and classify customers, recognize customer annoyance	Sales through individual needs recommendation to the customer, personalization of the purchase offer	Optimal pricing, extended B2B customer analysis	Optimized visitor routes for new and existing customers
Procurement und Purchasing	Demand forecast, Detection of supply bottlenecks	Document classification by products, supplier evaluation	Optimization of purchase decisions, selecting the best offer	Fraud detection during the ordering process, procurement support	Invoice processing contract review

Customer Service	-	Classification of incoming e-mails, pre-classification of callers in the call center	Procurement consultant, unique, relevant offers in real time	Intelligent customer support	Mixed customer dialogue using virtual and human agents, finding appointments
Human Resources	Prediction of future resignations	-	Finding skilled personnel, building strong project teams, skill-based capacity planning	-	Intelligent shift planning, making pre-selection of job interviews, further training: sales trainer

Table 1, based on a study by the Fraunhofer IAO by Dukino et al. among German companies, shows examples of possible application scenarios of artificial intelligence in the processing of business processes (Dukino et al. 2020, 16, 17).

SUCCESS FACTORS AND BARRIERS TO DIGITAL TRANSFORMATION

In a study, Hofmann et al. identified the role, attitude and mindset of higher management levels as being of central importance for a successful digital transformation. Success factors for a digital transformation in companies were identified. The management levels can set the framework required for the transformation through their attitude and by setting an example of the digital work culture.

– Digitalization affects all areas of the company, from customer interaction to internal processes, structures and roles. Traditional project management, for example, is being replaced by agile working methods. Existing legal frameworks may no longer be appropriate in a digital working world.

– A willingness to experiment, transparent communication at eye level and a constructive approach to resistance are decisive factors. A high level of willingness to change and adapt must be established, with employee involvement being a key prerequisite for success (Braun et al. 2023, 17).

– The most important success factor is the willingness to engage in lifelong learning at all levels and the creation of an open and innovative organizational culture (Hofmann et al. 2020, 7–9).

Figure 1, based on a survey by Metternich et al. among large companies in Germany, shows the perceived barriers to the use of AI in the company (1 = barrier perceived as low, 4 = barrier perceived as high). The high demand for know-how and experts in the companies surveyed is clear (Metternich et al. 2021, 14–15).

Fig. 1. Obstacles to the use of AI in companies (own illustration based on Metternich et al. 2021, 14-15)

In the future, almost all professional groups will cooperate with AI systems to complement and enhance human capabilities. AI systems will provide relevant information, support informed decisions and provide orientation in an increasingly complex digital environment. As a result, intelligent machines will expand the sphere of influence of humans. (Franken et al. 2022, 2).

Figure 2, based on a survey by Dukino et al., describes the expected change in the division of laboyr between humans and technology due to artificial intelligence in the next five years. Particularly strong effects are predicted for activities in the field of data analysis, with an average rating of 4.3 on a scale of 1 (very low) to 5 (very high). A high average value of 4.0 is also found for operational activities, such as routine tasks in administrative processing. (Dukino 2019, 35).
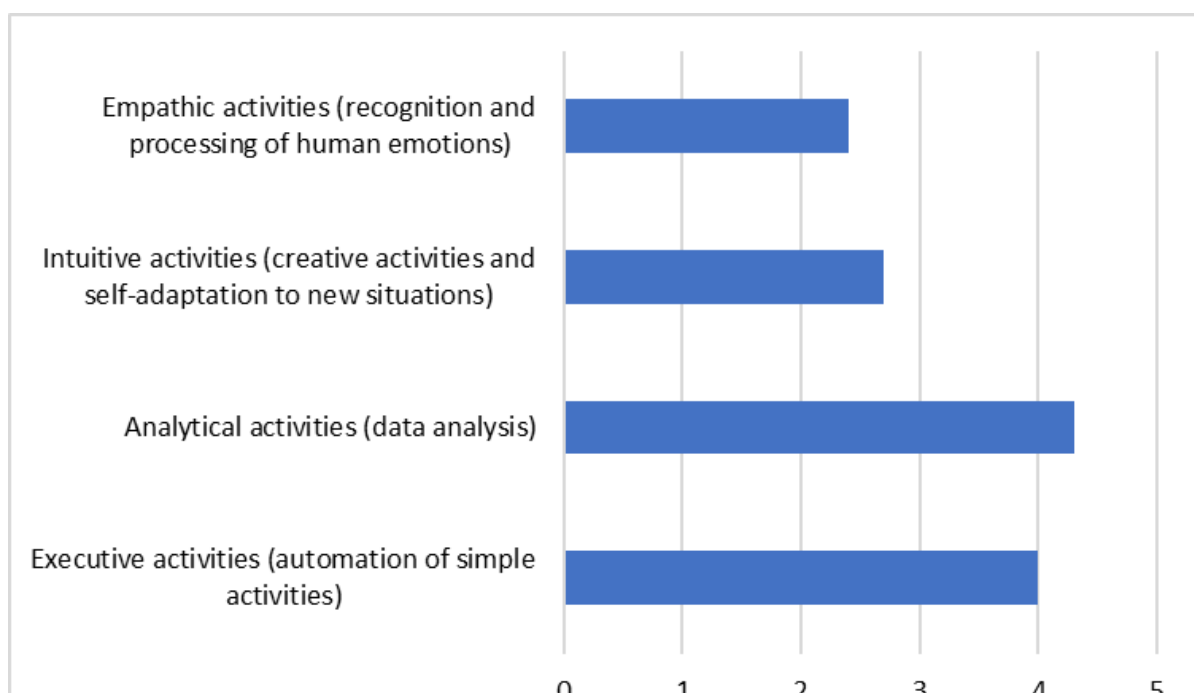

Fig. 2. Assessment of the labour division between humans and AI (Dukino 2019, 35)

KEY COMPETENCIES FOR DIGITAL TRANSFORMATION

The comprehensive and accelerated changes in the professional world brought about by digital transformation are creating a wide range of new requirements for employees and, in particular, for specialists and managers. Specialists and managers play a special role in digital transformation. They are the designers and catalysts of digital change. Therefore, there is a great need for new skills and competencies for this group of people, to which companies and organisations can respond proactively through targeted development programs.

Table 2. Key digital competences (own representation based on André et al. 2021, 18, 19)

Digital literacy	Mastering basic digital skills, e.g. careful handling of digital personal data, understanding basic security rules on the Internet, using common software
Digital Ethics	Critical questioning of digital information and the impact of one's own digital actions as well as corresponding ethical decision-making
Digital Collaboration	Use of online channels to efficiently interact, collaborate and communicate with others; effective and efficient collaboration regardless of geographical proximity; appropriate etiquette in digital communication
Digital Learning	Understanding and classifying digital information; interpreting information from different digital sources; building knowledge in selected subject areas; using learning software
Agile Working	User-oriented, self-responsible and iterative collaboration in teams using agile working methods

Table 2 shows that in addition to the basic skills for dealing with digital technology, ethics and agile working are also part of the competency requirements in the context of digital transformation (Stifterverband für die Deutsche Wissenschaft e.V. 2021, 6).

This also corresponds to the results of Thordsen et al., based on an expert survey on competency requirements in companies. The following competencies for employees were identified:

- Agility
- Digital communication
- Technology affinity
- Solution orientation
- Data literacy
- Data protection
- Error culture
- Customer orientation (Thordsen et al. 2020, 38).

Buschmeyer et al. have developed 9 fields of competence (cf. Figure 3) that enable employees to constructively manage and actively shape the digital change in the world of work. In this model, too, the diversity of competencies, from basic technical knowledge to self-competencies to cooperation skills, illustrates the complexity and high demands on companies and their employees in the context of digital transformation (Buschmeyer et al. 2024).

Self	Technology	Organisation
▪ **Self-management**	▪ Possibilities and boundaries of digital technology	▪ Locating one's own work activities in the context of the overall work process
▪ **(Self-) Learning**	▪ Implementation of digital technology	▪ Communication and collaboration
	▪ Creation of digital content	▪ Security and data protection
	▪ Use of information and data	

Fig. 3. 9 competence fields in three dimensions: technology, self and organization by Buschmeyer et al. (Buschmeyer et al. 2024)

AI-SPECIFIC COMPETENCIES

The introduction and now widespread use of AI in society and companies, especially through LLMs such as ChatGPT, is accelerating digital transformation. AI is creating new opportunities, for example for automation and analytical tasks. AI can make autonomous decisions based on large amounts of data or support people in decision-making.

The new technical possibilities also bring with them new requirements, especially for specialists and managers. New skills are needed to successfully meet the demands of the changing professional world. These new competency requirements go beyond the need for classic digital competencies.

Table 3. Competence areas in a digitalized professional world (Buschmeyer et al. 2024)

Professional skills

Employees have the technical knowledge and skills required to perform the daily tasks corresponding to their position. Depending on the role, this may also include manual skills.

Basic digital skill

Employees use conventional digital media and technologies safely and confidently. They are proficient in common office programs and tools for digital collaboration. They are also sufficiently informed about digital security aspects.

AI awareness

Employees are familiar with the AI systems used in the company and their basic features. They also know which tasks these systems cannot handle. In addition, they are aware of the type of data processed by the AI systems, including possible personal data.

Reflective skills

Employees are able to critically interpret and evaluate the information and results of AI systems. They can independently and competently assess when trust in AI systems and in the data generated by AI systems is justified.

Self-competencies

Employees have a sufficient degree of personal responsibility and self-organization. They bring with them the curiosity and willingness to learn how to use and work with machine learning and AI technologies.

Social and communication skills

Employees can work in teams of different compositions. They can work with colleagues with different professional backgrounds and different levels of experience and competence. When in contact with customers and users of AI systems, employees can explain the special features of using AI systems in a way that is appropriate for their respective areas of responsibility.

(Personnel) management, leadership skills, change management

Employees with management responsibility can organize a team, coordinate and delegate tasks. They can communicate the possibilities and limitations of AI, allay fears and activate training potential. When integrating AI systems into company processes, they can formulate reasonable goals and thus help shape the change process.

Decision-making skills

Employees know their responsibilities and are able to make reliable, well-considered decisions within the scope of their responsibilities.

Adaptability, transfer

Employees are able to adapt to the opportunities and challenges implied by AI and adjust their working methods accordingly.

Table 3 presents some AI-specific competencies according to André et al. It becomes clear that a broad application of AI requires a wide range of different competencies (own presentation based on André et al. 2021, 18, 19).

CONCLUSIONS/DISCUSSION

The analysis of the literature reveals a broad spectrum of relevant skills for digital transformation. In addition to technological skills, collaborative and communicative skills, as well as skills for applying agile working methods play a particularly important role in the future tasks of specialists and managers.
In relation to artificial intelligence, the requirements for social and collaborative skills are increasing. Basic digital skills remain relevant and are being expanded to include AI-specific basic knowledge. For managers in particular, the focus is on change management skills, which include the ability to communicate changes but also the development of digital strategies for the company. In addition, skills for self-reflection and self-organization play an increasingly important role.

In the course of further research, it will be necessary to determine which skills are relevant from the perspective of the target group – specialists and managers – and which priorities are set for the (further) development of the skilled workers. On the basis of the findings collected, role- and task-specific competency models can then be adapted and further developed.

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КОМПЕТЕНЦИИ ЗА ДИГИТАЛНАТА ТРАНСФОРМАЦИЯ

Резюме: *Дигиталната трансформация, задвижвана от технологии като IoT, Big Data и Cloud, оказва значително влияние върху професионалния свят, като променя задачите и ролите в работата. Тази промяна изисква нови управленски и специализирани компетенции. Компаниите трябва не само да приемат дигитални иновации, за да останат конкурентоспособни, но и да подготвят работната си сила за тези промени. Необходимите компетенции варират от основни познания за технологичните постижения до умения за прилагане на цифрови промени и комуникация със служителите. С бързото разрастване на изкуствения интелект съществува спешна необходимост от идентифициране и развиване на нови компетенции. Целта на тази работа е да се идентифицират ключовите компетенции за специалисти и мениджъри поради внедряването на ИИ, като се подобрят компетентностните модели за развитие на персонала, подбор и оценка на изпълнението.*

Ключови думи: *компетентност, изкуствен интелект, развитие на компетентността, дигитална трансформация, развитие на лидерството, изкуствен интелект*

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