Entrepreneurship in Focus

FGF-Forschungsnetzwerk Entrepreneurship, Innovation und Mittelstand e.V. and IfM Bonn Issue 1/2025

Artificial intelligence in the skilled trades

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Summary

The digitalisation of the skilled trades in North Rhine-Westphalia has gained considerable momentum in recent years, but the skilled trades still lag behind sectors such as industry, trade and healthcare. Only one-third of skilled trade companies actively use AI-technology.

The level of digitalisation in the skilled trades in North Rhine-Westphalia still lags behind that in industry, trade, social and health services, and energy. However, it has caught up considerably in recent years, thus demonstrating a much stronger dynamic. The index shows an improvement of 58% compared to 2020, whereas the average across all industries is only 17%. If we look exclusively at the skilled trades and also focus on artificial intelligence (AI), we can draw important insights from the study “KI-Index_Handwerk.NRW” from the end of 2024. It is currently the most comprehensive study in Germany on the use of artificial intelligence in the skilled trades. More than 820 skilled trade businesses from North Rhine-Westphalia took part in this survey.

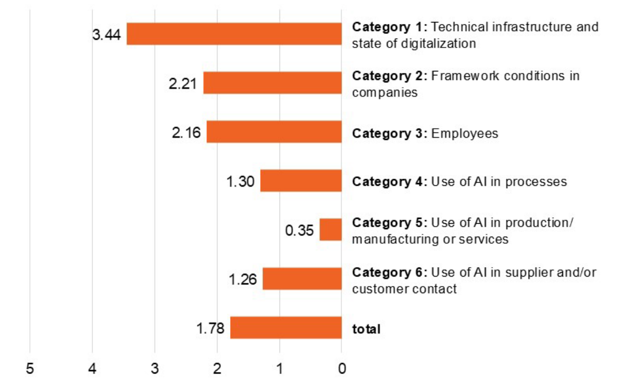
With an average total score of 1.78 on the maturity scale of levels 0-5 (from non-digitized to AI pioneer), there is still considerable potential for development. This corresponds to the 66% who have not yet introduced or use AI in their operations, and a further 16% tend to agree with this, i.e. less than 20% of craft businesses have already introduced AI in parts. Of course, we asked further questions:

Of the six categories surveyed, the companies perform best in the fundamentals and prerequisites for AI. The technical infrastructure (3.44) is in place, as are the framework conditions (2.21), and the employees (2.16) also have the appropriate skills.

So far, AI has hardly been used at all in production or manufacturing or in services, with a minimum value of 0.35 clearly attesting to this.

The first foundations have been laid in the area of internal process flows (1.30) or smart services (1.26).

AI-Index of skilled trades in North-Rhine-Westfalia (by categories and total)



Source: Overall result of AI-Index Handwerk.NRW.

According to the information provided by the companies, chatbots, language assistants, translation software or image and video processing are already being used most in the skilled crafts sector, while an analysis of existing or possible data is less frequently carried out. The defensive use of AI is mainly due to the fact that the benefits for the companies are less foreseeable, the lack of an overview of the possibilities that AI offers for the skilled crafts sector or the corresponding lack of know-how. If this were more prevalent, then the “paperless office”, documentation requirements, time tracking or communication processes with suppliers and customers would be at the top of the wish list.

The results of the index show only minimal bandwidths in the regional and structural distribution, both between more metropolitan and more rural chambers of skilled crafts and between the very different skilled crafts trades in NRW, hardly any differences can be detected. There is a clear tendency only with regard to size: the larger the companies, the higher the index value or degree of maturity.

SMEs in the skilled crafts

A look in the other direction also makes it clear that it is precisely the micro and small craft enterprises (with fewer than 20 employees), which account for more than 80% of the enterprises in North Rhine-Westphalia and in Germany as a whole and thus make a significant contribution to economic value creation in Germany, that do not have the scope to implement digitalisation and AI tools on a large scale. This scope is limited by a lack of skilled personnel – including regarding digitalisation – and a lack of financial (no economies of scale), temporal and knowledge resources. This raises the question of competitive business models, particularly for the small and medium-sized enterprises, so that their future viability and thus also their contribution to the transformation processes that lie ahead for us in many cases can be secured. This is a question that is not easy to answer, but it suggests that the skilled crafts sector is facing considerable adjustment processes. This is all the more true because the skilled crafts sector is currently characterized by a serious generational change. Many companies are about to be handed over, and at the same time there is a lack of trainees, skilled workers and successors. The immense challenges currently facing the skilled crafts sector are highlighted by the fact that companies are having to cope with a supposedly necessary technological transformation step, which has to be organized homogeneously between the person handing over and the person taking over, at a time when they are struggling to survive. This increasing personnel gap is leading to an intensifying spiral of demands on the skilled crafts sector.

The growing number of older people and fewer younger people is hindering the necessary transfer of knowledge, delaying necessary innovations and increasing the pressure to adapt and change – and this at several levels: in terms of technological possibilities, the know-how of tradespeople, the needs of customers and the fulfillment of social expectations. If the skilled crafts sector can successfully transform, it will certainly improve its image and attract more skilled workers, who can help it to meet the challenges of the future.

Implications for policymakers

Despite the skilled crafts sector's visible efforts to catch up, progress has been very slow. This is all the more surprising given that there is certainly no lack of research findings and analyses regarding the areas in which the skilled crafts sector needs to become more future-proof and the ways in which it can achieve this. However, the findings are often not reaching the companies. In this respect, the experiences of recent years reveal an implementation deficit in the skilled crafts sector – and the smaller the companies are, the more pronounced this is.The fact that skilled crafts businesses – and in particular the VSEs – need help from outside is impressively demonstrated by the KI study. More than half of all companies would like to see support from skilled crafts organizations, a strong show of confidence – private consulting firms, on the other hand, score worst here, with not even 10% of those surveyed wanting their support.

This clearly shows

- that there is a need for a special focus on the craft SMEs,
- that there simply must be specific offers for these craft SMEs that are easier to manage,
- that the organizations of the craft sector in particular, such as the district craft associations, guilds or the chambers of craft trades, are called upon, and
- that new approaches are needed because those of the past years have not yet been able to fulfill the expectations placed in them.

The skilled crafts sector is on the right track, as already demonstrated at the beginning, but has not yet arrived.

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References:

Beuchel, S.; Jantos, L.; Meub, L.: Digitalisierung im Handwerk zwischen Zettelwirtschaft und KI: Eine Status Quo-Analyse; ifh Forschungsbericht 23, Göttingen 2024.

Mittelstand-Digital Zentrum Handwerk: KI: Werkzeug fürs Handwerk; ZDH: Berlin 2024.

Schafmeister, K., Petersen, M., Sandoval, C.: KI-Index Handwerk.NRW; Bielefeld: Fachhochschule des Mittestands (FHM), 2024.

Schafmeister, K.; Boeke, T; Petersen, M.; Sandoval, C.; Stangier, Y.; Tawalalli, J.: KI im Handwerk, Beispiele, Trends und neue Perspektiven; Bielefeld: Fachhochschule des Mittelstands (FHM) 2024.

Kompetenzplattform KI.NRW, Temath, C.: Studie: Künstliche Intelligenz im Handwerk. St. Augustin 2023..

Imprint

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