



Digital competence – state of the art and future needs in the Swedish wooden house manufacturers

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..... Fel! Bokmärket är inte definierat.

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Summary

The aim of this pilot study was to identify the existing level of digital competence and skills at wooden house manufacturers and to understand the future perceived needs they have in relation to these competences. This is motivated by the acknowledgement that digitalization has been emphasized both as a critical necessity and significant challenge for this industry.

The number of responding companies in the study is rather low, offering a partial snapshot of the current state of the industry and potential future directions. However, it does provide valuable insights and considerations for future strategies for digitalization of the industry.

The wooden house manufacturing industry is facing challenges relating to the overall business cycle as well as the effects of war, inflation, and increased competition. Despite these challenges, the industry appears to be aware of the potential possibilities that digital technologies may offer. Overall, they are rather content with the current level of digitalization and the level of digital competence among their staff. At the same time, they realize the need to continue investing in hardware and software as well as continued enhancement of digital skills for the staff. Presently, only a very small portion of total investments in the industry is allocated to digitalization.

Most companies employ similar technologies and a variety of similar strategies to enhance their competences. The primary focus in terms of digital competence lies in the areas of production, marketing, communication, and sales. Areas such as customer support, decision-making, testing, and certification are not prioritized. Most of these companies recognize the need of digital competence development for their staff to effectively use contemporary digital technologies. Furthermore, they see a growing demand for digital competence over the next three years, particularly in domains such as artificial intelligence (AI), cybersecurity, infrastructure, and social media/marketing.

Background

Digitalization is identified as one of the major needs and challenges of wooden house manufacturers, its suppliers, and related industries (Smart Housing Smålands, 2020). Indeed, several technologies are used by companies in their daily business operations. However, the potential and value emerging from the use of these technologies and their role in process efficiency, strategy, competitive advantage, and associated challenges is often not fully understood. Generally, this industry is characterized to lag behind in digitalization efforts (Vestin and Säfte, 2021). Digital technologies have the potential to digitise hence to streamline the value chain processes and collaboration between actors in the industry, among other. It is therefore important to create an understanding, on what would be the best way for organisations to reap the potential of digital transformation, e.g., by streamlining internal processes, enhancing products, services and customer experience, or leveraging data as an asset. However, digital transformation is intrinsically linked to the digital competence of companies. There is a noted

gap between the existing and needed digital competence. Digital competence is limited and sometimes even inexistent.

To thrive in the digital transformation journey, which is an imperative process for competitive advantage, it is important for the industry to identify the existing level of digital competence and the perceived needs of digital competence.

The overarching aim of this pilot study is to identify the existing level of digital competence and skills at wooden house manufacturers and to understand the future perceived needs they have in relation to these competences. The argument is that only through clear identification and mapping of these needs, a future digital strategy plan for a successful digital transformation can be designed and implemented.

In this project we have collaborated closely with TMF (Trä och Mobelföretagen), with whom we had several meetings. TMF was consulted and provided support with the empirical part of the study, especially the workshop helped us organize the workshop where its technical team participated.

Initially a future workshop was organized. In the workshop 7 participants from 6 companies participated. Based on the information we got from the future workshop and other surveys made on the topic, we developed a survey with 23 focused questions. The survey was distributed to 84 companies online. In total it was distributed to 94 possible respondents. The survey was opened until July 30. The response rate was 10.64% meaning that only 10 companies responded. Due to the low response rate, we decided to conduct some follow-up interviews with the survey questions. The size of the responding companies varied from 4–550 employees, with a majority between 30–40 employees. Five of the companies are a part of a larger business group and five are independent enterprises. From ten companies four CEO:s, one technical manager, one head of technology and planning, one business development manager and one civil engineer responded to the survey. All in all, the responses were made from management perspectives, as was intended.

Results

Findings from the future workshop indicate that companies are rather adept at incorporating digital technologies into their operations. These technologies include: on-line ordering of complete houses, the use of reading tablets, digital 3D drawings that inform production lines in factories and customer relationship management systems. Nevertheless, they generally describe their digital competence as basic. They emphasize two key areas for improvement which they see problems with include information sharing across all actors in the building process and security concerns. In terms of the near future, they aspire to utilize and increase the competence on several areas, including drawing tools which can be linked to state regulatory requirements to prevent faults and errors, the development of digital customer relations tools for complaints and services, laser cutting, projections, improved 3D house modellings and industry specific programming. Specifically, all companies express a preference

for solutions for the analysis of the data they currently collect to enhance quality and cost efficiency. However, they acknowledge the importance of competence to determine which data to collect for relevant data analysis for them. In general, they seem to be satisfied with the general digital competence present among both blue and white-collar workers.

Due to the low response rate of the survey, the presented results only give a hint at the current situation of the branch.

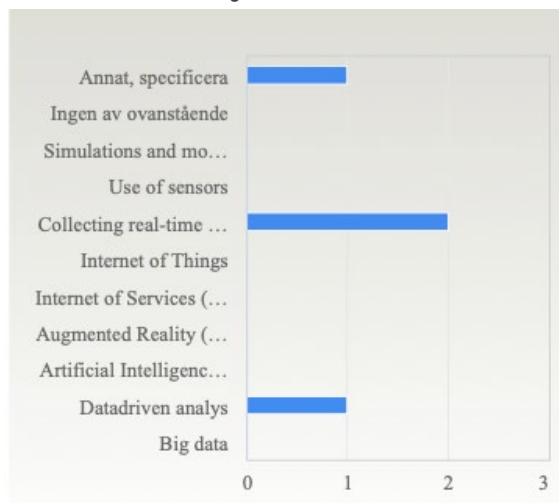
In relation to all types of investments that the responding companies are making, only between 0–30% are directed towards digitalization, and six out of ten only invest between 0–10% of all their investments in digitalization. This is not to imply that digitalization is not important for the companies, but that other investments so far have been considered more important.

Digital tools

The type of digitalized tools for *product development* that the companies are currently using includes 3D-printing, BIM-systems such as Vertex, Revit, HSBCAD and Agacads wood frames. A few are using systems for calculating electricity consumption and most are using cloud-solutions. Other tools that are being used are VR and AR-equipment and MPS-systems for iPad. For *internal communication* cloud-solutions, e-mail and intranets, mobile telephones, and communications systems such as Teams are used. And for *customer relations* all respondents are using their homepages and e-mail. Several companies are using digital housing catalogues, VR and AR, but also the possibility to configure a new house on-line and ordering on-line. For *supplier relationships* they mainly use e-mail and on-line ordering, but systems like EDI for purchasing also used.

Most companies are collecting data, but only two of the responding companies are using the data and analyzing it to develop their products. The types of technologies that are used to collect data include those shown in table 1 below, as well as BI-tools and accounting software (such as Kuber).

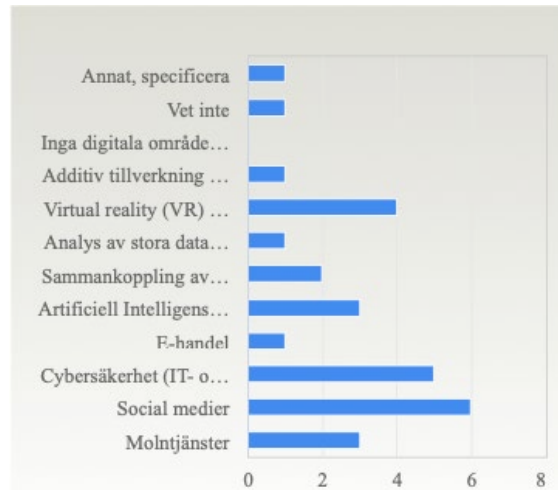
Table 1. What technologies are used to collect data?



Companies to a large extent use digitalized registers over customers (databases), and they have a good knowledge and understanding of GDPR regulations. However, only a few leverage customer data and other data as a foundation for their business decisions. On the other hand, five companies utilize gathered data to enhance their capabilities in both data collection and analysis to improve their businesses. They also distribute the data across different sections within the company. None of the responding companies have purchased data on existing customers, potential customers, or other market-related data from third party companies in the last year.

The responding companies believe that the most important digital areas for them right now are the following: social media, cyber-security, VR, cloud solutions and AI, as shown in table 2.

Table 2. What digital areas do you consider the most important for your industry/company right now?



The main drivers for digitalization emphasized by the respondents include: customer demands, cost reduction and competition from others in the industry. A few answers argued that suppliers demand increased digitalization and that quality improvements are a part of the driving forces. The expected results of the investments made in digitalization are mainly efficiency and increased productivity, customized products via for instance visualization and increased quality.

Digital investments

In terms of digital investment, so far, five companies have invested in either hardware or software, or both they consider necessary for their businesses. Four companies have also made adaptations in ways of working and changes in processes to make use of digital tools. Six companies are purchasing services from third party companies for technical support or digital competences. They are currently considering further investments to continue to be competitive in the following three years' time. Table 3 provides the dispersion of answers.

Table 3. Within which areas in digitalization are you considering making more investments to continue being competitive in the next three years?

13. Inom vilka av följande områden med koppling till digitalisering (om några) bedömer du att ditt företag måste göra ytterligare investeringar i för att behålla er konkurrenskraft på tre års sikt? (Flera svar kan markeras)	Antal svar
Kompetensutveckling för att hela personalen ska kunna arbeta med digitala verktyg och processer.	7 (70,0%)
Inköp av ny digital teknik (hård- eller mjukvara)	4 (40,0%)
Förändringar av organisation, processer och arbetssätt för att dra nytta av digital teknik	6 (60,0%)
Köpa in tjänster från tredje part för att få tillgång till teknisk infrastruktur, molntjänster och/eller digital kompetens	4 (40,0%)
Rekrytering eller kompetensutveckling med inriktning på teknisk specialistkompetens inom ett eller flera digitala teknikområden.	2 (20,0%)
Investeringar i forskning, utveckling och /eller innovation med koppling till digital teknik och digitalisering	4 (40,0%)
Inget av ovanstående	1 (10,0%)
Vet inte	2 (20,0%)
Annat, specificera	0 (0,0%)
Summa	30 (300,0%)

The results indicate that skill development for all the employees and changes in the organization, processes, and ways of working to make use of digitalization are the most common investments for the coming three years are most common. Common investments also include R&D and innovations, but also purchasing of technological infrastructure, cloud-services and digital competence. The areas that the companies consider most important for the upcoming three years can be summarized with issues such as connecting sensors and technological systems, social media, VR and AR. To some extent also cyber security, AI and e-commerce are considered important. Anticipating future needs is not a simple task, as evidenced by two companies responding "Don't know".

Regarding support for digitalization investment, four companies fully agree and two partly agree with the statement that these investments are supported by the owners, whereas two completely disagree. The results are similar in relation to the support of digital investment from top management. Responses to the statement suggesting that digitalization would be more successful with more support from top management reveal that three companies completely agree, two are neutral and three completely disagree. The results give a scattered view of the circumstances that the companies currently have regarding support from the top management.

Digital competence

Companies' views of current digital competence needs and training mainly revolves around continuous training in using digital tools and working processes. Only two companies stated that they need to recruit new digital competences that are lacking today. Within three years, seven companies stated that the need for digital competences for using digital tools and working processes will increase and three companies stated that they will recruit new competences. The main reason for recruiting new competences is to replace staff that are leaving, because the company will reorganize the production and therefore need new competences, and because the company is growing, and the business is expanding. Two companies stated that they are letting people go right now or that there is no need for recruiting right now.

Looking at what specific competences are needed, the following are most important: 1. IT-infrastructure (hard- and software), 2. social media and marketing, 3. Business-systems (i. e. customer databases), 4. AI and automatization, 5. collect and analyze data, 6. Cyber-security, and data protection. To some degree also e-commerce and webpages are seen as important areas of competence within three years.

Table 4. The type of digital competence that the companies viewed as becoming more needed within in three years.

21. Inom vilka delar av företagets verksamhet bedömer du att behovet av följande typer av digital kompetens kommer att öka markant inom kommande tre år? (Flera svarsalternativ kan markeras)	Antal svar
Administrativa uppgifter	3 (30,0%)
Försäljning	5 (50,0%)
Marknadsföring och kommunikation	5 (50,0%)
Kundsupport	1 (10,0%)
Produktion av varor eller tjänster	6 (60,0%)
Inköp	3 (30,0%)
Logistik och transport	4 (40,0%)
Verksamhetsanalys och framtagande av beslutsunderlag	4 (40,0%)
Produktutveckling och design	4 (40,0%)
Beslutsfattande	1 (10,0%)
Testning, utvärdering och certifiering	1 (10,0%)
Forskning och utveckling	3 (30,0%)
Inget av ovanstående	0 (0,0%)
Vet inte	1 (10,0%)
Annat, specificera	0 (0,0%)
Summa	41 (410,0%)

In table 4 we can see that digital competence is needed for a variety of working processes or areas. The most common areas are to produce goods or services, sales, and marketing and communication. Also, logistics and transportation, analyses of the business and for decision making, product development and design, and to a lesser extent R&D are viewed as needed within three years.

The expected types of competence and skill development that the companies see are a combination of upskilling (that is digital skill training for ordinary working tasks), repetition and training of current skills to keep adequate competences, reskilling (broadened skills to handle new working tasks), and specialization (in depth skills for specialization within a specific area).

For digital competence building and skill formation many actors and organizations are important for companies. They are usually also combined, so that many companies see the need of working closely with internal (to the organization) educational programs and training, purchasing private educational alternatives and courses, using Internet platforms that offers certificates and courses, higher vocational training, university courses and programmes on both bachelors and master-levels and commissioned courses. To a lesser extent the companies are seeing research and PhD-education as ways to build competence.

Conclusions

To conclude, companies employ similar technologies and a variety of similar strategies to enhance their competences. The primary focus in terms of digital competence lies in the areas of production, marketing, communication, and sales. Areas such as customer support, decision-making, testing, and certification are not prioritized. Most of these companies recognize the need of digital competence development for their staff to effectively use contemporary digital technologies. Furthermore, they see a growing demand for digital competence over the next three years, particularly in the areas such as artificial intelligence (AI), cybersecurity, infrastructure, and social media/marketing.

In the future workshop the companies emphasized the importance of being able to share data and information between different systems within the company and with suppliers and partners. The problems they saw include information sharing across all actors in the building process and security concerns. Also, they concluded that much is to gain from utilizing and increasing the competence on several areas, including drawing tools which can be linked to state regulatory requirements to prevent faults and errors, the development of digital customer relations tools for complaints and services, improved 3D house modellings and industry specific programming. The current underuse of existing data could be used much more in the future to analyze production processes and the organization of work. This would most likely enhance quality and cost efficiency. They acknowledged the importance for digital and other analytical competence to determine which data to collect for relevant data analysis. The results of the survey suggest that companies would have to continue enhancing digital competence with a variety of measures such as inhouse training and use of third-party consultants for training and courses combined with other formal organizations supplying the right competences for all levels of knowledge and for different groups of employees.



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Continuation

This report presents the results of a pilot study, which paves the way for future research projects. The lack of results that could be more generalist leads to data that only gives some directions and possible further issues and ideas for further research. Questions such as “What effects does investments in digitalization have on the wooden house industry?”, “What are the challenges for effective use of digital tools in the industry?”, That is, “what are challenges on different levels (organizational, management, working processes and skill formation, and so on? These types of research questions, and many more, can be more specifically raised based on the results from this pilot study.

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Genomförandeorganisationerna RISE, Linnéuniversitet, Jönköping University och Träcentrum i Nässjö i Smålandsregionen. I samverkan ingår förutom finansierarna representanter från näringslivet genom OBOS, Tengbom, CBBT- Centrum för byggande och boende med trä, TMF – Trä och möbelföretagen, Sveriges Träbyggnadskansli, Glasbranschföreningen, Glasforskningsföreningen Glafo och dessutom de tre länens Länsstyrelser. Utöver detta sker samverkan med andra universitet, innovationsplattformar och samverkanskluster både nationellt och internationellt.

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