

A DECADE OF TRANSFORMATION: THE ROLE OF THE GERMAN LEAN CONSTRUCTION INSTITUTE IN THE CONSTRUCTION INDUSTRY

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ABSTRACT

Since its foundation in 2014, the German Lean Construction Institute (GLCI) has made a significant contribution to the diffusion of Lean Construction in Germany. During this time, the GLCI has professionalised structurally by establishing an office with full-time employees, and the application of Lean Construction has developed considerably. This paper examines the impact of the GLCI as an institution on this development and is based on a survey reflecting the perception of the construction industry in Germany. It also analyses what value such an institution must offer in order to further promote the diffusion of Lean Construction. The survey results show that conferences, networking opportunities, community building, training and further education programmes, and publications are perceived as main added values of the GLCI. The study clearly demonstrates that the GLCI exerts a substantial impact on the awareness of Lean Construction in Germany, while its impact on the practical implementation within the industry is also assessed as significant. The findings provide valuable insights for the further development of the GLCI and offer international perspectives for other Lean Construction institutions to accelerate the diffusion of Lean Construction principles and tools.

KEYWORDS

Lean construction, Germany, diffusion, institution, network.

INTRODUCTION

Following the global recognition of the Toyota Production System in the 1990s under the term 'Lean Production', companies from various industries, including electronics, aviation, healthcare and IT, adopted Lean principles to enhance the efficiency of their processes and reduce waste. The construction industry also recognised the potential of Lean Management at this time and began to adapt the ideas to the specific requirements and challenges of the industry under the term Lean Construction (Alves et al., 2010).

Generally speaking – Institutions play a central role in the diffusion and promotion of progressive ideas, scientific findings and innovations. They act as catalysts by diffusing knowledge, establishing networks, promoting the exchange of experience and providing a

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strong voice in the discourse and discussions within political or practical context. The successful diffusion of Lean Construction also requires close links between academia and practice in order to organise the exchange of findings and knowledge and to promote change in the industry (McSharry et al., 2023).

A significant milestone for the international construction industry was the founding of the first Lean Construction Institute (LCI) in the USA in 1997, operating under the motto 'Improving the Construction Industry through Lean Principles'. This initiative was based on a global demand for productivity gains in the construction industry and arousing interest in Lean Construction. In the ensuing years, a substantial number of institutions were established in other countries, thereby making a significant contribution to the development of Lean Construction. As illustrated in Figure 1, there are currently 27 such organizations in the construction industry worldwide, listed in alphabetical order.

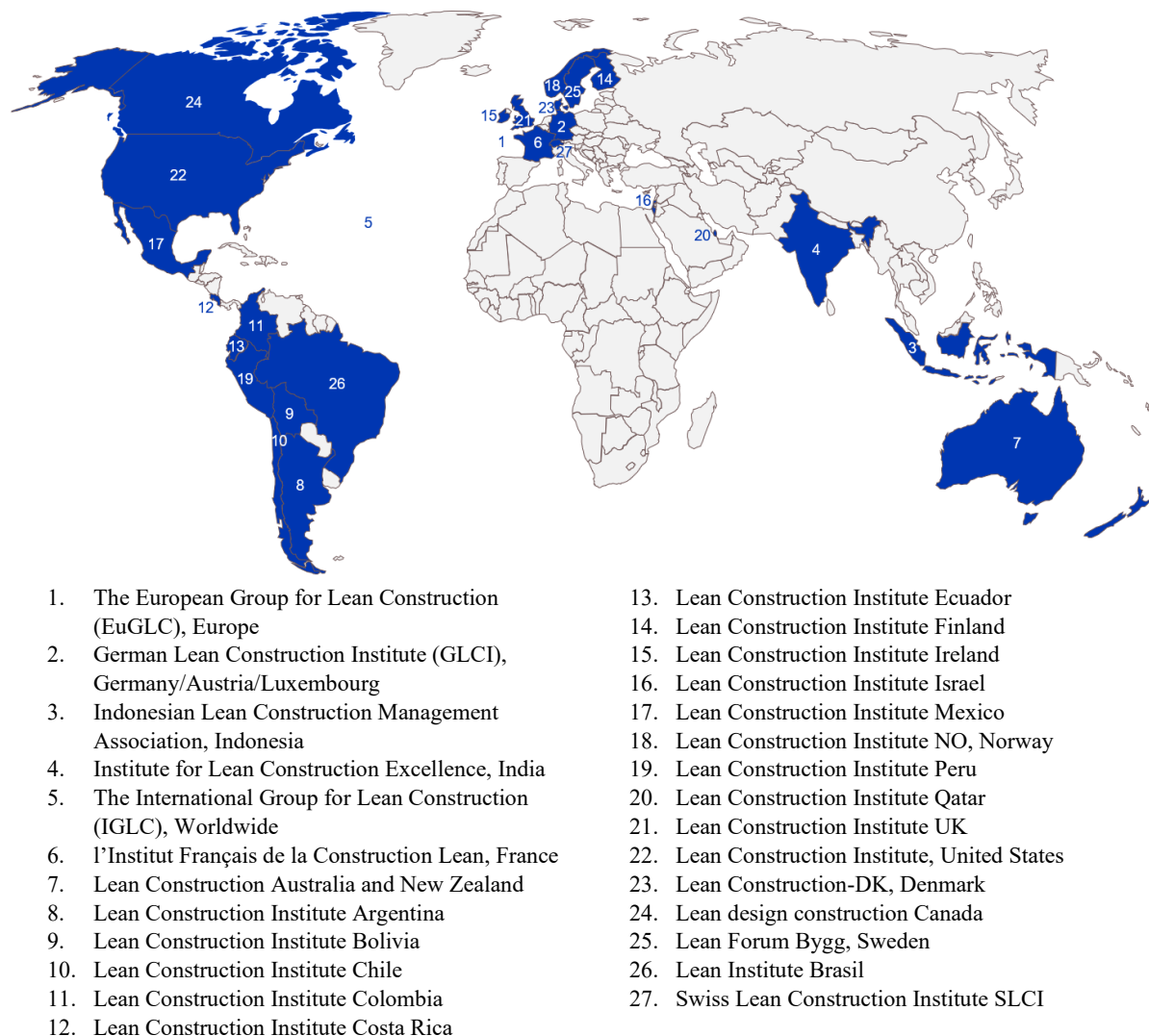


Figure 1: Overview of global Lean Construction institutions

Platforms such as the International Group for Lean Construction (IGLC), founded in 1993, and the European Group for Lean Construction (EuGLC), restructured in 2024, make a significant contribution to promoting Lean Construction as an internationally recognised concept and spreading the understanding and application of Lean methods and their adaptation to processes in planning and construction.

The scientific investigation of the role of national Lean Construction institutions and their impact on the construction industry is extremely limited. Only a few examples are known to the authors of this study, such as Ebbs et al. (2015), who highlighted that Lean Construction is still in its early stages in Ireland but is gaining momentum thanks to the Lean Construction Institute Ireland (LCII) Community of Practice (CoP), and McSharry et al. (2023) with an update on this development.

A more thorough investigation into the impact of national Lean institutions could enhance awareness of their crucial function in promoting the Lean approach, thereby facilitating its broader global adoption. Moreover, the exchange of experiences concerning the systematic diffusion of Lean principles could foster worldwide recognition of the construction industry's ongoing transformation. This study therefore describes the development of the German Lean Construction Institute (GLCI) as such an institution in the following chapter. Concurrently, the subsequent chapter presents a survey, which, for the first time in Germany, examines the impact of the GLCI on the diffusion of Lean Construction within the construction industry. The survey assesses the perception and value of the GLCI while also highlighting perspectives and potentials for other national and international Lean organisations to further promote the diffusion of Lean principles and methods. Finally, the key insights are discussed, followed by a conclusion.

10 YEARS GLCI (2014 – 2024)

The German Lean Construction Institute (GLCI) was established in 2014 as a non-profit organisation, following a similar model to the LCI in the United States. The GLCI was formed in cooperation with the two construction management chairs at the Universities of Stuttgart (Institute for Construction Management (IBL) – University of Stuttgart) and Karlsruhe (Institute for Technology and Management in Construction (TMB) – Karlsruhe Institute of Technology (KIT)).

The introduction of Lean Construction to Germany, however, took place in 2003, when Professor Fritz Gehbauer of the Karlsruhe Institute of Technology (KIT) met Gregory Howell (co-founder of the LCI in the US) at a conference in Brazil (Gehbauer, 2018). Over the next decade, Professor Gehbauer's work shaped the Lean Construction research landscape in Germany. In 2004, he held the first university lecture on Lean Construction in Germany at KIT; in the following years, other universities followed with similar courses and research initiatives (Gentes et al., 2017).

An important milestone was reached in 2006 with the start of Germany's first Lean Construction project in practice, which was supervised by researchers from KIT. In the same year, the first German-language publication on Lean Construction (Gehbauer and Kirsch, 2006) and the first IGLC paper with German participation (Gehbauer et al., 2006) were published. Despite these advances, Lean Construction remained largely unknown in the German construction industry. A study by Johansen and Walter (2007) surveyed 61 large construction companies at the time; only 17 responded. However, these 17 companies themselves had hardly any awareness, and even less experience. The study concluded that Lean Construction was basically a non-existent topic in German practice at that time.

While incremental progress followed in the ensuing years, the founding of the GLCI significantly increased the visibility of Lean Construction in Germany. An internal survey of GLCI members conducted in 2018 – four years after its formation – revealed, however, that there was still high potential for the practical implementation of Lean Construction in the German construction industry.

As a non-profit organisation, the GLCI is dedicated to the goal of diffusing Lean Construction in practice and academia in German-speaking countries, acts as a platform for the construction industry and does not pursue any profit-maximising interests. All funds generated are used solely for the purposes of the association.

The statutes of the GLCI place a particular emphasis on the promotion of practice, research and education in the field of planning, construction and operation of buildings. The key objectives of Lean Construction initiatives include raising awareness of its practical potential, developing and diffusing knowledge, and establishing a common language for its principles and methods in Germany. Efforts are focused on continuously advancing Lean Construction methodologies and promoting their adoption by highlighting benefits such as resource conservation, occupational health and safety, quality assurance, productivity, efficiency, and job security. Additionally, the publication of scientific studies, practical experiences, and project reports aim to provide valuable insights for the industry. Qualification and training programs are organized to communicate Lean principles and methods effectively, while collaboration and knowledge exchange among members and other stakeholders are fostered through regional practice groups. Furthermore, special achievements with regard to Lean Construction are recognized through awards and honors. The GLCI is committed to the values of customer focus, continuous learning, respect, openness and transparency. The GLCI's mission and vision are as follows:

- **Mission Statement:** 'We are drivers for the transformation of the construction and real estate industry towards more user-centricity, efficiency and saving resources in the planning, construction and operation of buildings.'
- **Vision Statement:** 'As the leading platform for the Lean Construction community in German-speaking countries, we connect people and organisations in the construction and real estate industry and enable them to apply the ideals, principles, methods and tools of Lean Management in the construction industry.'

In addition to paid memberships for private individuals and companies/organisations, the membership fee regulations also provide free memberships for students and academic staff. As of the end of 2024, the GLCI had 472 members, comprising 174 companies and 176 individual members. In addition, the GLCI had 101 members comprising academic staff and students, 17 universities and 4 associations. Figure 2 illustrates the continuous positive development of the GLCI's membership numbers, with a particular focus on companies and individual members.

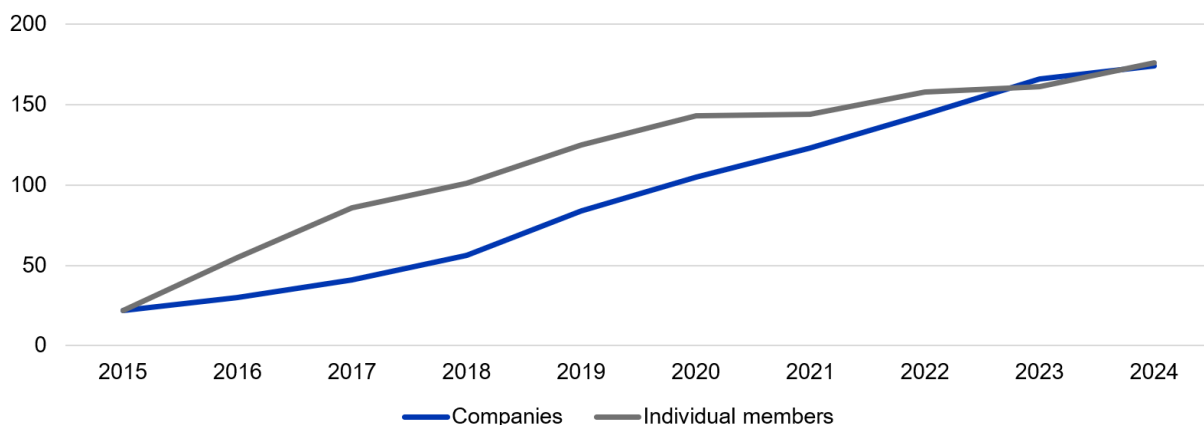


Figure 2: GLCI membership development of companies and individual members since 2015

In 2015, the first regional practice groups were founded in Karlsruhe and Stuttgart, shortly before the first GLCI congress in Germany, which has since evolved into the most significant annual event, with more than 500 participants in 2024. Further regional practice groups were

established throughout Germany in the following years. The establishment of practice groups in Luxembourg in 2023 and in Austria in 2024 has also led to the formation of two international groups in German-speaking countries, thereby bringing the total number of regional practice groups to 12. These regional groups organise 20-30 cost-free events per year for all interested practitioners, thereby serving as a significant point of contact for both GLCI members and interested practitioners, and also contributing to GLCI's visibility.

The first special interest group (SIG) was set up in 2016 and focused on establishing a general terminology for the principles and methods of Lean Construction. The result was a publication 'Lean Construction – Terms and Methods' in 2019. The next SIG 'Lean Construction in Teaching' was formed in 2018, which pursues the goal of making Lean philosophy, the principles of Lean Management and the methods and tools of Lean Construction the subject of training in all construction-related degree programmes and training occupations. In 2021, the 'Lean Logistics' SIG was founded on the initiative of committed members, which published the 'GLCI Lean Logistics Guide' in 2022. In 2023, the first SIG was established in cooperation with another institution; 'BIM and Lean' was created together with buildingSMART Germany. In 2024, the 'Lean Project Management' SIG was launched in cooperation with the DVP (German Association for Project Management in the Construction and Real Estate Industry) to develop application-oriented guidelines for the holistic integration of the Lean approach in client-side project management. The timeline of significant GLCI milestones is delineated in Figure 3.

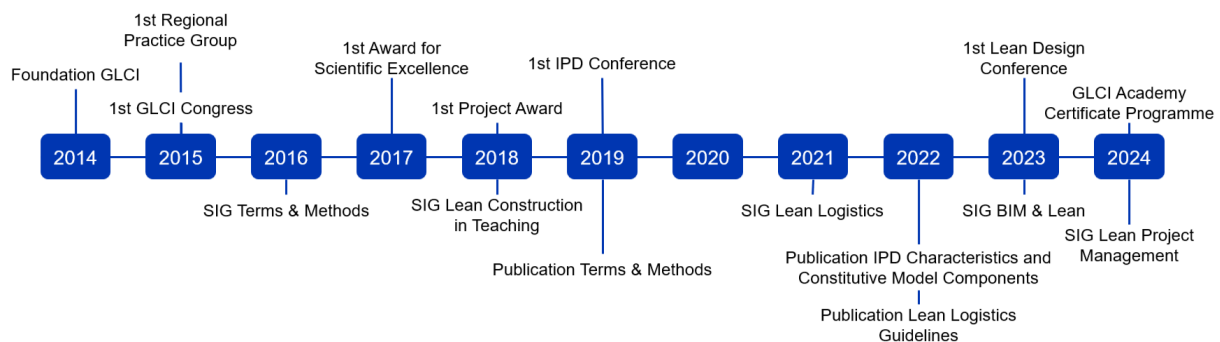


Figure 3: Significant GLCI milestones

Over the years, the annual GLCI Congress has, as mentioned, evolved into a highly attended industry event and a central platform for various activities, including the Award for Scientific Excellence, the Lean Construction Project Award, and opportunities for exhibitors and sponsors. In 2024, more than 500 participants from across the design and construction value chain attended. The distribution of participants was as follows: 35% contractors, 14% consultants, 13% designers, 12% project managers, 10% clients, 8% researchers, 5% IT service providers and 3% from other sectors. The event brought together professionals from all hierarchical levels, from students to CEOs. The three-day annual congress is structured into a Learning Day featuring over 10 full-day seminars, a Conference Day with more than 20 presentations, and a Practice Day offering construction site excursions.

The income from the annual congresses, which were initially organised on a voluntary basis, made it possible to finance the first salaried part-time position for the management of the GLCI office in 2017. The office was located in Karlsruhe at the Institute for Technology and Management in Construction (TMB) at KIT, where the managing director was also employed part-time as a research assistant. Due to the continuous growth in membership and conference participation, it was financially possible in 2018 to establish a full-time position in the back office (assistant). The office continued to be supported by volunteers, mainly from the university institutes. Following this evolution, an experienced full-time managing director was

hired in 2020. Two years later, in 2022, a full-time position was created to manage the newborn GLCI Academy and thereby professionalise training courses and set up a certificate programme. In 2023, a part-time Scientific Officer was hired and in 2024, the full-time position in the back office was split into a part-time position for a Finance & Administration Officer and a full-time position for Office Management & Event Coordination (Assistant). In addition, the work of the GLCI office is supported by a varying number of working students. The timeline of this development is shown in Figure 4.

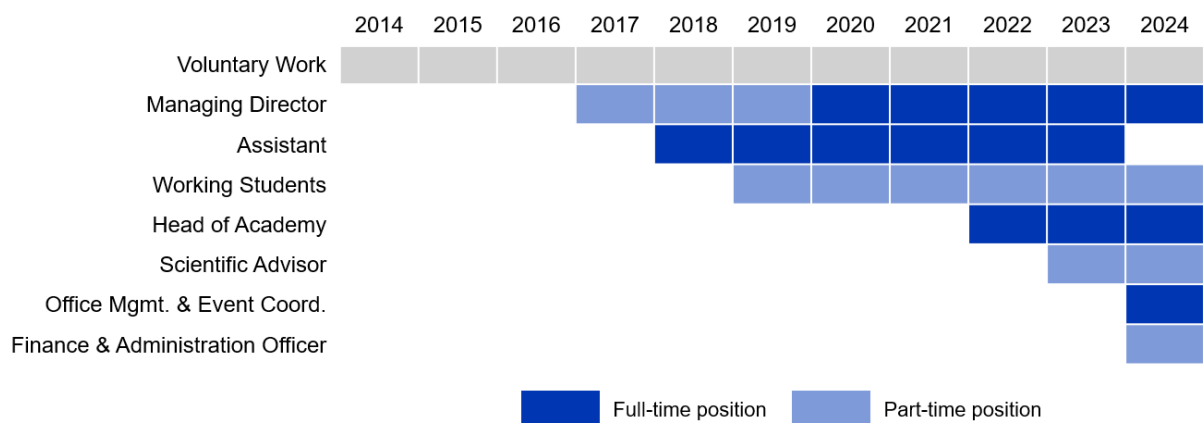


Figure 4: Personnel development of the GLCI

Through the described activities and the ongoing development of the thematic scope and the professionalisation of the institution, the GLCI is making a significant and visible contribution to the diffusion of Lean Construction in Germany. First insights into an ongoing study conducted in 2024 on the status quo of the application of Lean Construction in Germany shows that of the 65 companies surveyed, 12% have already fully integrated Lean Construction throughout the whole company, while 14% use it in most construction projects. 43% are implementing Lean in some projects and 23% are only using it in a few construction projects. 8% of companies have not yet applied Lean Construction in practice, but are already dealing with it (John et al. 2024). The findings indicate that Lean Construction is gaining traction in Germany, yet there is considerable opportunity for its further development. For the final results of the study see John et al. (2025).

GLCI'S IMPACT ON THE DIFFUSION OF LEAN CONSTRUCTION

RESEARCH METHOD

The following survey is an analysis of the perception and impact of the GLCI within the construction industry in Germany. To this end, a questionnaire was developed with the aim of gaining insights from industry participants who are already familiar with the concept of Lean Construction and the GLCI.

The questionnaire was developed by the authors in multiple iteration loops, with both scientific and practical aspects being taken into account to ensure the relevance and quality of the survey. The objective was to obtain preliminary, yet well-founded, insights into the perception of the GLCI and its impact on the diffusion of Lean Construction in Germany. The questionnaire comprised 40 questions, incorporating single-choice, multiple-choice, ranking, and free text options, and required an average of 7 minutes to complete.

The survey was disseminated within the GLCI network in order to reach individuals with relevant experience, making it a survey of an affinity group rather than a purposive sample in the strict sense. This methodological decision was based on the assumption that only individuals who are already familiar with the GLCI can provide a valid evaluation of the institution's role and impact.

The survey was thus distributed via the GLCI's internal mailing list, which includes members and former conference guests, as well as via the GLCI's LinkedIn account, which had 6,168 followers at the time the study was conducted (cut-off date: 10 January 2025). Due to the distribution method employed, it is not possible to determine an exact response rate. The survey does not claim to be representative; rather, the results should be understood as an initial indication and assessment. At the start of the survey, participants were invited to specify their area of expertise and their relationship to the GLCI (e.g. membership) in order to contextualize their responses. These methodological choices allow for specific and in-depth insights into the perception of the GLCI within the construction industry. However, it should be noted that the results cannot be generalised due to the sampling method and are therefore primarily exploratory in nature.

KEY RESULTS

Due to the limited scope of this paper, the focus is on the key findings which provide an impression of the role and the impact of the GLCI in the German construction industry. The survey link was accessed a total of 573 times over the course of 10 days, and 144 individuals started the survey. The survey was completed by 102 respondents, therefore the number of respondents varies according to the question. The distribution of GLCI membership types among survey participants is as follows: The majority of respondents (82) are affiliated with their respective companies or organisations through corporate membership, followed by 31 individual members. Additionally, three participants identified themselves as student or research assistant members. A further 27 respondents are not GLCI members themselves but maintain some form of connection with the institute (e.g., through events or professional networks).

The distribution of project roles among the survey participants ($n = 142$) reveals a notable distribution. The largest group, comprising 53 respondents, identifies as clients (and client representatives), followed by 41 participants from contractors. The representation of consultancy and scientific roles is 16 and 15 respondents, respectively. Designers account for 12 participants, while IT service providers and other roles are the least represented groups, with 3 and 2 respondents. This distribution underscores the preponderance of clients and contractors within the surveyed group.

Firstly, with regard to the general recognition in the construction industry, respondents were asked: *"How would you rate the level of awareness of the GLCI within the construction and real estate industry in the German-speaking region?"* As shown in Figure 5, the majority of respondents (54) consider the GLCI to be "rather well known" in the German construction industry, followed by 38 who perceive it as "little known". A smaller group of 13 respondents regard the GLCI as "very well known," in Germany while no participants indicated that it is "not known at all." This indicates a generally moderate to high level of recognition within the industry. However, given that Lean Construction is currently utilised by only a small percentage of the construction industry in Germany (John et al. 2025), this level of awareness can be considered to be very positive.

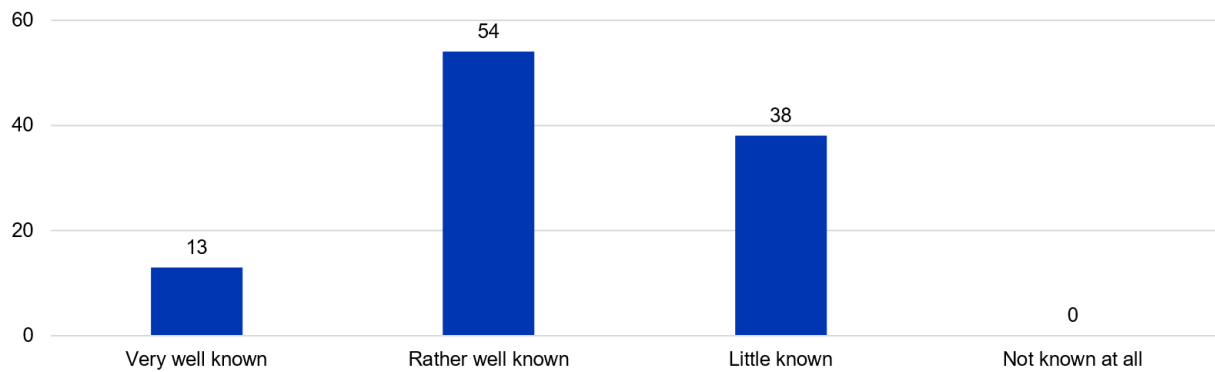


Figure 5: Assumed Recognition of the GLCI in the construction industry (n = 105)

In addition to recognition of the GLCI, participants were asked: “*How would you assess the impact of the GLCI on the following aspects?*” – referring to their own companies as well as the construction industry more broadly, particularly with regard to Lean Construction awareness and implementation behavior. The results are illustrated in Figure 6. The respondents evaluated the GLCI's impact on a scale ranging from "Very strong" to "None at all".

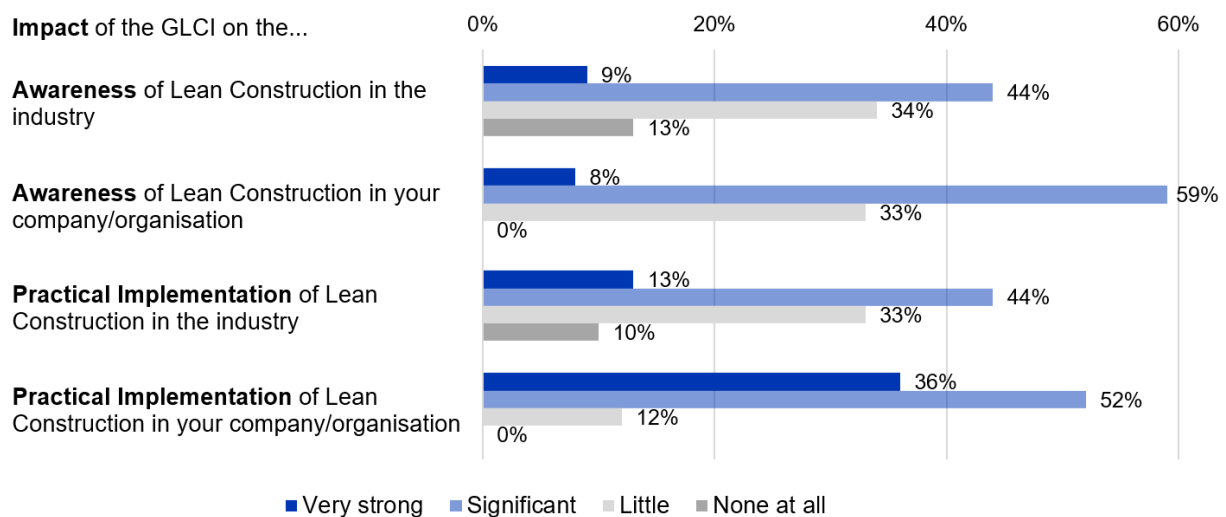


Figure 6: Assessment of the GLCI's impact on the awareness and practical implementation of Lean Construction in the industry and the companies of the respondents (n = 105)

The findings of the study indicate that 53% of respondents perceive the impact of the GLCI on the awareness of Lean Construction in the industry to be very strong or significant, while 34% consider it to be little and 13% perceive no impact at all. Concerning the awareness of Lean Construction within their respective organisations, 67% of respondents consider the GLCI to have a very strong or significant impact, while 33% perceive it to have little impact, and no respondents reported no impact. The impact on the practical implementation of Lean Construction across the industry is recognised by 57% of respondents as having a very strong or significant impact, while 33% perceive little impact and only 10% attest that the GLCI seems to have no impact. Regarding the impact on the practical implementation of Lean Construction within the companies of the respondents, 88% of respondents perceive the GLCI's impact as either very strong or significant, while 12% consider it to have little impact, with none reporting no impact. Overall, the GLCI is widely recognised as having a strong impact on the practical implementation of Lean Construction within organisations as well as on the awareness. While its impact at an industry level is slightly lower, it is still considered significant by the majority of respondents.

With regard to the diffusion of the lean approach through the GLCI, participants were asked: “Which added values should an association for the diffusion of Lean Construction focus on most strongly?”. Figure 7 shows the survey results. The participants ranked the eight listed added values based on their personal priorities. Points were assigned according to the ranking, and the percentages shown in the figure represent each value's share of the total score.

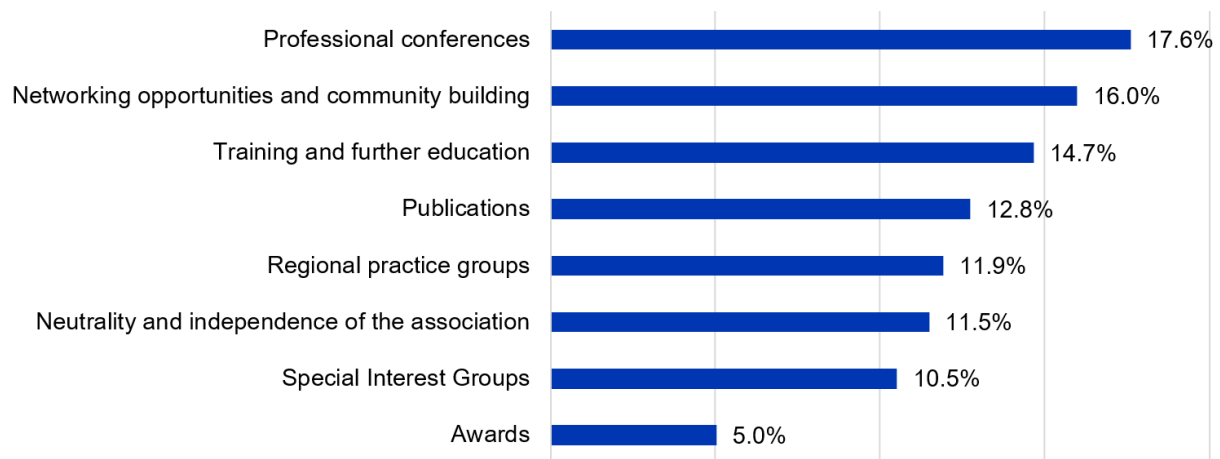


Figure 7: Key value propositions a Lean Construction institution should focus on (n = 105)

These findings indicate that conferences (e.g. the GLCI congress) are regarded as the most significant added value, accounting for 17.6% of the total score. This underscores the substantial importance of such events in facilitating knowledge transfer and networking within the industry. Following closely at 16.0%, networking opportunities and community building underscore the pivotal role of exchange and cooperation among the constituents of the Lean community. Training and further education, encompassing GLCI Academy seminars and certificate programmes, emerged as the third most important value according to respondents' prioritisation. This highlights the perceived significance of ongoing professional development in supporting the diffusion of Lean Construction principles, although this reflects participants' subjective valuation rather than a direct measure of impact. Publications, including specialist literature and guidelines, are recognised as a vital conduit for knowledge transfer, accounting for 12.8% of the survey's findings. The regional practice groups (11.9%) and the neutrality and independence of the institution (11.5%) are also regarded as relevant added values that contribute to the diffusion of Lean principles and the credibility of the institution. Special interest groups (10.5%) play a somewhat lesser role, but they offer a platform for specific thematic specialisations. The least prioritised category was that of awards, which includes project awards and scientific excellence awards. This finding suggests that recognition within the community is perceived as having less importance than other added values. The results demonstrate that the respondents consider direct exchange and knowledge transfer via events, networks and further training to be the central tasks of a Lean Construction institution.

Lastly, the survey responses indicate that while practitioners utilise diverse channels to gather information on Lean Construction, the GLCI remains a primary source for many. Additional sources from which respondents drew information include the internet, LinkedIn, professional literature, and online communities. In addition, networking, internal company exchanges, and international platforms such as LCI and IGLC are identified as valuable sources for information on this topic. Personal interactions, industry events, and newsletters further contribute to staying informed. The survey results therefore demonstrate that the GLCI plays a central role in providing essential knowledge on Lean Construction.

DISCUSSION AND CONCLUSION

Prior to the GLCI, Lean Construction was largely unknown in Germany. Over the past decade, the GLCI has experienced significant growth and professionalisation, establishing itself as a key player in driving the diffusion of Lean principles within the construction industry and thereby supporting its transformation. This paper underscores thereby the crucial role an institution could (and should) play in the diffusion of Lean Construction.

Over the past ten years, the GLCI has established a strong presence among professionals engaged with Lean Construction in Germany and is perceived by survey respondents as playing a significant role in promoting its diffusion and supporting its practical application. Through its diverse offerings – including knowledge-sharing events, training programs, and networking opportunities such as the GLCI Congress – the institute contributes to raising awareness of the Lean approach and providing opportunities for learning and exchange. While the positive survey feedback suggests that GLCI's strategic focus resonates with industry needs, the results reflect the perspectives of individuals already familiar with or engaged in the Lean discourse. Therefore, the findings should be interpreted as indications of perceived relevance and potential impact, rather than conclusive evidence of actual effects on Lean adoption across the broader industry. Nevertheless, by continuously adapting to the evolving needs of its community, the GLCI is well-positioned to further strengthen its role in supporting the diffusion and practical implementation of Lean Construction in Germany.

However, a few limitations must be taken into account in this study. On the one hand, the sample primarily comprises people who have already had contact with the GLCI, which limits the informative value with regard to general awareness of the GLCI in the industry. As previously outlined, the findings cannot be generalised due to the sampling method employed, and thus, are primarily of an exploratory and indicative nature. On the other hand, external factors, such as economic fluctuations and their influence on the diffusion of Lean Construction were not taken into account in this study as the focus was particularly on the impact of the GLCI.

Despite these limitations, the study provides valuable insights and shows potential for further research. Conducting the survey on a regular basis could help to monitor the development of the GLCI in the long term and measure its impact on the construction industry even more precisely. Future studies could also integrate additional questions in order to obtain a more comprehensive picture of the impact of the GLCI on the implementation of Lean Construction. A link with studies on the status quo of the application of Lean Construction in Germany could provide further valuable insights and contribute to an even more differentiated assessment of the impact of the GLCI. In addition to quantitative data, the GLCI aims to collect more qualitative information in future. This will be achieved, for example, through a planned research project on the effective self-assessment of companies with regard to Lean Construction. Based on the principle that one can only improve what one can measure, companies should have the opportunity to make a valid self-assessment in order to further develop their Lean Construction practices in a more effective way.

We hope that this study can help Lean Construction Institutes in other countries to advance the practical implementation of Lean Construction and thereby contribute to transforming the industry towards more efficient and collaborative project delivery, increased customer satisfaction and greater sustainability in construction.

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