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## Implementation of remote working in the Latin-American construction industry

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### Abstract

The topic of remote working in the construction industry has gained traction in recent academic literature as a consequence of technological innovation and the COVID-19 pandemic. The purpose of this research is to study how the Latin-American construction industry is adapting to the practise of teleworking by exploring the drivers, strategies and challenges behind its implementation.

An inductive approach was taken to conduct and analyse 20 semi-structured interviews from employees and employers from Latin-American companies related to the construction sector. The impressions collected were grouped and discussed by themes, contrasting the findings with the existing literature and arriving to the following conclusions:

- The COVID-19 pandemic has been the primary driver behind the implementation of telework in the Latin-American construction industry.
- Remote working was implemented in the Latin-American construction sector primarily through the use of communication and data transmission tools, as well as employee training and support.
- Latin-American construction companies are not using the equipment and software available to perform remote work to their maximum capacity.
- Few companies in the Latin-American construction sector are applying change management principles to implement teleworking conditions.
- The main challenges for implementing remote working in the Latin-American construction industry are social and mental obstacles, as well as technological limitations.

Future research could use this investigation as support to find potential solutions to overcome the current barriers to telework implementation in Latin-America, as well as how to improve remote cooperation with the help of technology and the implied cost-benefit.

### Keywords

Remote work, Telework, Construction industry, COVID-19, Latin-America

### 1. Introduction

Remote working is a topic that has received much attention lately due to advancements in technology, as well as the onset of the COVID-19 pandemic (Slavković et al., 2021); (Felstead & Reuschke, 2020).

For the sake of this research, remote working is defined as a mode of labour in which the subjects involved are located in geographically distant places, usually out of the office environment (Janene-Nelson & Sutherland, 2020) Although the incorporation of new trends in the construction sector is rather slow, some studies have been done regarding remote work in this field.

In the construction business, the advantages of remote working might be linked to lower overhead expenses related to office activities such as electricity and water costs, waste disposal, etcetera, since these are eliminated when the employees are working from home (Ogunnusi et al., 2022) Some other benefits of remote working are the reduction

of car emissions, flexible schedule and work environment, as well as time saving in commuting (Orzeł & Wolniak, 2022)

Even though owners and employees of project offices recognize the advantages of remote working, there are some major obstacles for the adoption of telework in the construction industry. Executing significant changes in project offices can be challenging due to the busy nature of the business, lack of necessary digital skills among employees, and the preference of clients for physical interaction with the design and construction team (Orzeł & Wolniak, 2022)

The cost of implementation is another barrier for many companies, even though using affordable equipment could make these technologies accessible to more people (Moore & Gheisari, 2019). Aside from this, there are concerns related to remote collaboration using these devices, as they might be susceptible to privacy and security issues when connected to the network (Wang et al., 2021).

An additional challenge faced by remote collaboration is the human psyche, as interaction can become more difficult in a remote setting (Manko, 2021). Change management could be a useful instrument to implement this new working method effectively, but it is necessary to gather more data from the field to identify the specific issues affecting the implementation of telework in the construction industry. It is notable to mention the small amount of information regarding remote collaboration among construction workers in developing countries. The aim of this paper is to explore the way remote working has been recently conducted in the Latin American construction industry in order to understand how it could be used more efficiently.

## **2. Background**

According to (Hai-Jew, 2014), there are seven factors that are driving the implementation of remote work worldwide:

- Enhanced technologies at a lower cost.
- Access to a diverse labour pool.
- Opposition to relocation from employees.
- Less need for permanent office space.
- Requirement for business continuity in case of force majeure.
- Demand of flexibility in work schedule and place from personnel.
- Increase in productivity markers from remote workers.

These factors are similar to those presented by (Soroui, 2021), who reported rental cost, territorial coverage, retention and expansion of employees as main drivers of telework implementation. In addition, the COVID 19 pandemic and its associated social isolation policies hastened the adoption of this kind of labour. According to a survey conducted in May 2020, 35% of USA workforce was labouring from home because of the coronavirus (U.S. Bureau Of Labor Statistics, 2022). In the UK, the percentage of employees saying they only worked from home increased from 5.7% in February 2020 to 43.1% in April 2020 (Felstead & Reuschke, 2020).

### **2.1 Benefits and challenges of remote working**

According to literature, remote work provides an array of benefits from an organizational perspective since the satisfaction reported by employees when allowed to choose their work environment enhances productivity markers for the company (Popovici & Lavinia Popovici, 2020). Corporations also view telework as a cost-cutting technique because employees who don't spend all their time in the office use less utilities, office space, and other resources (Golden, 2009), making it a 'win-win' situation in which employers profit from a more efficient labour force more cost effectively, and workers gain a superior work-life balance (Felstead & Henseke, 2017).

As working remotely became more common, not only the advantages but also the downsides of it have been gradually revealed. (Popovici & Lavinia Popovici, 2020) found in several studies that telework agreements could affect the work-life balance, performance and health of an individual, which can indirectly impact the company. To avoid this, the implementation of telework requires changes in scheduling, behavior, and physical arrangements in the home environment. Nevertheless, these might not be enough, and teleworkers could lose the restorative qualities of their homes due to the practice of doing mental effort related to work in their free time (Hartig et al., 2007).

Finally, the dispersion of office activities, unavoidable result of teleworking, raises new issues related to cybersecurity. To prepare for any infringement, all job-related devices should have strong and modern protection software to secure working infrastructure from any cyber-related threat (Mihailović et al., 2021).

## **2.2 Remote working in the construction industry**

Telework has increased significantly, yet some vocations and industries use it more frequently than others. For example, in computer-related industries teleworking is practically the norm nowadays, while jobs like manufacturing and some service positions have seen very little growth in this area. Given the physical separation of the working team, there is a strong reliance upon technology to interact while working remotely (Golden, 2009) a factor that has not been explored in the construction industry as much as in other sectors.

According to (Jallow et al., 2021), the COVID outbreak affected the management and operation teams more than any other group in the construction industry, since it was harder to lead the team remotely, as well as complete work that required physical interaction with the construction site. The least affected were the design teams since their work usually does not need physical interaction and they could communicate easily through digital mediums. These technologies allow faster and more organized data transfer ((Burton et al., 2021). Nonetheless, risks related to the digitization of the design and construction process, such as the loss of information and data duplication act as barriers to the adoption of digital processes (Orzeł & Wolniak, 2022).

## **2.3 Remote working in Latin America**

Some nations were better equipped than others to keep their economy stable while adhering to social distance. As stated in a study measuring the impact of remote work in thirty countries, developed nations fared better through the pandemic, especially those with favorable conditions for working from home, such as widely available high-quality internet. In contrast, developing countries came in last place in the rankings, due to factors such as families with a high proportion of young children and low internet quality (Bana et al., 2020).

According to (Gottlieb et al., 2021), the low percentage of remote working adoption in developing nations could affect the possibility of their habitants to keep their jobs in case of another global disruption. The vulnerable groups are the less likely to access remote positions, widening the broad economic gap existing in these countries.

## **2.4 Change management and remote working**

Change management is described as “the process of continually renewing an organization’s direction, structure, and capabilities to serve the ever-changing needs of external and internal customers” (Moran & Brightman, 2000). Successful change management requires understanding the situation which is causing the change and the potential impact this could cause. The way a certain group views a particular change situation will depend on the organizational culture, the source of this change, the social, employment and educational background of each individual and how management handle the change (Paton & McCalman, 2008).

Many employees found themselves in a new working environment caused by the pandemic, and they improvised the best they could to adapt to the unknown teleworking conditions. However, the statistics indicated a deterioration of health and working environment due to the accelerated transformation, showing the importance of planning and managing change implementation (Rymaniak et al., 2021).

## **2.5 Conclusion from literature review**

After reviewing several journals and many other sources, some gaps have emerged from the data available regarding remote working in the construction industry:

- Most papers concerning remote collaboration in the construction sector are written by Europe-based scholars, which shows the need for more research from other continents to understand the extent and impact of this topic.
- Since more than half of the examined journals were literature reviews of previous publications, it could be extremely helpful to update academic information regarding remote work in construction with first-hand information from the field.

- It is notable to mention the small amount of information regarding remote collaboration among construction workers in developing countries. The aim of this dissertation is to explore the way remote working has been recently conducted in Latin American construction industry.

Consequently, more research is needed on comparing different remote collaboration approaches, as well as critically reviewing the benefits and detriments of this method of working in order to understand how it could be used in the construction industry more efficiently.

## **2. Research Methodology**

The methodology used in this investigation started off from the chosen methodological framework, which in this case is the Nested Model proposed by (Kagioglou et al., 2000). Since the object of study in this research are the impressions of workers involved in the construction sector, interpretivism is the philosophy selected, as it fits well with the intent of the investigation.

Interpretivism requires the researcher to understand the meaning of certain experiences for the subject, how they are perceived by others and why such perceptions are made (Clark et al., 2021). Here lies the key difference between interpretivism and positivism: the ability of the subject of study to understand and describe their own experiences (McLaughlin, 2011).

The research has been approached in an inductive manner, working exclusively from the participant experiences, analysing raw data to identify repetitive themes related to the research questions (Azungah, 2018). The conclusions are drawn directly from the examination of the collected data and not from assumptions made beforehand (Thomas, 2006).

Since this research focuses on capturing the opinions and experiences of a group of individuals regarding remote working in the Latin American construction industry (Wisker, 2008), qualitative research methods will be fundamental for exploration of the topic and development of conclusions, as the variables are unknown (Creswell and Creswell, 2018). When dealing with changing work contexts and the complexity of significant organisational transformation, qualitative research offers an effective range of methods to discover and understand the impact behind an issue (Creswell and Creswell, 2018; Wisker, 2008). Subsequently, a qualitative data collection method is used to collect impressions from the participants of this study, sampling 20 professionals from the Latin American construction industry.

The semi-structured interviews were based on 10 questions to understand:

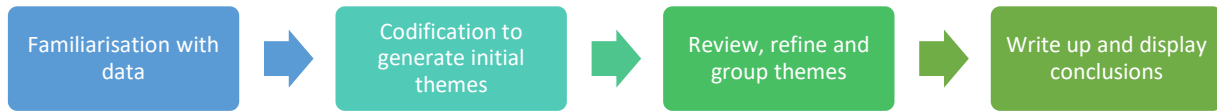
- what has driven the implementation of remote working in the construction industry
- which strategies have been used in the Latin-American construction industry to adapt to remote working
- how are these companies applying these strategies, and
- what are the challenges faced by this new mode of working in the Latin-American construction industry

Interviewees were questioned about their experience through the implementation of remote working in their respective companies in order to gather first-hand accounts on how the Latin American construction companies have managed the change from physically working in an office to allowing their employees to telework from various sites. With the help of Nvivo as the main data analysis software, the data collected from the interviews was categorized by codes, grouping them under common themes related to the research objectives

## **3. Data analysis method**

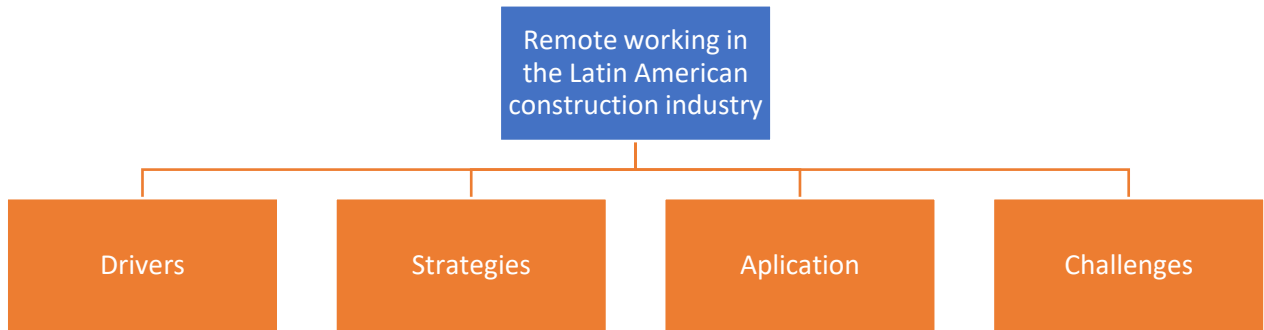
Data analysis entails the critical examination of the data collected to identify patterns, in order to find satisfactory answers for the research questions (Dudovski, 2022). According to (Lacey & Luff, 2009) there are several approaches available to analyse qualitative data, such as grounded theory and framework analysis.

The framework analysis has been selected as the systematic approach for this thematic analysis, as it involves clear linear stages for the thematic analysis of information.



**Fig. 1.** Framework analysis stages.

With the help of Nvivo as the main data analysis software, the data collected from the interviews was categorized by codes, grouping them under common themes related to the research objectives, as displayed in the figure below:



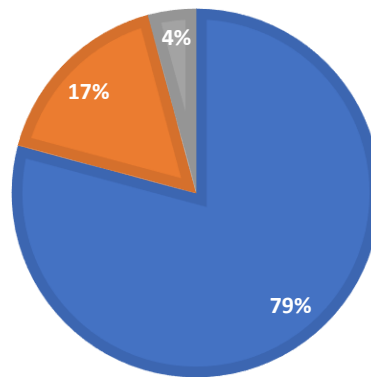
**Fig. 2.** Themes according to research objectives.

## 4. Results and discussion

### 4.1 Drivers behind the implementation of remote working

Question 1: What was the cause behind the implementation of remote working in your company?

■ COVID-19   ■ Geographical distance   ■ New bussiness model



**Fig. 3.** Drivers behind the implementation of remote working.

As shown in the figure above, an overwhelming majority of the companies analysed started to work remotely because of the COVID-19 pandemic.

Question 2: What advantages can you identify in this mode of working?

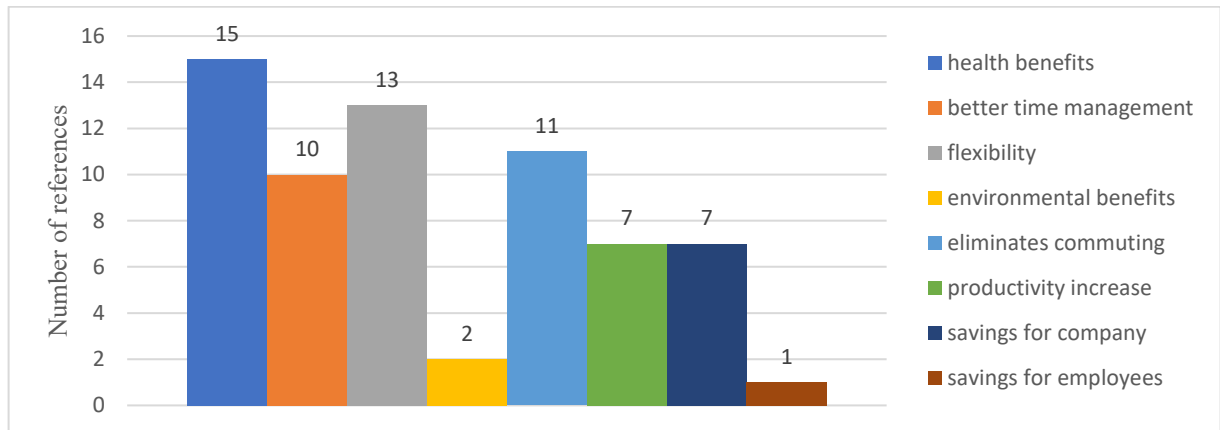


Fig. 4. Advantages of teleworking according to interviewees

By implementing this mode of working, employers can benefit from cost effective personnel, whereas employees get a better life balance (Felstead & Henseke, 2017). This aspect was highly valued by the interviewees, agreeing with employees from many other industries and locations that have been pushing in favour of more flexible work arrangements as a result of their positive experience with remote work during the pandemic.

#### 4.2 Strategies for the implementation of teleworking in the Latin American construction industry

Question 3: What tools, software, etc. have been used in your company to implement remote working?

■ Anydesk ■ Autodesk BIM 360 ■ Google suite ■ Skype ■ Teams ■ Trello ■ Whatsapp ■ Zoom ■ Others

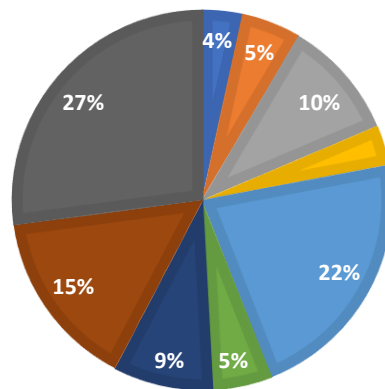


Fig. 5. Software used in the companies examined for the implementation of remote working.

Microsoft Teams was the most popular tool among the investigated firms for communication. The affordability of this software compared to similar options, and its seamless integration with other widely used tools could be some of the reasons why this resource led this area of the investigation. Other software mentioned by the participants, aside from the ones showed in the figure 14 were Plannerly, Bluebeam, Asana and Dropbox.

It is remarkable the minimal implementation of software properly oriented to collaboration in the construction sector, such as the platform of Autodesk BIM 360. This would have been a valuable resource for the implementation of remote work in the aforementioned companies, as BIM can aid in alleviating some of the significant challenges of

managing and developing effective stakeholder collaboration during remote construction projects (Arayici et al., 2012).

Question 4: Which techniques have been used in your company to adapt to remote working?

■ Education   ■ Mental health support   ■ Coordination meetings   ■ Socialization meetings

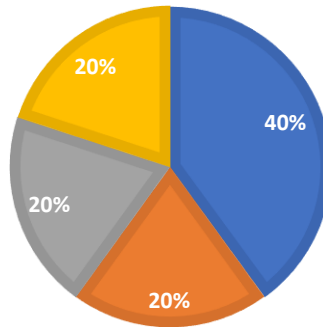


Fig. 6. Techniques used in the companies examined for the implementation of remote working.

The companies examined focused on educating their employees about the implications and best practices of remote working, as well as giving them mental health support to facilitate the adaptation process.

#### 4.3 How are Latin American companies leading the change to remote working?

Question 5: What new rules were applied in your organization for the implementation of remote working?

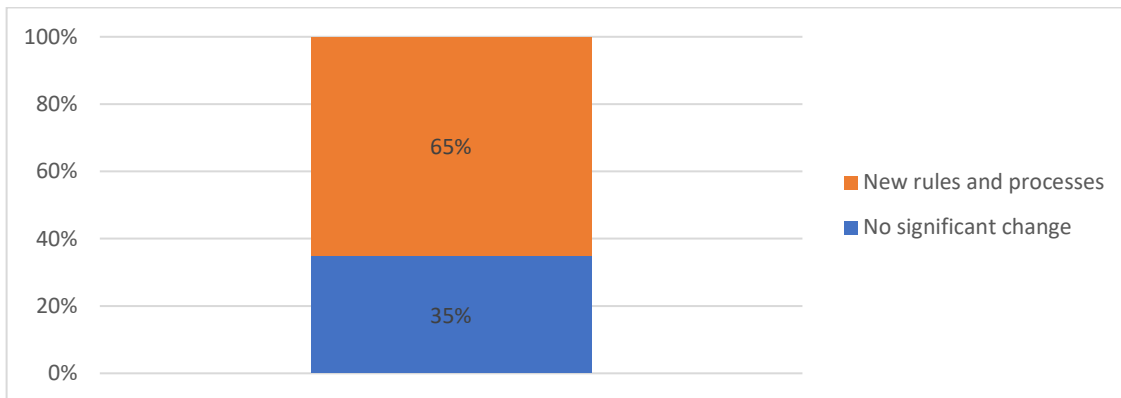


Fig. 7. Change in organization rules or processes.

Even though, 35% of participants commented that the processes in their companies basically remained the same, with the difference that they were using new communication tools, most of them noted that new rules were implemented, for example, the virtualization of some procedures in the business. An important point touched by several participants was the need for their companies to implement new rules regarding time boundaries, with the purpose of enforcing respect for the non-labouring hours among co-workers as well as between management and subordinates.



Question 6. Did your company follow any change management process to implement remote working? Please elaborate in this process.

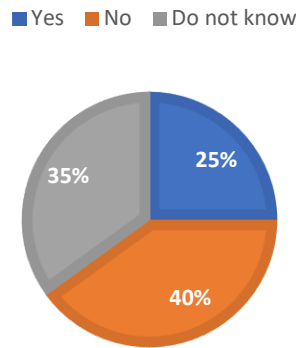


Fig. 8. Use of change management for implementation of remote working.

Regarding the exercise of any change management process to facilitate the shift from traditional work methods to telework, only 25% of participants could identify a structured process applied in their enterprise, while an astounding 35% ignore if there was any individual or department in charge of directing the operation.

The key to effective change management, according to (Paton & McCalman, 2008), is first identifying appropriate problem owners, and then selecting a management methodology to provide a means of transition. Most companies did not assign a responsible to manage the change process, but as pointed out by (I-02) and (I-09): “everything was done on the fly”.

The start of remote work in many of these companies coincided with the onset of the COVID-19 pandemic, which affected the way they implemented changes to incorporate the teleworking method. The few successful instances support the claim made by (Stride et al., 2021) that construction organisations could benefit from adopting a systematised approach for the introduction of remote working.

#### 4.4 Challenges of remote working in the Latin American construction industry.

Question 7: What disadvantages can you identify in this mode of working?

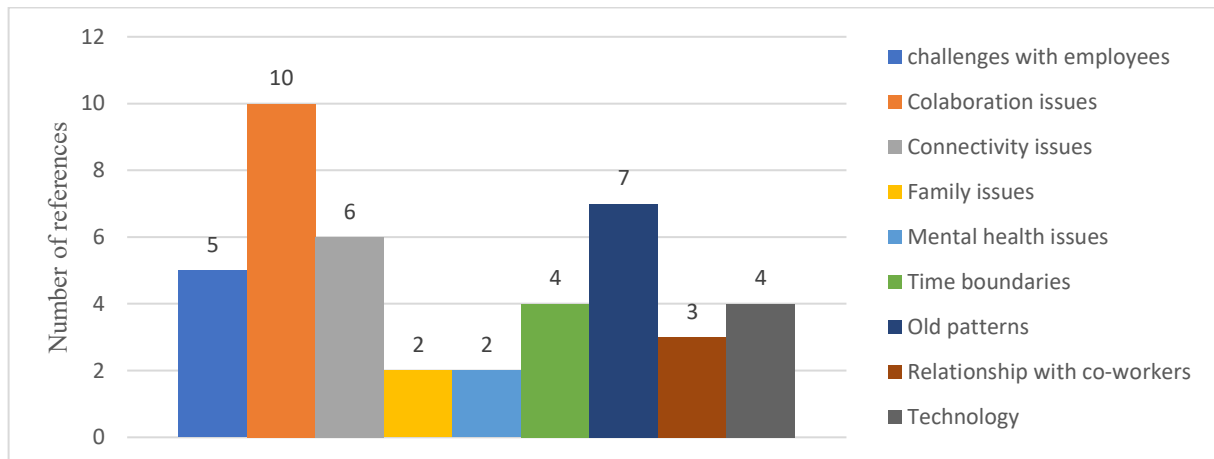


Fig. 9. Disadvantages of teleworking according to interviewees.

Even though most interviewees commented that they had no problems adjusting to remote working, they could still recognize many disadvantages regarding teleworking, ranging from mental and social challenges to technological barriers.

Connectivity issues was among the prevalent challenges cited for the implementation of remote working in the region, confirming the results of (Bana et al., 2020). Almost all participants reported having problems while teleworking due to the poor signal quality in the area or the total loss of the service lines.

Some participants mentioned that the relationship with their co-workers cooled down, which might aggravate the collaboration while working remotely. Other disadvantages mentioned by the participants were the tension that remote work creates when the labour is done in the common family environment, as well as the stress caused by teleworking time when it overlaps with the employee's free time and personal space. These comments were consistent with the literature, as several studies found that telework agreements could affect the work-life balance of an individual, which can impact the performance indicators for the company (Popovici & Lavinia Popovici, 2020). For these reasons, (Wöhrmann & Ebner, 2021) advocated for the implementation of guidelines to regulate remote working in order to protect the mental health of teleworkers.

Question 8: Have you experienced any issues because of switching from working in an office to working remotely?

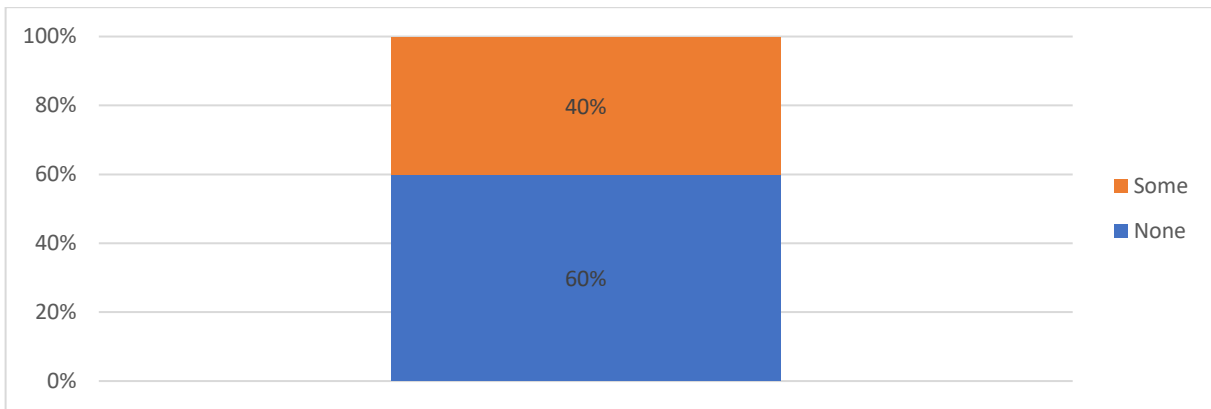


Fig. 10. Personal issues when shifting to teleworking.

The majority of the participants in this study stated that they had no trouble adjusting to teleworking. Managers were more affected than staff in intermediate positions through the implementation of remote working due to the COVID-19 pandemic, as it was more challenging to lead their teams remotely (Jallow et al., 2021); (Park & Cho, 2022), but “some difficulties with management can be improved with practice”, as commented by (I-20).

Question 9: Has remote working continued in your enterprise? Please detail why it has/has not continued.

■ Yes, 100% remote   ■ Yes, hybrid   ■ No

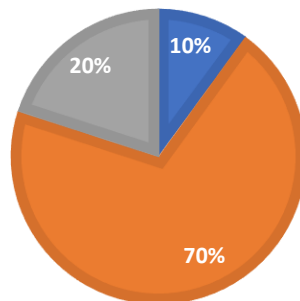


Fig. 11. Continuity of teleworking conditions.

Even though some companies only maintained the teleworking conditions while the authorities demanded it, most of them continued with a hybrid modality that allowed their employees to choose their work environment and

schedule, as long as they meet the assigned goals. This has allowed the aforementioned employees to continue with their work in situations of force majeure, as well as giving them the flexibility to attend personal appointments without affecting the development of their work.

In a recently conducted study, 81% of respondents agreed that the hybrid model is the best way to work (WeWork et al., 2022). Nevertheless, the old paradigms of executives and clients in the Latin American construction sector interfere with the implementation of new ideas that can take the construction sector to the level of modernity that other industries hold.

Nevertheless, we still do not have the technology to perform many of the functions in the construction workflow remotely. As remarked by 20% of the participants, the physical presence of the worker is required in many of the processes. This is one of the reasons why telework is more prevalent in 'white collar' occupations (Lyons et al., 2006)

## **5. Conclusions and recommendations**

This investigation has provided a deeper insight into the topic of remote working, focused in the Latin American construction sector. Little research has been conducted in this area, which makes this study extremely valuable for commercial, academic and governmental organisations in order to fully understand this phenomenon. The results of this study are summarized below:

- The principal cause for the implementation of telework in the construction industry has been the COVID-19 pandemic.
- Teleworking has been implemented in the Latin American construction sector mainly by using communication and data transmission tools, as well as training and giving support to employees.
- Latin American construction companies are not fully exploring the equipment and software available to carry out remote work in this industry.
- Very few companies in the Latin American construction industry are applying change management principles to facilitate teleworking conditions in their business.
- Social and mental constraints, as well as technological obstacles are the main challenges for the implementation of remote working in the Latin American construction industry.

It is remarkable that the interviewees did not mention any of the privacy and security concerns associated with remote collaboration found in the literature. Future research could explore this factor, and potential solutions to this issue. Executives from AEC companies should contemplate the adoption of new working practices to protect their business from unexpected threats, and to keep up with developments in this area.

The limitations of this research in regards of sampling could hinder the generalization of the results. Nevertheless, this study is still significant, as it can guide further investigation regarding the implementation of telework in Latin America. Finally, it is recommended to evaluate in future research how to enhance remote cooperation with the help of technology, as well as the implied cost-benefit.

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