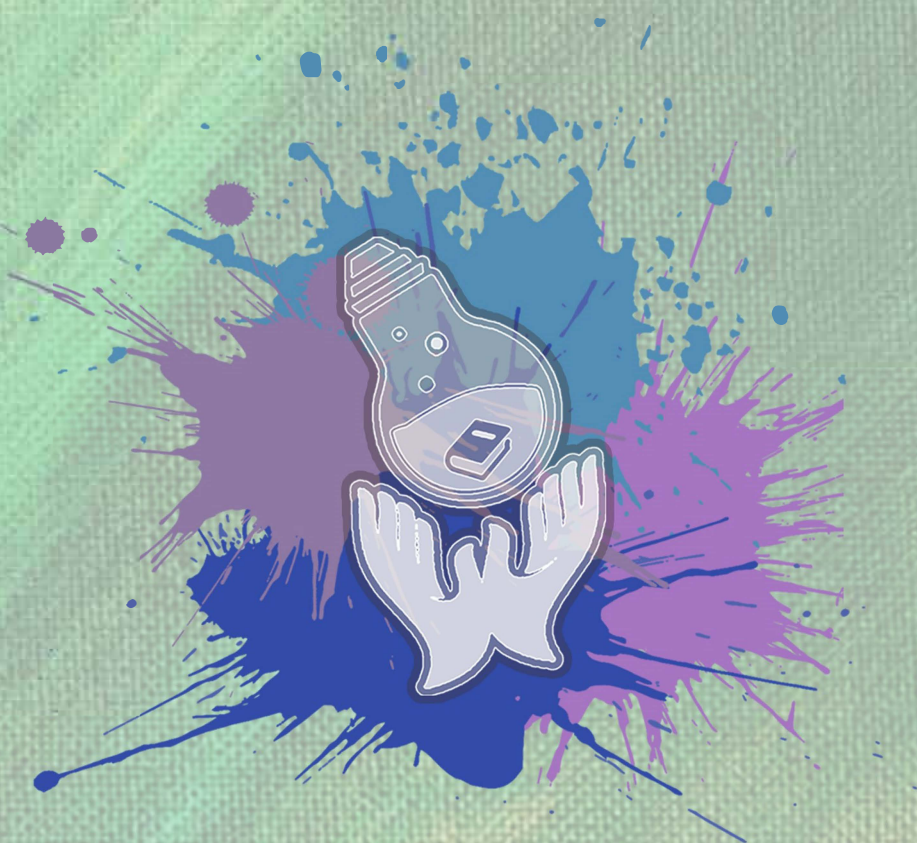




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DIGITILISING THE INTEGRATION OF CONSTRUCTION SITE INFORMATION AS A MEAN TO REDUCE DELAY RISKS

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Abstract:

Construction delays affect not only contractors, but also caused lost and waste to clients. The aim of this paper is to identify the problems related to delays and general idea of ways to reduce the risks. This research based on the design thinking approach and involved two phases of studies, whereby data will be collected from different stakeholders involve in the construction stage. It is identified that if the daily progress of task can be traced and rescheduling can be done on that time, delay may be avoided. However, traditional method of writing site daily in a physical log book is a tedious task that sometimes ignored at the construction sites. Now with applying the advance of technology like smart and mobile applications, the daily site diary task can be done easily with flexibility of time and place. Thus, recording site diary will be more efficient, in the same time reducing the risk of delay in construction process.

Keywords:

Delay; Mobile Application; Information on Site

1.0 INTRODUCTION

Construction delays have negative impacts on project stakeholders in terms of monetary problems, litigation, mistrust and increment of argumentative relationships. Delay occurs at a different stage of a project life cycle and pre-cast construction projects are not exceptional. According to Gebrehiwet and Luo 2017 delays for pre-cast projects may occur during the delivery stage, manufacturing and installation at site in the Malaysian construction industry. Failure in management and problems with interim payment contribute the highest risk of delay in a construction process. Efficiency in the supervision of overall site activities daily and recorded in site diary is really important to ensure that work run as scheduled as per stated in master planned and noted if any task is postponed or having difficulty, so reschedule can be done immediately and reducing the risk of delay. However, this task has been ignored due to the lack of awareness of the importance of it and have no time to do this papering task. These issues have derived this research to build a mobile application which can help improve and easing the recording task in the efficient ways and comes with features for application of interim payment. This innovation project will only focus on the execution phase of a project life cycle due to this area of time is the crucial phase in a construction project.

2.0 LITERATURE REVIEW

Gebrehiwet and Luo 2017 conducted a questionnaire survey on 14 contracting organizations to identify the significant causes and effects of delay. The study found that in the construction stage, the top ten substantial causes of delay identified are corruption, unavailability of utilities at site, lack of quality materials, inflation or price increases in materials, slow delivery of materials, late release budget/funds, poor site management and performance, late design and design documents, low efficiency and productivity of equipment's, and insufficient or shortage of equipment. This scenario shows that the factors vary but, most are related to poor management and controlling system and lack of transparency on what is happening on site. Technology facilitated aids such as construction related mobile applications, therefore, may be an appropriate means to enhance construction management tasks in ensuring the completion of a project as planned. Productivity and efficiency improvement are one of

the main goals of the construction industry although it is still a challenge in the construction industry due to the large human factor input and the use of hand tools in construction. The industry is constantly looking for means and methods to improve the efficiency and productivity at the jobsites. The integration of smart or android mobile tools and technologies such as the use of phones, tablets among others into construction operations management can help enhance the jobsite efficiency, quality, and productivity. Mobile technologies are expected to initiate the next wave of technological development, which will transform the construction industry to the next level of technological. In the United States and other developed or developing countries, the adoption of this technological change is driven by companies who look to their younger, newer employees to drive the adoption of technological change such as this because they are assumed to be familiar with the latest technological innovations available in the construction industry. (Yankah Jonas Ekow, 2016)

3.0 METHODOLOGY

This innovation research adopts ‘design thinking’ approach into creating solution to problems (Dorst, 2011). In this approach, an iterative process to understand issues, redefine problems and create innovative solution is carried out in two phases, i.e. inspiration and ideation. Each of these phases provides different set of data to be collected based on the model developed by Brown (2008) shown in Figure 1. This research does not include the implementation phase of Brown (2008) model as it requires different resources and strengths. In addition, this research is carried out for BCT604 and BCT654 that require only until the stage of producing a prototype given the capacity of the programmer. Therefore, this paper exhibits only the inspiration stage whereby the problems or issues needed solutions are identified. Meanwhile, the following stage of this research, i.e. ideation that involves the process of generating, developing and testing ideas will be carried out later. Data including input from different stakeholders on construction delay and information needed on site will be collected, analyzed and compared with the current mobile apps available in the world. A SWOT analysis will be carried for the current mobile apps. All types information vital to reduce risks of delays will be identified and integrated to create a new design of the mobile application to monitor site performance. A question as outlined in the Brown (2008) model of how this new technology can (mobile app) helps will be answered. (Tim Brown, 2008)

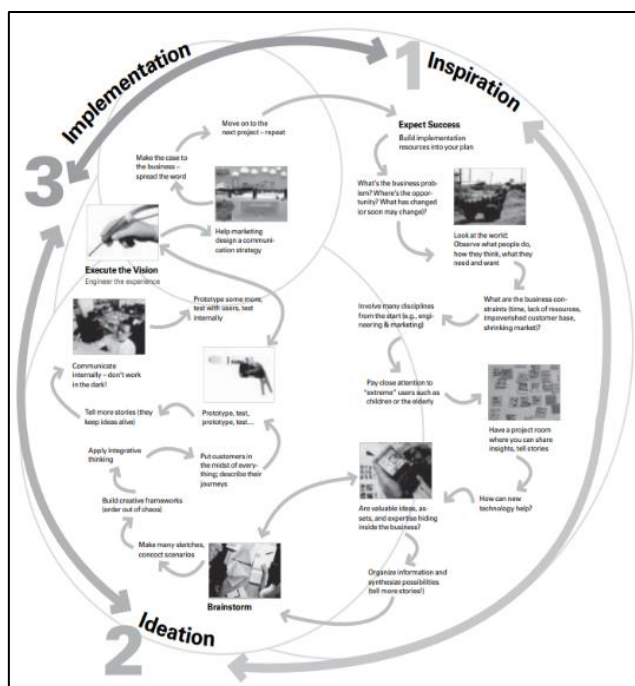


Figure 1: The process of design approach adopted for this study (Brown, 2008)

4.0 DISCUSSIONS

Daily site diary is one of the most important administrative tools. It acts as a solid record of the project's progression and can be used as supporting documentation for many different aspects of a construction such as:

1. Inclement weather: Being able to claim an extension of time with supporting diary entry reports of weather conditions and photo evidence.
2. Design delays: Works being held up due to design delays can be recorded and issued with the extension of time claims.
3. Negative Variations: Ensuring that any damage caused by a contractor is accounted for and back charged accordingly.
4. Progress Claims: Keeping a record of works performed and labour on site for each contractor that can assist with payment claim approvals.
5. Recording Safety: Logging all accidents/incidents on site into the diary and ensure that the safety management process has been followed.
6. Delivery of goods: Tracking what has been delivered from all purchase orders sent out for a project.
7. Workers on site: Keep a record of the number of people on the site so managers can organise adequate amenities that are required by law, e.g. bathrooms, lunch sheds, etc

Developed countries like European already practicing smart mobile apps software for the daily site activities record and live progress update. It proven makes construction management to be more efficient. By implementing this type of technology in construction, the delay can be reduced by the distribution and monitoring functionality in digitalized project management system. It allows managers to see projects through to completion and even review work when it is finished, while real-time job-status tracking and data collection help reduce delays. Using mobile applications, construction managers can improve the efficiency and transparency of the entire construction project, from authorization and accountability to scheduling and monitoring. Construction projects consist of multiple authorization controls in order to progress. With communication features in these applications related stakeholder can access the apps freely and have live communication in every task and problems to be discussed and solved. (Arditi, Nayak, & Damci, 2017)

5.0 CONCLUSIONS

Construction is an important sector that contributes greatly to the economic growth of a nation. The Construction Industry is an investment-led sector where the government shows high interest. The government contracts with Construction Industry to develop infrastructure related to health, transport as well as education sector. For the prosperity of any nation, Construction Industry is quintessential. This is why the construction industry should always develop to achieve the high quality and performance to contribute more benefits and reducing problems to the nation. By the implementation of the latest technology, this goal will achieve and Malaysian construction industry can stand high and empowered with the others.

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