

# USE OF MOBILE APPLICATIONS FOR THE CONSTRUCTION INDUSTRY

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**Abstract** - The construction trade has been criticized as associate degree "old-school" trade, as a result of of being a slow adoptive parent of mobile technologies. This has modified recently. A survey of one,048 participants found that seventy two of construction practitioners have smartphones, and use smartphone applications for work functions. whereas there area unit thousands of smartphone applications publicised as "construction apps", the most in style smartphone applications offered by software system suppliers to the construction trade area unit for field information assortment, project management, bidding, building info modeling (BIM), accounting, client relationship management, and estimating. This paper discusses the current state of smartphone applications offered to the industry, and examines the apps' functions. Due to the speedy growth in the smartphone applications market, new applications become offered each day for use in totally different industries. Given the massive range of selections, each corporations and people in the development trade should look out once choosing and buying smartphone applications. The business desires of the potential users and the expectations from the applications should be well known, and the choice should be created consequently. Properly choosing and deploying smartphone applications for construction-related tasks is expected to improve communication, enhance advancement with real time info, and increase productivity. **Keywords:** Mobile apps, Smartphone apps, Construction tasks, automation, Construction productivity.

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## 1. INTRODUCTION

Smartphones and mobile applications that run on them have modified the world and have become a half of everyday life. The total range of mobile applications accessible in leading mobile application stores (e.g., Google Play, Apple App Store, Amazon Appstore, Windows Phone Store, and BlackBerry World) is virtually four million. The applications cowl several fields and will execute a selection of tasks, however they have one main purpose, and that is to deliver a service (Krouse 2012). According to Engineering News Record (ENR) (2011), mobile devices area unit additionally dynamical construction management. Construction professionals use tablets and smartphones to increase job-site potency. each tablets and smartphones mix mobile accessibility with mobile construction management applications, with the extra advantage for smartphones that they will work in a pocket and offer the same advantages. The main advantage gained from the use of such mobile devices is that they alter construction professionals to work interactively and dynamically; information collected from the web site is shared in real time among the project participants with visual attachments, and web site reports area unit generated with a lot of correct and up-to-date info. It is apparent that construction firms want to go mobile in order to keep competitive in the business. However, it is essential to establish a mobile device strategy before choosing a mobile device and applications. Since carrying multiple devices is not ideal for construction professionals, the selected applications should be compatible for the device used for work functions. totally different|completely different} mobile devices with different operational systems limit the alternative of applications. In choosing a mobile device, the benefits and disadvantages of its operational systems should be taken into thought. For example, Apple's iOS is simple to use and learned quickly by many of us, whereas no device that uses iOS has Associate in Nursing actual keyboard. Most individuals area unit already acquainted with Windows' operational system, however application support between its totally different versions is lacking. mechanical man has the biggest market share, operates on several devices accessible in totally different sizes, and with native keyboards. However, Android's info security is a concern. It follows that 1st, firms ought to rank their business desires and expectations from mobile technologies, and then choose a mobile device and applications to implement. A made implementation needs a mix of smart applications and comfortable coaching, regardless of the chosen device (Bulley 2013). subgenus Chen and Kamara (2011) developed a framework to examine however mobile computing technologies will be used in construction sites to exchange on-site info. 3 key problems regarding mobile devices, mobile applications, and wireless networks were declared within the study. First, mobile devices used on {site|website|web web site} ought to be equipped with the

hardware that permits users to method site info effectively and expeditiously. This hardware includes however is not restricted to keyboard, bit screen, voice recorder, and camera. Second, mobile applications used for onsite info exchange ought to have specific functions for totally different|completely different} users that have different roles in construction comes. For example, a project manager desires to review drawings, monitor progress, update schedule, and distribute records, whereas a web site engineer has to review drawings and run necessary calculations. Third, the wireless network that the mobile device uses ought to offer coverage for massive geographic areas particularly if users work on many construction comes at the same time. Currently, construction info exchange is done through ancient info and communication strategies that area unit hand-operated and paper-based. However, having construction info digitalized by victimisation a mobile computing technology that runs automatic info management activities is ideal and a lot of desired. There area unit 3 methods that will be enforced to improve on-site info management from the current state to the desired level; utilization of a commercially accessible mobile application that will be synchronous with the main info system, utilization of a commercially accessible mobile application that will transfer information to the main info system wirelessly, and design/development of a particular mobile application that exchanges information with the main info system wirelessly.

## 2. MOBILE APPLICATION

Within the housing industry Lu et al. (2014) investigated the current state of info and communication technologies (ICT) in the design, engineering, and construction (AEC) trade through a review of a hundred forty five papers that were printed in designated journals between 1998 and 2012. Application development was the second most common analysis methodology within the reviewed papers once empirical analysis. Even although the use of mobile applications is gaining quality in the construction trade, its adoption is a important method that should be conducted properly. The study showed that there are 5 components that have an effect on adoption: the user, the organization, the technology, the project, and the surroundings. A triple-crown implementation of new technologies needs coaching and participation of users. high management executives' involvement in new technologies facilitates the adoption method. The technology adopted by organizations should be simple to use, compatible, reliable, and offer info security. Project sort, cost, duration, specifications, and location should additionally be thought of in choosing and adopting technologies. The surroundings affects the use of mobile technologies indirectly. as an example, government rules, competitive forces, market demand, seller ways, skilled norms, current standing of technologies, and socio-economic condition will have an effect on structure behavior in choosing and adopting new mobile technologies. Studies of mobile applications in the construction trade will be classified into 3 categories; general construction management, defect/damage management, and instrumentation management. This section reviews the studies conducted beneath these 3 classes. In recent years, construction firms have become aware of the potential in mistreatment mobile applications. Some firms ar developing their own mobile applications. The reason behind this shift is that a massive quantity of info is made throughout construction, however this info is not managed expeditiously. Chen (2013) claimed that 2 thirds of the issues encountered in construction comes is expounded to info and communication issues, and projected a mobile application image that aims to solve these issues in construction management. 5 main functions were provided among the application: contract administration, progress management, instrumentation management, value management, and quality management. With the given capabilities, it was advised that mistreatment mobile applications in construction management will minimize time-space constraints, scale back time spent in selections creating, offer period info, and strengthen competitive advantage. Construction professionals with totally different|completely different} roles need different varieties of data to manage the construction activities that they ar accountable for. Nourbakhsh et al. (2012) investigated the info necessities for mobile application use in construction management. The importance of completely different classes of data was evaluated from the angle of consultants, contractors, and owners. It was found that homeowners would like info concerning delay records, website directions, schedule updates, productivity performance, modification orders, variation orders, daily reports, and QC/QA issues, whereas contractors would like to access schedule updates, violation reports, QC/QA issues, accident reports, productivity info, review results, progress photos, and modification orders. On the different hand, consultants would like style intent and clarification info. In response to these numerous wants, Nourbakhsh et al. (2012) developed a mobile application known as Construction Mobile Application (CMA) that was evaluated by a variety of construction practitioners, and was found to be economical, easy, and simple to use. Kim et al. (2013) bestowed a mobile application for on-the-scene management that enables construction managers and website engineers to monitor construction sites, manage activities, and exchange period info. The application was tested in a hospital building project to validate its utility. The take a look at showed that the applying has nice potential to improve the overall performance of on-the-scene management by rising the amount of information sharing and communication, reducing travel time, minimizing process, and rising quality. Most of the info and communication connected activities in the housing industry ar time overwhelming once conducted manually.

Chen et al. (2013) declared that it takes time to get Associate in Nursing organized and complete report of visual review of broken structures as a result of engineers capture photos and gather info on website separately, and as a result of the detection and quantification of the injury is measured through cumbersome manual approaches. Chen et al. (2013) developed a mobile application known as cooperative Mobile-Cloud Computing (CMCC) to boost the current follow in team-based visual review of civil structures. In a field based mostly experiment, it was found that CMCC will be used for post-disaster Associate in Nursing routine review of civil structures in an surroundings that needs collaboration, imaging, and real time info. In a parallel effort, Walker et al. (2013) developed a mobile application known as Mobile info assortment Application (MICA) whose purpose was to produce information assortment and organization support in infrastructure assessment, and to eliminate unorganized and paper-based documentation. The application was used by sixty review groups that investigated the Mississippi watercourse flood in 2011. It was found that the groups that used the application operated the review additional expeditiously and effectively than different groups. the applying allowed the user to capture visual information and location info and share it with the command center in virtually real time. The study showed that the use of translucent substance saves travel hours, will increase productivity and accuracy of info, and improves safety. A smartphone provides a constant feed of info among individuals that act with every different on a daily basis. mistreatment a smartphone for work functions is a call that several contractors ar considering these days. The potential edges of mistreatment smartphones on website outweigh the prices of user coaching, purchase of mobile devices and applications. One of the potential edges is that a construction manager will monitor job-site productivity, and take necessary actions to maximize potency. integral cameras enable project participants to exchange website information with photos and videos that, in some cases, ar a lot of additional elaborated and informing than a speech. Real time job website information with visual attachments will even increase a contractor's quality with the owner. With a selection of choices, construction firms and professionals will notice commercially out there applications that will assist with regular operations, increase productivity, quality, and value potency (Yunorich 2011). As stated, development of a specific mobile application is not the solely methodology that may be used to improve productivity and potency in the construction trade.

Table 1. Commercially available mobile applications

<b>Specific Use</b>	<b>Application Name</b>	<b>Platform</b>	<b>Cost</b>
Bid Management	SmartBidNet	iOS	Subscription Required
BIM	Autodesk BIM360 Field	iOS	Subscription Required
Management	Powerplay	iOS/Android	Free
CAD, Design & Drawings	CAD Touch	iOS	Free
	Finger CAD	iOS	\$5.99
	REVITKeys	iOS	\$0.99
	iRhino 3D	iOS	\$3.99
	AutoCAD 360	iOS/Andorid	Free
	DAKO PRO Civil Eng.	Android	\$9.99
	Rilievo	Android	\$4.08
	AndCAD	Android	\$34.99
Calculator	Construction Master Pro	iOS/Android	\$24.99
Contract Management	Contract Maker Pro	iOS	\$4.99
	Contract Maker Elite	iOS	\$19.99
Document Viewing	Drawvis iBlueprint	iOSiOS	Free
			\$0.99
Estimating	Quick Service Estimates	iOS	Free
	Contractors Estimating	iOS	Free
	Construction Cost Estimator	iOS	\$19.99

	Ultimate Estimator	Android	\$4.99
	A Estimate All Pro	Android	\$3.99
LEED	Leed BDC Flashcards	iOS	\$19.99
Project Management	Procore	iOS	Subscription Required
	OnSite Punchlist	iOS	Free
	Construction Manager	iOS	Free
	ArchiReport	iOS	Free
	Safety	iOS	Free
	Safety MeetingWrike	iOS/Android Android	FreeFree
Scheduling	Project Plan 365	Android	Free
	Project Planning Pro	iOS/Android	Free

### 3.Applicatins of one of app in field: powerplay app



**FLOW CHART 1**

### 3.1 Feature of powerplay app in field

#### Feature 1: Create Site

We can add site name and our organisation name, we can add multiple sites at a time.

#### Feature 2: Add members

We can all the members who are working on this site all will be connected through WhatsApp and on app. There they we get all notifications.

#### Feature 3: Upload of the task

We can upload our daily task here and also add the how much the work has completed and in which category its falls for example related to civil, electrical or other general work

#### Feature 4: Details of the work

Here we will get all details of the work, its category, work start date, expected end date, who is assign to this particular work what is assume price of the work.

#### Feature 5: Attachments

We can upload here plans of the site or photos of the which all the members will able to see and can also able to share it.

#### Feature 6: Timeline

Here we can all the progress of the work, how many workers are involved in the task, when we have created this task.

#### Feature 7: Issues

Here we can see or update the issues related to on going work, which will help to monitor the work properly.

#### Feature 8: Chats

Here all the members which are added in that particular task can communicate and take the fallout of the on- going work.

#### Feature 9: Materials Record

Here we can add all the list of materials which in stocks and how which quantity we have which will help in proper planning of materials.

#### Feature 10: Materials Request

From here we can request the item or materials which will be required for the work, we can mention delivery date and we can track the item.

#### Feature 11: Labour Attendance, Working Hours and wages to be paid

Here we can note the details of worker his wages to be paid, his attendance, no. of working hours. We can also mention workers total details and any remark we have regarding to specific worker.

#### Feature 12: Over All Report of The Day

Here we will get report of the day, we can generate report for that specific day or the over all month report, week report that site which will can be share to higher authorities to take the fallout of that site

### 4. Main Benefits of This App

- It provides day to day report of the project as we saw above.

- Its is easy to use than Ms excels and Ms project.
- Its free App no extra charges.
- It provides workers working hours, workers present or absent remark and daily wages.
- We can chat with all the members of the project whenever we want.
- We can see what in the inventory and we can request the material we want.
- As we stated earlier it can solve most off our concern about labour Issues, Material handling and Scheduling problem.
- Its available in all regional language.
- User friendly app can learn very easily

## 5. CONCLUSIONS

The construction trade has realised the potential in victimization mobile devices and applications for work functions. many studies conducted recently valid that victimization smartphone applications for construction-related tasks will improve the amount of communication, enhance work flow with real time info and increase productivity. There are 2 strategies that are most ordinarily utilized in adopting mobile technologies in terms of mobile applications; development of a selected application for known wants, and utilization of a commercially out there application adore the known wants. However, no matter the tactic chosen, establishing a mobile strategy is of important importance for a in implementation. Before creating the choice of investment in an exceedingly mobile application, the roles of the development practitioners that are getting to use the appliance should be known and therefore the expectations from the mobile application concerning its functions should be determined consequently

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