DIGITAL INFORMATION MANAGEMENT BUSINESS REPORT (A CASE OF ST JAME BUILDING IN THE UNITED KINGDOM)

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Abstract

Digital information management refers to the process of receiving credible information from various sources, collecting valuable information, and distributing the information within an organization or to other stations worldwide. Numerous organizations have adopted digital information management since the information is usually stored in digital format. The digital format mostly used by organizations is cloud computing, where the organization's data and information are stored in invisible cloud storage. The United Kingdom's Department for Transport has digitized most of its project deliveries. This report focuses on Building Information Modelling in a collaborative digital delivery in United Kingdom's Department for Transport. The project is the regeneration of the St James Quarter, Edinburgh.

Keywords: Building**,** Business, Construction, Digital information and Management

Introduction

Building Information Modelling (BIM)

The United Kingdom has immensely promoted the growth and development of Building Information Modelling globally. The model's adoption was made in 2011 when the UK government laid a strict construction strategy (Crotty, 2013). The construction sector in the UK had for years lacked efficiency and ample productivity. Hence, to increase the productivity numbers, the BIM level 2 model was revamped by the UK's government. The government-mandated a policy that involved all construction projects using BIM level 2.
The mandate was to store the 3D models on a common platform for a general view, unlike the preceding years where the models were user-specific. When using the model, the mandate positively influenced many people, both in the public and private sectors. Unsurprisingly, after five years of using BIM level two, the government announced the construction industry to prioritize BIM level 3 by 2020. The upgrade would see an advanced system incorporating proper management, detailed project cost, and proper time management. Over the last decade, the UK has seen a tremendous increase in BIM in construction.

The Design and Construction Process

Design and construction play a close relationship in the planning and building facilities and can be defined as integrated processes. Designing involves the descriptive aspect of the building, while construction speaks volumes about creating a physical representation of the description.

Documents Required For a contractor to acquire the required local licensing to begin construction, the project would need some documents approved. The pre-contract execution plan (BIM Execution Plan) offers an overview of the contract between the client and the contractor. Signing is mandatory for both client and the contractor. The next document required is the Supply Chain Assessment document. The SCA document points out the contact information and obligation between a materials supplier and the contractor. The post-contract execution plan is documented when the contractor has finished their work, and the client is satisfied with the construction. A Project Information Model is another document that underlines in detail what the construction project will entail. The PIM document is useful in noting the key design procedures and highlights technological considerations in the project. The final document involved the Project Implementation Plan (PIP), which outlines the methods and technical construction details to be involved in the project.

The standard Protocols

The Building Information Modelling Level 2 requires minimal copyright laws altercations. Therefore, BIM strategies acknowledge the use of standardized construction protocols. The protocols urge the suppliers to supply specific BIM level 2 details at specific stages of the projects. The Protocol also incorporates additional producer protections for

their information and is mandated through BIM-specific licenses. The Protocol also promotes an effective working collaboration by defining the roles of information managers in their respective fields. In addition, the inclusion of provisions that the information managers will use the acquired information standard.

Scope of the Project

The Role of Building Information Modelling (BIM)

Building Information Modelling involves the creation and proper management of information throughout a construction project's life cycle. Building Information Modelling ascertains that every little aspect of the whole cycle is described digitally and comprehensively. In the construction of the St James Quarter, Edinburgh, Building Information Modelling played a critical role. BIM generated a link between the building information and the development of 3D building models. During the construction of the regenerated city, the event data were collected, which added valuable information to the building delivery. BIM helps in data collaboration from various teams working as a unit. An agreement between information structures and design is coordinated by the initiation of a Building Information Modelling. Through these coordination's, construction operations benefit maximumly, and the initiators of the laid projects are rewarded handsomely. BIM helps plan the construction of a project as it reaches its final stages through the information gathered. In cases where a project requires revision, BIM is used for transparent and honest design changes. The modeling done through the BIM may be useful in future asset building with digital imprints are asserted within the model for real-time information gathering.

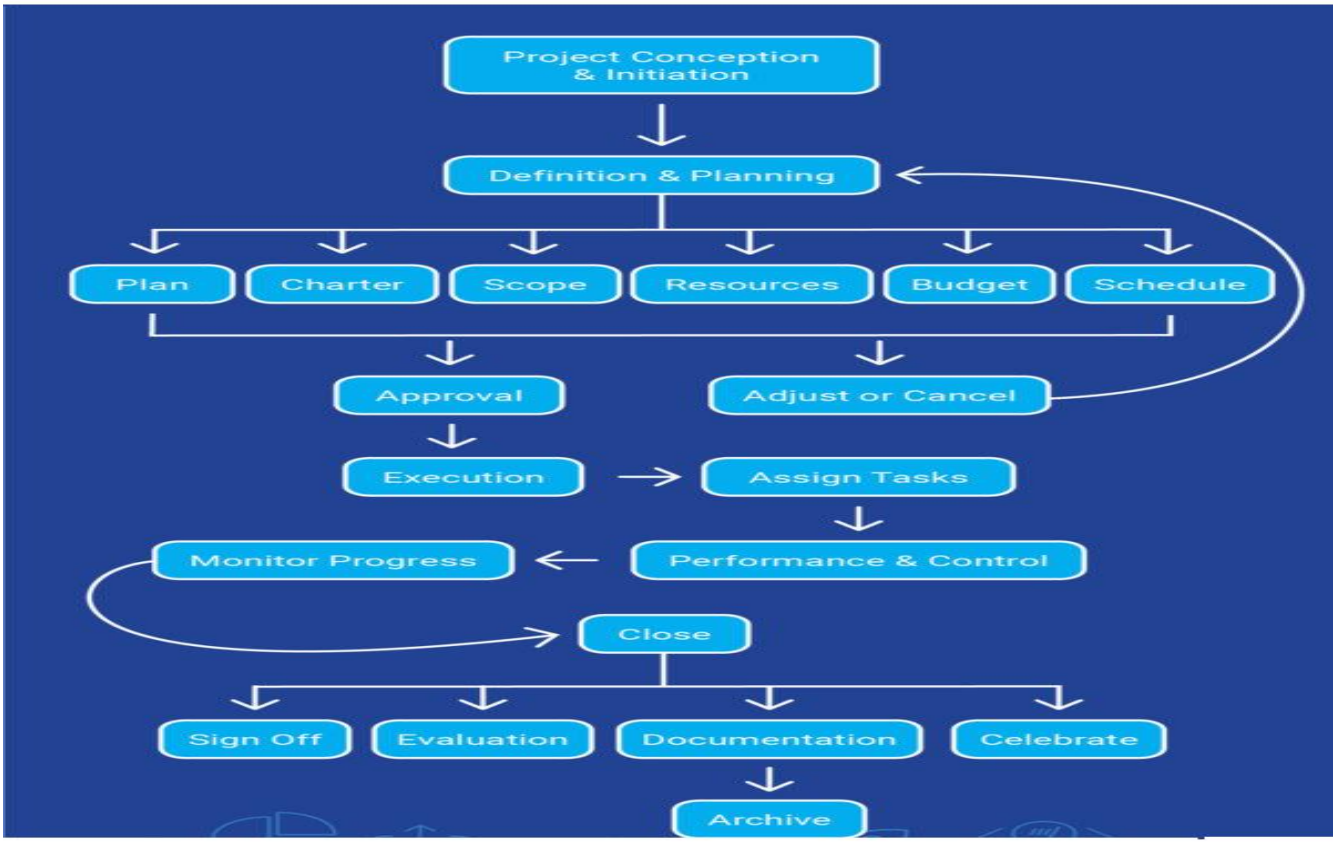


Figure 1-1: flowchart of the project

Integrated BIM In Complex Digital Built Environment Projects

BIM is usually categorized into four main strategies ranging from level 0 to level 3. The second BIM Level is the UK Government's approved, compliant level used in public sector constructions (Cheng, Lu, 2015). This second level offers a structured data entry layout and works collaboratively with the supply chain departments. Therefore, any collected data is shared among various teams since the data is structured for general use.

Deployment of BIM at organizational Level and Project Level

BIM faces several roadblocks as it aims to meet both organizational and project demands. Therefore, certain barriers exist that hinder the deployment of BIM and its implementation. Most of the time, organizations are faced with higher deployment challenges as compared to projects. Among the deployment issues, organizations are mostly affected by various major challenges. Organizations need a lot of time to conduct training for their personnel on the use of the BIM, where also the cost of hiring trainers to teach the recruits is quite high compared to projects. The cost of the BIM hardware is quite expensive for organizational setups, with the software also requiring regular updates and legal licensing. Small organizations also face a setback as they require huge funds and resources to set a fully functional BIM.

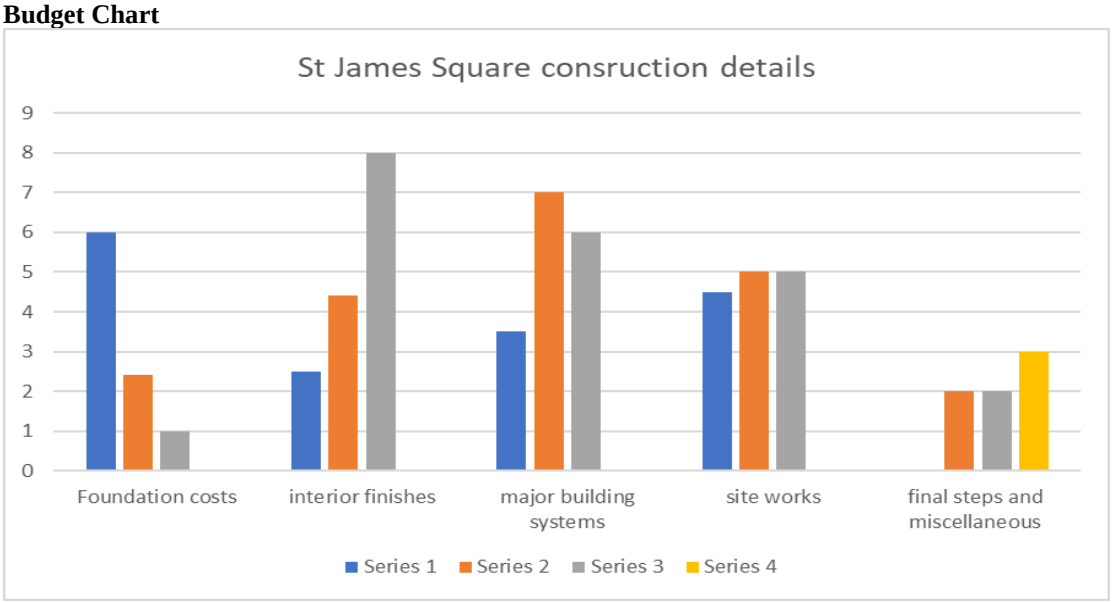
At the project level, the deployment of BIM is not high-fund oriented and thus more reliable in non-organizational setups. Although the resource aspect is not as wanted, the project level also faces various challenges in implementing BIM. Among them is the lack of insurance policies to ensure the BIM. The absence of such a policy may be worrying in case of a disaster. There are data ownership issues and copyright protection loopholes in project levels where there is no clear outline for who owns the data. It also proves difficult to determine who made an error in a project level BIM and identify the individual's specific error. Moreover, project levels tend to demand longer durations to complete high-level projects.

Both the organizational and project level BIM are guilty of creating software compatibilities for working. They are also both responsible for ensuring data accuracy and account for data errors imposed. The complexity of BIM is also gauged from both an organizational and a project level state with the absence of BIM contractual documents. Both project-level BIM and organizational levels face the challenge of information loss through the use of different software. With the above information, it is clear that organizations face a challenge of overcoming the resistance to BIM integration than projects.

Charter

The BIM works under the Steel construction Charter officiated in May 2011. The charter advocates for incorporating 3-D construction models on all BIM projects as of April 2016. The processes of construction, maintenance, and demolitions are included in the charter.

Budget Chart



Resources

Interpretation of drivers, opportunities, benefits, and challenges in adopting BIM in digital built environment projects

Drivers

The main driver to BIM adoption in the UK is the pressure from the government. Through mandating the implementation of BIM in construction, BIM adoption has gradually risen over the last decade. Through the Ministry of Justice, any form of construction bidding is supposed to be carried out in a BIM model for contract considerations (Whyte, 2019). Therefore, the pressure from the UK government has enabled sustainable designs to be implemented through BIM digital environments.

Another driver to BIM adoption is competition pressure among rival contactors. The construction industry boasts a highly competitive global market. With the birth of BIM, clients are seeking contractors with the knowledge of working with BIM and those with finished past BIM projects. This request drives the urge for contractors to work with BIM to maintain their competitive edge.

Opportunities

BIM adoption brings forth a sea of unforeseen opportunities in the construction industry. BIM brings in the chance of constructing health and safety designs. BIM offers an opportunity to design and simulate a project before any construction kickoff to curb injuries and accidents in the building industry.

BIM also provides an opportunity to build projects with accurate designs and with automated clash detection mechanisms. A 4-D BIM is the most preferred means of designing an accurate and proper sequenced construction (Eadie et al., 2013). In terms of clash detection, BIM provides one with visual representations and a series of animated simulations of clashing constructions as a means to remedy and prevent future crashes from occurring.

Benefits

BIM provides plenty of benefits in both the construction and design processes. BIM proves to be a cost-effective method, which is mainly a result of accurate pre-construction estimates. Estimating the material cost, labor, and shipping materials enable architects and engineers to gauge the construction cost and reduce construction costs.
BIM also offers good and enhanced communication between the major construction players comprising architects, engineers, and contractors (Latiffi et al., 2013). The enhanced communication results from BIM operation of a single truth basis, meaning that only the construction materials are shared on common ground. The use of on-site software access provides an additional BIM benefit. The software addition allows contractors to carry out updated work plans, which promote broader project visualization.

Challenges

The main challenge facing the implementation of BIM in digital environments is the unskilled labor force. The effort required to train employees on BIM proves to be quite costly, and thus an economic constraint is identified. The management of the data obtained from the BIM models is a challenge many organizations unfamiliar with the use of BIM (Zahrizan et al., 2013). The responsibility of data entry into the BIM may prove a challenge, with highly skilled personnel required for the task. Moreover, the undesired by various construction outlets to use BIM is a challenge that hinders the digital growth of BIM. Lastly, the complex nature of the BIM software is a major challenge to personnel seeking to work on a BIM project without immediate experience.

How BIM Supports Collaboration, Integration, Energy Efficiency and Sustainability, and Whole Lifecycle Management

Lifecycle management is solely developed to track the lifecycles of various products. The building lifecycle involving the design, construction, and operational phases is represented as a data repository format in BIM. The client's construction intentions are showcased through an implementation model (Wong, Zhou, 2015). Collaborative work is integrated to ensure maximum client's intentions are guaranteed. In this design phase, bidding and signing of contract documents with contractors take place. BIM tries to improve operational efficiency; information is grouped into categories that each participating party can easily identify.

The construction phase is more dynamic since construction has kicked off. In this phase, project implementation takes actions such as obtaining construction permits and construction contracts being signed off. The operation phase involves the maintenance of operation projects under various environments. The main activities involve the maintenance of buildings and equipment, with a user signing a contract in this phase. BIM integrates these three phases to work collaboratively towards a sustainable environment.

Competence in Applying Theoretical and Methodological Concepts In Integrated Digital Built Environment Projects
In most cases, integrated concepts necessitate building digitally sustainable environments. The inadequate single approaches in BIM prove difficult in achieving this integration. Therefore, a sustainable BIM model is considered when looking at the various performance concepts. These performance concepts can be based on environmental factors, social and economic factors. The competency of these theoretical criteria is geared towards promoting digital environments, which favor the growth of Building Information Modelling. As a result, the application of various methodological concepts favors BIM growth and digital environment growth.

Conclusion and Evaluation

Building Information Modelling (BIM) is a new emerging prerequisite that is used for many projects. The demand for BIM will gradually increase over the years as new clients and contractors employ the method daily. The adoption of BIM in the UK has seen tremendous growth in the construction industry, which has integrated high competency levels in its related applied fields. This report has shown the important drivers towards the integration and collaboration of BIM in the construction industry in the UK. With the help of a flow chart, sequential analysis of the Building Information Modelling is explained with clear outlines and illustrations.

The underlying discussion is the importance of Building Information Modelling to provide information on digital management. The BIM repository provides an elaborate avenue for sharing gathered information, disseminating that information, and the overall application of knowledge derived from the information. The information derived from the BIM delivers value to contractors, clients, and building tenants. Furthermore, documenting all processes of the building process is paramount towards continuous building improvement in the current construction industry.

References

Cheng, J. C., & Lu, Q. (2015). A review of the efforts and roles of the public sector for BIM adoption worldwide. *Journal of Information Technology in Construction (ITcon)*, *20*(27), 442-478.

Crotty, R. (2013). *The impact of building information modeling: transforming construction*. Routledge.

Eadie, R., Odeyinka, H., Browne, M., McKeown, C., & Yohanis, M. (2013). An analysis of the drivers for adopting building information modeling. *Journal of Information Technology in Construction (ITcon)*, *18*(17), 338-352.

Latiffi, A. A., Mohd, S., Kasim, N., & Fathi, M. S. (2013). Building information modeling (BIM) application in the Malaysian construction industry. *International Journal of Construction Engineering and Management*, *2*(4A), 1-6.

Whyte, J. (2019). How digital information transforms project delivery models. *Project management journal*, *50*(2), 177-194.

Wong, J. K. W., & Zhou, J. (2015). Enhancing environmental sustainability overbuilding life cycles through green BIM: A review. *Automation in construction*, *57*, 156-165.

Zahrizan, Z., Ali, N. M., Haron, A. T., Marshall-Ponting, A., & Hamid, Z. A. (2013). Exploring the adoption of Building Information Modelling (BIM) in the Malaysian construction industry: A qualitative approach. *International Journal of Research in Engineering and Technology*, *2*(8), 384-395.