International Journal of Latest Research in Engineering and Technology (IJLRET)
ISSN: 2454-5031
www.ijlret.com || Volume 07 - Issue 11 || November 2021 || PP. 14-16

Phygital & Digital Twin: The Relationship between Project Management and Asset Management

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The current world of construction requires many and different skills so that the project manager is able not to solve the detailed problems but to direct the right information, at the right time and to the right person. This approach is close to the concept of Integrated Project Delivery or the collaboration between all stakeholders so that the set goal is reached in the right time, at the right cost and with the quality required by the customer.

The optimization of the construction process is exclusively due to the advent and application of the BIM methodology, Building Information Model Modeling and Management. This methodology allows to become aware of the project not only from the geometric point of view but also from the point of view of the information inserted in the elements. The classification of the information allows you to perform cost estimation and control of payments from suppliers. To confirm this, the SWOT and PESTEL analyzes are very useful for understanding the true value of applying BIM to Project Management.

Strength:

Interactive database. The bim allows you to have a collector - "box" of all useful information for design and construction.
Comparison: The use of BIM allows you to compare the incoming and outgoing data.
Cost analysis: Constant verification of quantities
Information Exchange: The native format, IFC and BCF allow the exchange of information between all stakeholders
Increase in ROI: The BIM methodology allows an increase in the return of investment not only at an economic level thanks to the control of costs and verification of different options but it improves the order management method and communication thanks to the interoperability between all its parts .

Weakness:

Cost / Initial time: When choosing the design suppliers, the design in BIM involves higher costs than the traditional process and also a shifted delivery of the drawings since more time is needed for modeling.
Software: There are higher costs for both the purchase and management of the CDE and the Solibri model checker software and there are also periodic fixed costs for updating the software.
Learning curve: the use of new technologies and the awareness of the BIM methodology also provides time for learning how to use the software as it is more complex than normal design software.

Opportunity:

Complex project: Thanks to the BIM methodology it is possible to manage a complex process
Suppliers: The designers and suppliers who have adopted the BIM methodology have had more space in the tender phase and, on the part of the general contractor, enjoying an AS BUILT federated model allows it to also offer itself in the management and maintenance phase of the building.
Process Management: The BIM methodology allows to optimize the management of the process and allows to have a general framework of the project of all the aspects that characterize it.

Threats:

Change: Often there is laziness on the part of the project leader of the projects to correctly implement the BIM methodology within their own reality, thinking that it is only modeling.

Private Market Demand: The manager of the general process in the face of an optimization of design costs may request to have the same level of detail and depth at the same time; this involves either the failure to implement BIM or its adoption in the face of an economic loss of the executing company.

Fixed Costs: Although the BIM methodology, at least in the design field, is now established, the costs of the software for their (mandatory) update are constantly increasing and this could be a reason for doubt for the small companies that have to take care of these costs.

Pestel

Political: Change in the traditions of the construction site or of project & building management companies that recognized the enormous potential of the BIM methodology

Enviromental: Being a topic of particular urgency for the environment, integrated design allows you to minimize waste.

Social: this aspect has a double value: the first, internal or thanks to the CDE - BIM and meeting of the PM, an incentive for communication between technicians has been realized, also considering international designers and suppliers; external or the model contains all the information that is available to the likely buyers and / or managers of the building. The social aspect is linked to interoperability, which guarantees the best integrated management of data and therefore of the design, construction and maintenance of the product.

Technical-Technological: the technical functionalities of the tools such as Solibri Model Checker, Naviswork, dynamo, Tekla and Revit, have guaranteed the following characteristics for all stakeholders: automation, which offers better control of data, greater reliability of the documents, possibility of visualization, extraction of information at any time in the process and automatic updating of each data according to the others.

Economical: this aspect is not limited only by cost optimization but also by an optimization of time and space organization. The model is a tool used by everyone, each for their own purposes and interests, in order to better understand the space and therefore organize the site logistics.

Legal: the legal aspect of BIM is outlined by the regulations used in Italy (eg UNI 11337) but above all by the aspects related to the contract with your customer.

To ensure compliance on site with: costs, time and quality, the transition to phygital is essential. With the implementation of BIM throughout the design and construction chain, we have come to the establishment of a scheme that can be defined as PHYGITAL (Physical - Digital) or the perfect combination of digital entity and material reality. The acronym phygital allows you to enjoy predictive maintenance which, in addition to improving the performance of the building, increases its economic value in terms of asset value and improving the conditions of users who live in the spaces. The goal is to reduce work on site in order to eliminate risks due to safety, reduce the timing of work activities.

The real revolution in project management is the result of the evolution of design and production since today it is unthinkable to manage a construction site like 5-10 years ago. The application of Phygital translates into a sum of the levels: geometric, informative and reliability of the elements. The consequence of the phygital is tangible and translates into off-site construction or the construction of buildings thanks to the assembly of the elements produced in the laboratory.

The criticality that could arise due to a lack of management and planning of the economic cashfolw concerns the economic and financial aspect. The economic aspect is given by the revenue that the general contractor manages to achieve while the financial aspect corresponds to the management of income and expenses in a given period of time. The time frame must be the only element that must be checked by the project manager as a delay or time lag on the critical path could nullify the entire effort required for the design

The prospect of this revolution is the application of artificial intelligence to project management in order to reduce the level of effort of individual workers in the face of a clear improvement in the project from the point of view of quality. It is important to improve more and

more not only the project but also the way of building, of economically managing the entire flow of the building's lifecycle.

Project managers will play a central role in the use of BIM on projects in the construction, management and maintenance of the building. Its main attitude will have to be to apply the BIM methodology for each phase of the design process. To date, although it is widespread, BIM is mostly applied for the design and construction phase but its true potential in project management is never perceived or sometimes remains latent. The novelty consists above all in the updated exchange of information and all the actors are aware of the continuous changes and / or development. For the figure of the PM, this new transformation of the way of working, collaborating and exchanging information translates not into a revolution but as an evolution to optimize the process.

It is highlighted how the evolution of project management where the collimation between: all the stakeholders (participation and collaboration at every hierarchical level), the organization of supplies / times and the possibility of being able to enjoy a model with all the info in the sale / rent of spaces (thus exponentially increasing the value of the properties.) This last figure is due to the fact that the potential customer feels safer and more ready to make a decision if he has a virtual container of information available (digital twin.). The goal of this collimation translates into the sweet point and partly with the achievement of the objectives of the PM. The market is ready and requires figures identified as BIM Project Managers who can manage, coordinate, collaborate and exchange information with all the stakeholders having the BIM methodology as a background. The range of the methodology, thanks to its size, allows the PM to have a supervision under every aspect of the building in a more organized and faster way. In this regard, there is the evolution of the BIM acronym, from Building Information Model / Modeling / Management to Better Information Management. The new paradigm detects the true potential of a correct application of the BIM methodology within project management, that is, the optimization of the information exchange and above all the complete reliability of the information that is constantly updated to a level of detail appropriate to the project phase.