

Impact of Incremental Delivery Process on both of Initial Handover and Final Acceptance Certificate in Project Management

Awad

Alazhar university

Abstract—Incremental delivery is a key component of software Projects, it allows us to deliver the most valuable elements of a system first, which allows our customers to start getting benefit from the system earlier, this can have a significant impact on time, cost, quality and project management. It helps both of the contractors and the owner's representatives to symplify the initial handover processes when an iterative work is repeated when an incrementally delivery occurs. The incremental build model is a method of software development where the product is designed, implemented and tested incrementally (a little more is added each time) until the product is finished. It involves both development and maintenance, the product is defined as finished when it satisfies all of its requirements. this model combines the elements of waterfall model with the iterative philosophy of prototyping. Phased construction method can deal with projects such as housing, infrastructure and roads when each step, phase and stage can be delivered separately and give profits and benefits to some people, companies or foundations even when the other steps, phases or stages can be done later (planned or not). Then incremental delivery process is different from phased construction delivery method, which integration process is mandatory and important to reach the project objectives and deliverables. The difference here is in planning phase , when you plan to deliver a certain and a defined objective which can give you something (profit or benefit) and then with integration process you can continue to accomplish the remain objectives incrementally with the same way to reach finally the project objectives and goals ,then an iterative work will take place every delivery stage and a repeated process for initial handover even a final acceptance certificate can be done with an ease of use saving time, effort, cost and conflicts specially in the documentation domain. Incremental delivery process affect positively both of initial handover delivery and final acceptance certificate of the projects for all included parties and give a new approach to deliver projects deliverables incrementally

which can get customer satisfaction and improve the projects quality in both implementation phase and closure phase.

Index Terms—Incremental delivery, final acceptance certificate, project closure process, snag list, phased construction method, facility management, the project operator.

I. INTRODUCTION

Projects are today widely used as a business model for private and public sectors and they constitute the preferred model for developing changes in construction, oil, and gas, chemical processes, aerospace, defense, etc. A common characteristic of such projects is that many are large and complex which many of them involve intervention with nature or affect the public in some way, thus they are exposed to media monitoring, and public attention. Complex projects are found in different industrial and public sectors and span over different types of project such as building and construction, product innovation and others. Complexity is a relative term depending on the capability of the organization, thus a small project may be complex for a small organization.[6] In the past, customers have paid contractors for their ability to deliver the goods to destination. If a new delivery was required, there was no guarantee that the first contractor would show interest to this regard. Customers were interested to the final results and not in the means to reach this final result when a series of partnership also arose, but the customer wanted to keep as many suppliers involved, consequently stimulating competition. If the success of the project used to be traditionally measured based on the

compliance with the triple constraint of time, cost and performance, nowadays the definition of the success has elements of business, such as the ability to sell the product and the ability to satisfy a market need.[1]

Project closure process does not mean that the project is finished, but an initial handover process from the contractor to the owner means that the project is already handed to another part and the responsibility is moving on now from one side to another one, then a snag lists are present here to describe the case and some documents have to be represented from the contractor to the owner under the full supervision of a consultant supervisor office, when the guarantee period assurance stage has to start describing the end of the project, where still the final acceptance certificate present the remaining relationship between the contractor and the owner, when finished, then all is finished, apart the long lead items warranty period and the legal responsibility.[2]

Maintenance, housekeeping and security facilities have to takes place just after the initial handover process, when this process is important complex and necessary to be performed, also when the responsibility move on from the contractors companies to another companies which concern the facility management process (housekeeping-maintenance and security) which will need documents, training, and cohabitation time to deal with these new responsibilities ,then this process will redo again for many times when a new incremental delivery will take place and an iterative work will be done with approximately the same documents ,people ,steps and others , then one of them is sufficient to ensure and facilitate all, which will save time, money and effort in the future which is different when the whole project is to be delivered at just one time taking all the steps at once and affront all the conflicts after finishing the work and get the project goals and objectives .

Many documents and financial duties, has to be done to perform the final acceptance certificate of the project, then, when incremental delivery process can facilitate and act positively on both of them, a realistic study have to be presented to show how, when, why, who and whom can do that. The time needed to deliver individual project activities and/or the entire project is one of the fundamental characteristics of any project, and an element of the so-called Iron Triangle [5]. As the Project Management Institute (2017) pointed out, it is not time that is managed but rather the schedule of

project activities that is defined and managed. Accordingly, the name of this knowledge area was changed from Time Management to Schedule Management.[7] A project schedule is an element of project management which analyses and develop a specific timeline, providing a detailed plan of activities,[] delivery, and milestone within a project, and it serves as a communication tool in communicating with other project stakeholders[3] .Once the activities needed for deliverables are specified, the interrelationship of activities is determined and the time required to perform each activity is estimated.[5]

II. INCREMENTAL DELIVERY METHOD AGAINST PHASED CONSTRUCTION METHOD IN BOTH OF PROJECT HAND OVER AND PROJECT FINAL ACCEPTANCE CERTIFICATE PROCESS

Incremental delivery method differs from phased construction method in project management, when the first means delivering the integrated project deliverables successively, the second means delivering the planned project deliverables separately (each of them can be an independent project), may be not to reach the next phase in time, may be to not continue the planned project and if needed some of them can be modified.

Usually phased construction method is used in housing projects when just one phase can lead to a successful goal, when the other phases depend on marketing, financing, investment and others.

Incremental delivery method does not mean to deliver equals parts or equal values of the project but it means delivering the project deliverables according to a certain and defined plan which mean something to both the owner and the operator at the same time and which can present the integration process to get the project objectives.

III. EFFECTS OF INCREMENTAL DELIVERY METHOD ON BOTH OF INITIAL HANDOVER AND FINAL ACCEPTANCE PROCESS

Incremental delivery process allows for some components of the project to be delivered earlier and during project life time which can ease all the required

and recommended procedures, saving time, cost and improve the quality control such as [2]:

1. All deliverables apart the last incremental deliverable will be delivered during the life time of the project which is different in other delivery methods in projects.

2. The ease of use and the ease of handing over process because of iterative work occurrence between all included project parties.

3. The ease of handing over for the maintenance, housekeeping and security companies and facilities management from the construction companies and others, because this process will be among the existence of these construction companies which have a great experience to deal with these deliverables' problems and data requirements.

4. The full supervision and leadership of the owner representative (The project managers) in the handing over process between all the involved project parties, when still the project in progress and other deliverables are waiting to be done.

5. Add financial value to both of the contractor and the owner, when the first receive about 95% from different deliverables invoices, then the second can have profits from these planned deliverables and then invest in project and can confront high inflation rates and high banking interests.

6. The operator has the high chance to test, commission and use some or many of the project components earlier and then, many problems can be solved easily when all project parties still in the project progress.

7. Improve the quality control by iterative work for snag lists and by avoiding to repeat works which can prevent or even constrain, retard and obstruct the initial handover process or the final acceptance certificate process or both of them.

8. Improve the design quality, supervision quality, implementation quality and full coordination between all involved project parties when some of many deliverables and components were handed to the owner, operator and the beneficiary part, then

everything is all right, which also improve the morals for all people and keep the confidence in the project management and other project parties.

May be, and according to the project life time which can be 3-5 years or more, some or many final acceptance certificate process occur and the same procedures and required documents will be repeated and we can gain all the previous advantages for all project parties in addition to test and use the deliverables for more than one year and then the owner, the operator, and the beneficiary representative or all of them will have more and more experience, quality ease of use and which we can call a full cohabitation with the project deliverables, which we are needing to give an add value to the project objectives, especially for the national mega scale projects.

IV. DEVELOPMENT AND CREATION OF PROGRAMS AND TECHNIQUES CONCERNING PROJECT ACTIVITIES

The United State Department of Defense (DOD) created the WBS concept as part of the Polaris mobile submarine- launched ballistic missile project. After completing the project, the DOD published the work breakdown structure that was used and allowed the use of the procedures in future projects of similar scope and size. WBS is a tree structure of deliverables and tasks that need to be performed to complete a project being undertaken. The WBS was later adopted by private sector project practitioners and today it remains one of the most commonly used project management tool. PERT was developed by The United State Department of Defense's US Navy Special Projects Office during the development of the Polaris mobile submarine- launched ballistic missile project.[4]

This was during the era of cold war that witness an arms race globally and hence the desire to attain military superiority and defensive capability was a priority. PERT is a method based to analyze tasks involved in completing a project. It is used analyzed mainly the time needed to complete tasks and identify the minimum project duration. PERT technique involves building a PERT chart which is a network graph with details about project activities, their

durations, and their dependencies. PERT take consideration of risks and uncertainties using probabilities on activities. They are divided into three, namely, optimistic, pessimistic, and one being considered as most likely event.[4]

V. CONCLUSION

Incremental delivery process affect positively on both of project initial handover and project final acceptance certificate process because of many reasons concerning all the included parties and the involved activities of the project when it can save time, save cost, save effort, add financial values, improve the quality control, improve and higher morals for all, when iterative process can take place and some learned lessons from the past one can lead the project to a higher cooperation and facilities. The ease of use of the documentation process and the transferring of responsibility from the contracting companies which represent the executive party to the owner which represent the beneficiary party and which is also responsible about facilities management which means the maintenance, the housekeeping the security and the management of the product after the handover process ,all of them can depend on incremental delivery method to improve the overall quality of the project . The first incremental delivery process will facilitate all the steps and the stages which are needed to complete the whole project one. An add financial value will take places for all the parties when the project components are incrementally delivered, where the owner can get an earlier profit and invest in project, also the contractor will receive 90-95% from the budget depending on which stage the handover is represented. The warranty period for many equipment and elements of the project can be in the time which the project still in progress, then a cohabitation period can take place between the maintenance party and the operator in the existence of the contractor to give an ideal solution to how to deal with such problems. Customer satisfaction and some variations in project objectives (without affecting the milestone schedule or the cost evaluation) can take place depending on the quality of the first incremental delivery and others which can be delivered earlier, when normally a project can take about 3 years to be finished and some requirements can affect the project path, then

incremental delivery method can answer these questions.

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