

**Project Management Processes Common to Technology-Intensive Organizations.**

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The contemporary business environment is being characterized by intensive deployment of technology in order to gain competitive advantage for survival and thrive. In that respect technology is pervading all business processes within an enterprise. This has created a need for new advanced strategies for work management (Pineiro, 2010). Corporations all over the globe have therefore shifted their work process systems by adopting implementation of projects as a work management strategy in order to attain their strategic goals in the competitive global business environment. Research studies indicate that both large and small sized technology intensive organizations have high probability of organization success when work is handled as projects (Bradshaw, 2008; Murphy and Ledwith, 2007). Corporations shift towards implementation of projects in their efforts to gain competitiveness has been aided and catalyzed by several factors. Pineiro (2010) points out that these factors include: a) advance in computing and internet technologies, b) globalization, c) availability of knowledge workers, d) cut throat competition and e) finite resources.

Implementation of projects as a work management process has given rise to new terms employed in the work process. The new terminologies include a) project, b) activity, c) schedule and d) project management (PMI, 2008). A project is defined as an interconnected collection of activities with a definite commencement and termination points, with the activities yielding a unique outcome. Activity also called task is a micro unit of work that is carried out to accomplish a project, and consumes time and resources. A schedule is a plan that is used by project managers to allocate resources to the various activities under the project in order to facilitate timely completion of a project (PMI, 2008). Project management is the use of both hard and soft skills and techniques to plan and control resources necessary for the completion of a project to the desired state. Scholars stress that a project has the following unique features: a) it is carried

out by a team assembled for the specific project; b) the team comprises of individual from diverse background and organizations; c) the teams responsible for projects are interdisciplinary; d) the project team only hands over the project to the sponsors once the project is complete becomes viable once completed and e) benefits of a project are realized once the project is complete (PMI, 2008).

Though implementation of projects is reckoned as a contemporary work management process by organizations, specifically technology intensive organizations, to gain competitive advantage, it requires effective deployment of financial, human resources. Technology intensive organizations should therefore have an effective project management framework to ensure project success. Project management framework is a critical implement in facilitating organizational survival; consequently, it should be backed and controlled by senior management of an organization through all the phases. An effective project management framework involves several phases, which include a) project management initiation, b) planning, c) implementation, d) monitoring, e) measurement, f) control and g) closing (Pinheiro, 2010). Due to the strategic importance of project management framework, top echelon personnel of technology intensive organizations are being involved in control of project implementation. Drucker (2000) observes that controls are being extensively utilized in technology intensive organizations to overcome emerging risks, regulations and unfavorable factors that are impeding growth of organization that heavily use technology in their processes. Pinheiro (2010) opines that control of projects is accomplished through the use of the following techniques: a) project management plans, b) project-matrix organization and c) management tools and techniques.

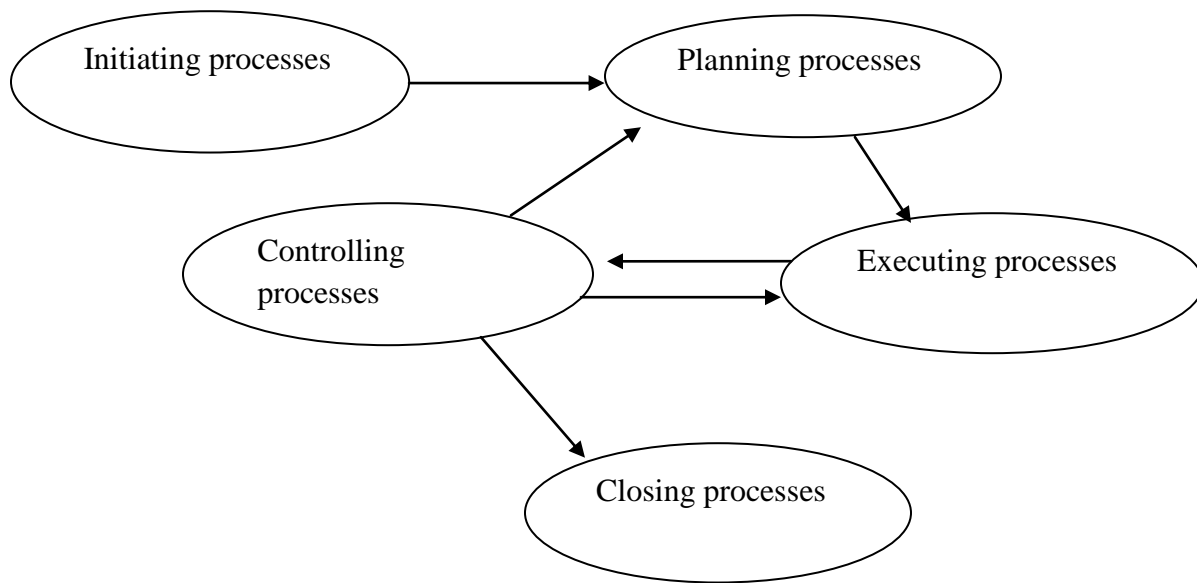
Stelth and Le Roy (2009) assert that project management has over the years been a concept that has been employed in organizations, and at the same time going through

improvement and variations. The first documented project management concept was Critical Path Method (CPM), which was created in 1957 by Morgan Walker and James Kelly (Korman, 2004). Critical Path Method, commonly known as CPM, used arrows and network methods to represent processes in a system. The second project management concept was developed by the U.S Navy, it was known as Program Evaluation Research Task or PERT. Program Evaluation Research Task, commonly known as PERT, was used by the naval to track progress and completion time of a project (Stelth and Le Roy, 2009). According to project management scholars, PERT suffers from one drawback, which is that it focuses on time constraints ignoring material issues such as quantity, quality and cost details that are critical elements in projects. Since the pioneering project management concepts, CPM and PERT, suffers from various bottlenecks, project management scholars and practitioners have devised other concepts to complement the revolutionary concepts.

Implementation of projects involves execution of various processes, which is a series of interlinked set of actions to bring a desired end result. The processes are carried out by people within a team. The processes are organized into logical step that are sequentially carried out in accomplishment of a project. According to PMI (2008) there are five logical phases involved in a project execution. The five unique phases include: a) project initiation, b) project planning, c) project execution, d) project management and control and lastly e) project closing (PMI, 2008). The first step in project management process involves project initiation. During this phase a project manager recognizes and commits to commence a project or project phase. The second phase is the planning phase. During the planning process the project manager develops a workable plan to accomplish the objectives and goals of the project. Execution phase is the third phase in project management processes. It involves coordination o human and other resources to

execute the plan developed during the planning phase. Controlling processes are carried out during the fourth phase, which is the controlling phase. It involves monitoring, evaluating and reviewing project progress. Any deviations from the predetermined plan are identified and corrective measures taken to correct the anomaly and bring the project to the desired state. The final phase in project management processes is the closing phase. During this process, the project is brought to the final end through formalizing acceptance and handing over the project to the sponsors. PMI (2008) points out that the five processes are interlinked and one phase sequentially follows the next, with the closing of one providing input to the next phase or process. Despite the five phases being unique, they are not discrete since there are cases when their respective activities overlap. These phases are a subset of the five standard processes involved in project management, which include a) project selection, b) project planning, c) project scheduling, d) project control and e) project evaluation.

Figure 1. Five phases involved in project management processes



Source: PMI (2008). *A guide to the Project Management Body of Knowledge* (4 th ed.). Project Management Institute

### **Project Selection**

According to Gido and Clements (2008) project selection entails assessment of needs of an organization and then deciding the most urgent need that needs project implementation. In this case, the senior management of a technology intensive organization carries out cost benefit analysis, advantage and disadvantages of the possible needs and opportunities facing the organization in order to decide which project to execute. Assessment of these needs may take the form of qualitative or quantitative evaluation or tangible and intangible assessment (Gido and Clements, 2008). Quantitative assessment is through financial evaluation, which encompasses costs, revenues and profits attributable to carrying out a certain project. Quantitative elements of a project may be evaluated as tangible consequences that result from carrying out a specific

project. Qualitative evaluation, on the other hand, mostly refers to intangible consequences that result from carrying out a given project. For instance, assessing whether implementing a certain project will result to enhancement of corporate image; this is an intangible consequence.

Gido and Clements (2008) argue that an organization carrying out project selection should perform the following four steps; namely, a) developing benchmarks against which to measure the need to be evaluated; b) creating and listing of assumptions involved in the need identification; c) data collection and analysis of the project needs and lastly d) critical evaluation of the need against the set benchmarks. The first step in project selection, according to Gido and Clements (2008) is developing benchmark against which to evaluate need. The benchmark may be quantitative or qualitative, depending on the characteristics of the technology intensive organization. For instance, a technology intensive organization that is being faced with myriad of needs such as implementing new technology to replace obsolete technology, developing a new product or expanding operations, may evaluate these needs against the following criteria: a) market share, b) return on investment, c) alignment with organization's strategic goals and objectives. The second step is building of assumptions, in the case of technology intensive organization that would like to implement new technology; the management may enumerate assumptions that would make the project a success. For instance, the management may enumerate that the organization would be able to obtain debt financing to implement its project need. Once assumptions have been enumerated, data collection is the next step to help the management make an intelligent assessment regarding project selection. Mostly, the data involves financial implications such as costs, revenues and profits. Using financial, statistical and mathematical models the competing needs are analyzed. Besides hard data, the management may conduct qualitative assessment of the implications of the competing projects. Once data

collection and analysis, which encompass quantitative and qualitative, has been conducted for all the projects, each project need is evaluated against the established benchmarks to facilitate optimal decision making. Gido and Clements (2008) recommend that evaluation and selection of project should involve diverse personnel in the organization. The scholars highlight that, though this approach presents problems in quick consensus building, it is effective as it results to a better selection decision due to the different inputs that diverse individuals bring to the discussion.

### **Project Planning**

Once the project to be implemented has been identified, the next phase in project management process is project planning. According to Kerzner (2009) senior executives in an organization are the ones involved in project planning phase. Planning phase starts with selecting of a project manager, who then oversees all planning activities of a project. PMI (2008) points out that at the planning phase, a project manager should be appointed and project teams constituted and organized. The members' specific roles should also be stipulated at this stage to avoid conflicts during the subsequent stages of project implementation process. PMI (2008) advises that selection of project team members should take in cognizance of the project's requirements and needs. Therefore, project manager and senior executives of an organization should match skill needs of the project and the skills of other project team members. Moreover, PMI (2008) asserts that the planning phase should involve a) establishing objectives of selected project, b) defining the selected project and c) breaking down project into constituent activities and costs. Kerzner (2009) states that the planning cycle involves two activities; namely, work breakdown structure and sub-divided work description. The work break-down structure, commonly referred to as WBS, serves two critical purposes in project implementation. One it acts as a control from which planning of the project is done. Secondly, WBS acts as a



communication tool in project implementation. In essence, WBS communicates project deliverables by establishing the following critical elements in a project: a) tasks to be performed, b) period of performance and c) maximum allowable time available of the project (Kerzner, 2009). SWD, on the other hand, acts as an adaptable tool that is used to: a) authorize contract funds, b) release work, c) authorize planning and lastly d) illustrate activities of a project (Kerzner, 2009). Moreover, SWD or subdivided work description is used to subdivide work processes enumerated in the work breakdown structure into small work packages.

### **Project Scheduling**

According to PMI (2008) project scheduling phase involves attaching a timescale and progression to the tasks to be conducted in accomplishing a project. In that respect, project scheduling helps in prior determination of human capital and materials needed at each stage of a project. Additionally, the time that it will take to complete a given stage is determined at this stage. Razaque, Bach, Salama and Aloitabi (2012) observe that projects are subject to uncertainty due to unforeseeable events that may be beyond project team member control. Due to the adverse effects of risks in a project, project managers undertake project scheduling to mitigate risks. Razaque et al., (2012) state that project scheduling is a strategic tool that is used to control risks in projects. In project management process project scheduling phase is critical in estimating project duration times and risks involved in a project. Estimation of project duration is accomplished through the use of: a) Critical Path Method, b) Linear Programming and c) Gantt Chart. Razaque et al., (2012), on the other hand, assert that mathematical models such as a) Monte Carlo Simulations, b) Event Tree Analysis, c) Fault Tree Analysis and d) Fuzzy Logic are used in risk identification and management in project cycles.

### **Critical Path Method (CPM)**

This is a method that is usually utilized by technology intensive organizations in project scheduling. It is a management methodology that has been in existence since 1950's (Stelth & Le Roy, 2009). CPM utilizes project network to determine the longest path of tasks. Newbold (1998) asserts that by ascertaining activities that take the longest path, project managers are able to concentrate on the critical activities ensuring that the project is completed on time. Besides time, CPM identifies cost of a project, which is another important project variable that usually defines project success

### **Project Cost Control**

During a project implementation cycle, there should be controls and techniques to ensure that the project does not overrun the set budget. Project control tools are used by project managers to monitor, measure and manage project deliverable in order to ensure that they are within the set budget. Schwalbe (2010) observes that successful projects are those that are completed within the stipulated budget and time. It is therefore the prerogative of project managers to ensure that projects adhere to the approved budget, which is realistic and cost friendly. Pinheiro (2010) points out that project cost control can be carried out using two control tools and techniques; namely, benchmarking and economic value analysis.

### **Benchmarking**

PMI (2008) highlights that benchmarking involves comparing costs of the planned project to the costs of comparable projects to come up with improvement ideas for cost reduction mechanisms. Benchmarking process is critical in verifying projects cost estimates, more so, during the bidding process. In this case, project managers use performance benchmark to compare and track cost of implementing a project and any deviations are instantly corrected to

ensure that the project sticks to the budgeted levels. This view is upheld by Pryor, White and Toombs (2007); the scholars state that benchmarking involves selecting benchmark parameters, collecting and analyzing data, evaluating information against the benchmarks, developing improvement targets and undertaking corrective measures to correct anomalies.

### **Earned value analysis**

Earned value analysis is a method combining project cost and scheduling. It then provides a comparison of project comparison progress to the budget estimates (Pinheiro, 2010). Bradshaw (2008) recommends the use of economic value analysis since it gives early signs of potential problems in a project facilitating prediction estimates of completion. Cesarone (2007) in describing the working of economic value analysis as a project control tool states that there should be inputs in order for the technique to produce outputs that are used in project cost controls. The input include a) task list, b) actual costs involved on each activity, c) predicted labor hours for each activity, d) scheduled commencement and end dates for each activity and e) percentage completion of each activity (Cesarone, 2007). The technique as a result produces a) actual cost of task done on the project, b) budgeted cost of task performed on the project and c) cost variance. This information is then used in project cost control by implementing control mechanisms to bring cost to desired budgetary levels.

### **Project Evaluation**

Project evaluation in project management may refer to different processes depending on the stage of a project. Some scholars argue that project evaluation should be embedded in project planning phase since it is concerned with choosing alternative project objectives. Small (1998) observes that project evaluation is a process of analyzing projects and comparing them with alternative projects. On the other hand, some scholars view project evaluation as an ongoing

process that involves constant review of projects progress. Projects are evaluated on the basis of budgeted costs, time schedules and quality. Project evaluation, basically, refers to the process of reviewing whether the project attains the set objectives in terms of cost and time deliverables.

Project evaluation usually involves the following processes: a) problem and objective identification, b) identification of options, c) design, d) conducting of financial and economic analysis, e) environmental impact assessment and lastly f) stakeholders approval (Martland, 2003).

When project evaluation is conducted during the pre-stage of a project, project managers use financial and economic models such as cost benefit analysis, net present value and internal rate of return to assess economic viability of undertaking a specific project. However, subsequent project evaluation are conducted to track whether the project meets all the deliverables. Before handing over of the project to sponsors, project evaluation is conducted to ascertain that all the project terms have been satisfied.

### **Conclusion**

Due to the escalating competition in the business world, technology intensive organizations have adopted the use of projects as a work management process. In that respect project management plays a critical role in ensuring that the strategic goals and objectives of technology intensive organization are met through effective management of project delivery. The existence of knowledgeable workers, advanced computing and technology and globalization has aided technology intensive organizations to successfully adopt project implementation as a work management process. It is notable that efficacy of implementing projects as a work management can only be realized through senior management commitment to project implementation. This is due to the fact that project implementation requires constant monitoring and control which can only be offered by senior management.

Implementation of projects is a sequential process that is both discrete and continuous since some phases overlap. Project implementation can be divided into five unique phases, namely, project initiation, project planning, project execution, project management and control and project closing. Project initiation involves recognizing and committing to commence a project. This is followed by the planning phase. During this phase the project manager develops a workable plan to accomplish the objectives and goals of the project. Once planning is completed, execution is the phase that follows; it involves coordination of human and other resources to execute the plan developed during the planning phase. The fourth phase is the controlling phase. It involves monitoring, evaluating and reviewing project progress. Any deviations from the predetermined plan are identified are corrective measures taken to correct the anomaly and bring the project to the desired state. The final phase in project management processes is the closing phase. During this process, the project is brought to the final end through

formalizing acceptance and handing over the project to the sponsors. It is evident that through all this processes control is critical to ensure smooth transition between the processes.

Consequently, senior management is key to project success in a technology intensive organization.

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