Key Success Factors of PRINCE2 Project Management Method in Software Development Project

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ABSTRACT

Project management uses many tools, techniques, and methodologies in project development. PRINCE2 methodology set documentation which must be tailored to suit the occasion project. Since software projects may often fail due to lack of well-structured project management method, it is necessary to identify the key success factors of PRINCE2 method in software development project. The purpose of this research study is to identify key success factors of PRINCE2 project management method in software development project. The researcher undertakes a case study in an organisation where software project is implemented in PRINCE2 project management method. Data has been collected from questionnaires and face-to-face interviews. Documents review, and observation techniques were used as secondary data collection sources. The researcher has conducted template analysis with interview data and excels analysis with the questionnaires data. The researcher has then triangulated the data to get authentic and accurate findings. 20 factors have been identified as key success factors in this research study such as defined roles & responsibilities, scope management, manage by stages, well planning, top management support, time management, risk management, monitor project progress, change management, communication management, quality management, project team competency, managing product delivery, cost management, learn from experience, prioritizing task, assign work to right person, benefit realisation and being agile.

Key Words: Software Development Life Cycle (SDLC), Project Management, Projects in Controlled Environment (PRINCE2), Key Success Factor.

1 INTRODUCTION

Since software development become under diverse and increasing pressure as technology has been changed, markets become more sophisticated and global competition raised, software vendors require well-organised project management in each area for information quality, system quality and user satisfaction (Saad et al 2012). Time, cost, quality, scope, risk and benefits of a project are managed by well-organised project management approach (Commerce 2009). While PRINCE2 project management methodology provides well-structured project management, many Project Managers often say that PRINCE2 method involves complex processes which are time consuming and it is difficult for Project Managers to complete project within time frame and budget particularly in software Development Company. On the other hand, software projects may often fail due to lack of well-structured project management method (Kruger & Rudman, 2013). Software projects are associated with risks. Organisations who fail to manage the inherent risk associated with change, innovation and management of projects often end up with high proportion of project failures (Whyte et al, 2016). Change has become a way of life for organisations that need to remain effective and competitive in order to thrive. In order to manage these issues, software development projects have to be developed in a controlled environment (Kruger & Rudman, 2013). In this context, PRINCE2 project management method plays a vital role in software development project. But it is necessary to identify the key success factors of PRINCE2 project management method in software development project. But no research has been done yet on key success factors of PRINCE2 project management method implementation in software development project. Without knowing key success factors of software projects have less concentration on communication, team, project management and product related factors. The Royal Melbourne Institute of Technology (RMIT) (a university in Victoria) is reporting major problems with their implementation of ERP system because of not knowing the key success factors (Nielsen 2002). Particularly it is important to know key success

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factors of software project that is implemented in PRINCE2 method as PRINCE2 is a structured project management methodology, different levels of management are involved in the project and there was no such key success factors model was developed for software project that is implemented in PRINCE2 method. Hence, the purpose of this research is to evaluate key success factors (KSFs) for software development projects in PRINCE2 method. This research is useful for organizations working on software projects. The project managers working in the industry can get benefit from the mentioned key success factors by concentration on them while planning and executing software projects. Key success factors (KSFs) identify the most important issues/areas that need attention to perform properly for the business to flourish (Majarian & Putnam, 2015). If they are not performed well, it is unlikely that the mission, objectives, or goals of a business or project will be achieved. These factors can be used internally for assessment or prediction of success in a business or project. The KSFs are firm specific and prioritizing them can help managers to be aware of important aspects of success. Therefore, this research project aims to identify key success factors of PRINCE2 project management method in software development project.

2 AN OVERVIEW OF PRINCE2 AND SDLC

A project is managed in six aspects such as scope management, time management, cost management, quality management, risk management and benefit management (Schwalbe, 2011). A PRINCE2 has seven principles, seven themes and seven processes to manage, direct and deliver the project (Commerce, 2009). Apart from this, a SDLC project has six phases including system planning, system analysis, system design, system development, testing and deployment (Shelly & Rosenblatt, 2012). The activities of these six phases are accomplished within PRINCE2 project management framework.

2.1 Aspects of Project Management

Project management applies knowledge, skills, tools and techniques to project activities to meet the requirements of the project (Atkinson, 1999). According to Commerce (2009), five process groups are comprised of project management processes. These are initiating, planning, executing, monitoring, and controlling and closing (Commerce, 2009). The project is accomplished by application of these processes that executed by project managers. According to Project Management Institute (2008), there are some specific tasks to manage a project including identifying requirements, addressing the various needs, concerns and expectations of the stakeholders as the project is carried out and planned, balancing the competing project constraints such as scope, quality, schedule, budget, risk and resources. Project Management Institute (2008) states that project management knowledge areas consist of project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communication management, project risk management and project procurement management. According to Schwalbe (2011), a project is managed in six aspects such as scope management, time management, cost management, quality management, risk management and benefit management. A PRINCE2 project is also managed in six aspects including scope management, time management, cost management, quality management, risk management and benefit of the project (Commerce, 2009). Since the scope of this research study is PRINCE2 project management method in software development, these six aspects are discussed in this dissertation.

2.2 Principles of PRINCE2 Method

PRINCE2 is an integrated framework of processes that addresses the planning, delegation, monitoring and control of all these six aspects of project performance (Kruger & Rudman, 2013). According to Commerce (2009), there are seven PRINCE2 principles that can be summarised as continued business justification, learn from experience, defined roles and responsibilities, manage by stages, manage by exception, focus on products and tailor to suit the project environment. A PRINCE2 project must have continued business justification (Commerce, 2009). The project must have justifiable reason to start and the justification should remain valid throughout the life of the project (Commerce, 2009). The justification is documented in a business case and approved. PRINCE2 project teams learn from previous experience by seeking lessons, recording, and acting upon throughout the life of the project. Project teams review previous or similar projects whether they can apply the lessons that learned from those projects. This learning process continues as the project progresses and closes. Roles and responsibilities within organisation structure in a project facilitate to engage the business, user, and supplier stakeholder interests. A PRINCE2 project must have that kind of defined and agreed roles and responsibilities within organisation structure (Commerce, 2009). The project should be planned, monitored, and controlled on a stage-by-stage basis. PRINCE2 method divides the project into several management stages, have a high-level project plan and have a detailed stage plan (Kruger & Rudman, 2013). The project has defined tolerance limits for each project objective including time, cost, quality, scope, risk and benefit to establish limits of delegated authority (Commerce, 2009). PRINCE2 project focuses on the definition and delivery of products including quality requirements. Finally, PRINCE2 project is tailored to suit the project's environment, size, complexity, importance, capability, and risk (Commerce, 2009).

2.3 PRINCE2 Themes

All the themes of PRINCE2 are addressed continually in such way which provides aspects of project management (Commerce, 2009). Project managers perform the role in a professional manner with the help of these themes (Too & Weaver, 2014). According to Commerce (2009), there are seven themes in a PRINCE2 project including business

case, organisation, quality, plans, risk, change and progress. Organisation is an important theme for a project to have potential value. Business case enables organisational idea to be developed into a viable investment proposition. Business case also enables project management team to maintain the objective of the organisation throughout the project (Commerce, 2009). The roles and responsibilities in the PRINCE2 project management team are defined and agreed by organisation theme. Quality theme describes how the outline is developed so that project management team can deliver required products based on the quality attributes (Schwalbe, 2011). PRINCE2 projects progress based on a series of approved plan. Projects entail risk. Risk theme enables project team to manage all uncertainties of the project in its plans. Change theme enables project management team to manage change (Whyte et al, 2016). This theme addresses how project team assess and act upon issues including unanticipated general problems, requests for change or instances of quality failure that have a potential impact on the baseline of the project. The progress theme explains the decision-making process for approving plans, the monitoring of actual performance and the development process if events do not go per plan (Commerce, 2009).

2.4 PRINCE2 Processes

PRINCE2 process is a structured set of activities defined to secure a specific objective. According to Commerce (2009), "PRINCE2 has seven processes that give the set of activities required to direct, manage, and deliver a project successfully". These processes are starting up a project, directing a project, initiating a project, controlling a stage, managing product delivery, managing a stage boundary, closing a project. The objective of the starting up a project process is to justify business for initiating the project (Bentley, 2015). This process ensures that all the necessary authorities exist for initiating the project and sufficient information is available to define and confirm the scope of the project. The key activities of starting up a project are to appoint the executive and the Project Manager, capture previous lessons, design and appoint the project management team, prepare the outline business case, select the project approach and assemble the project brief and plan the initiation stage (Commerce, 2009). The activities within the Directing a Project process are Project-Board-oriented and are to authorise initiation, authorise the project, authorise a stage or exception plan, give ad hoc direction and authorise project closure. The activities within the Initiating a Project process are Project-Manager-oriented and are to prepare the risk management strategy, prepare the configuration management strategy, prepare the quality management strategy, prepare the communication management strategy, set up the project controls, create the project plan, refine the business case and assemble the Project Initiation Documentation (Commerce, 2009). The purpose of the Controlling a Stage process is to assign work to be done, monitor such work, deal with issues, report progress to the Project Board, and take corrective actions to ensure that the stage remains within tolerance. Controlling a Stage activities are Project-Manager-oriented and comprise authorising a work package, reviewing work package status, receiving completed work packages, monitoring and reporting stage status, highlighting report, capturing and examining issues and risks, escalating them and taking corrective action. The objective of the Managing Product Delivery process is to ensure that work on products allocated to the team is authorised and agreed, team managers, team members and suppliers are clear as to what is to be produced and what is the expected effort, cost or timescales (Commerce, 2009). Team Managers ensure that the planned products are delivered to expectations and within tolerance (Bentley, 2015). This process ensures that accurate progress information is provided to the Project Manager at an agreed frequency to ensure that expectations are managed. The activities within the Managing Product Delivery process are Team-Manager-oriented that are to accept, execute and deliver a work package. The objective of the Managing a Stage Boundary process is to enable the Project Board to be provided with enough information by the Project Manager so that it can review the success of the current stage, approve the next stage plan, review the updated project plan and confirm continued business justification and acceptability of the risks (Commerce, 2009). The activities within the Managing a Stage Boundary process are Project-Manager-oriented that are to plan the next stage, update the project plan and the business case, report stage end and produce an exception plan (Bentley, 2015). The objective of the Closing a Project process is to provide a fixed point at which acceptance for the project product is confirmed, and to recognise that objectives set out in the original Project Initiation Documentation have been achieved and that the project has nothing more to contribute (Commerce, 2009). The activities within the Closing a Project process are Project-Manager-oriented that are to prepare planned and premature closure, hand over products, evaluate the project and recommend project closure (Bentley, 2015).

2.5 Systems Development Life Cycle (SDLC)

The systems development life cycle (SDLC) is a term used in systems engineering, information systems and software engineering to describe a process for planning, creating, testing, and deploying an information system. The systems development life-cycle concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both (Shelly & Rosenblatt, 2012). An SDLC aims to construct high quality systems that meet or exceed customer expectations, based on customer requirements, by delivering systems which move through each clearly defined phase, within scheduled time-frames and cost estimates. Computer systems are complex and often link multiple traditional systems potentially supplied by different software vendors. To manage this level of complexity, a number of SDLC models or methodologies have been created, such as 'waterfall', 'spiral', 'Agile software development', 'rapid prototyping', 'incremental' and 'synchronise and stabilise' (Kay, 2002). In project management a project can be defined both with a project life cycle (PLC) and an SDLC, during

which slightly different activities occur. The project life cycle encompasses all the activities of the project, while the systems development life cycle focuses on realising the product requirements (Shelly & Rosenblatt, 2012). According to Shelly & Rosenblatt (2012), the SDLC adheres to important phases that are essential for developers, such as planning, analysis, design, development, testing and deployment.

3 RESEARCH DESIGN

Software development project is managed by well-structured project management method. Each phase of software development including system planning, system analysis, system design, system development, testing and deployment is managed and controlled by project management method such as PRINCE2. Success of a project depends on how project team complete project within scheduled time, estimated cost, defined scope, expected quality and how they manage risk and benefit realisation. PRINCE2 provides well-structured project management framework to manage software project in these six aspects. If a project fails to satisfy any one of these aspects, the project will face the risk of failure. So the key success factors of software project lie on project management method including PRINCE2 that manage project in six aspects in every phase of software development life cycle. Therefore, this research aims to prepare questionnaires and interview questions on project management method, software development phases and six aspects of the project. Project time management, project cost management, project scope management, project quality management, project risk management and project benefit management are kept in grey box. These activities are performed in each phase of software development life cycle. This relationship is shown in theoretical framework with arrow symbol in figure 1. Questionnaires were derived from various factors of principles, themes and processes of PRINCE2 project management methodology and the participants of the case study were asked how these factors were worked in system planning, system analysis, system design, system development, testing and deployment of software development life cycle (SDLC). Analysis of the respondents' answers determines the key success factors.
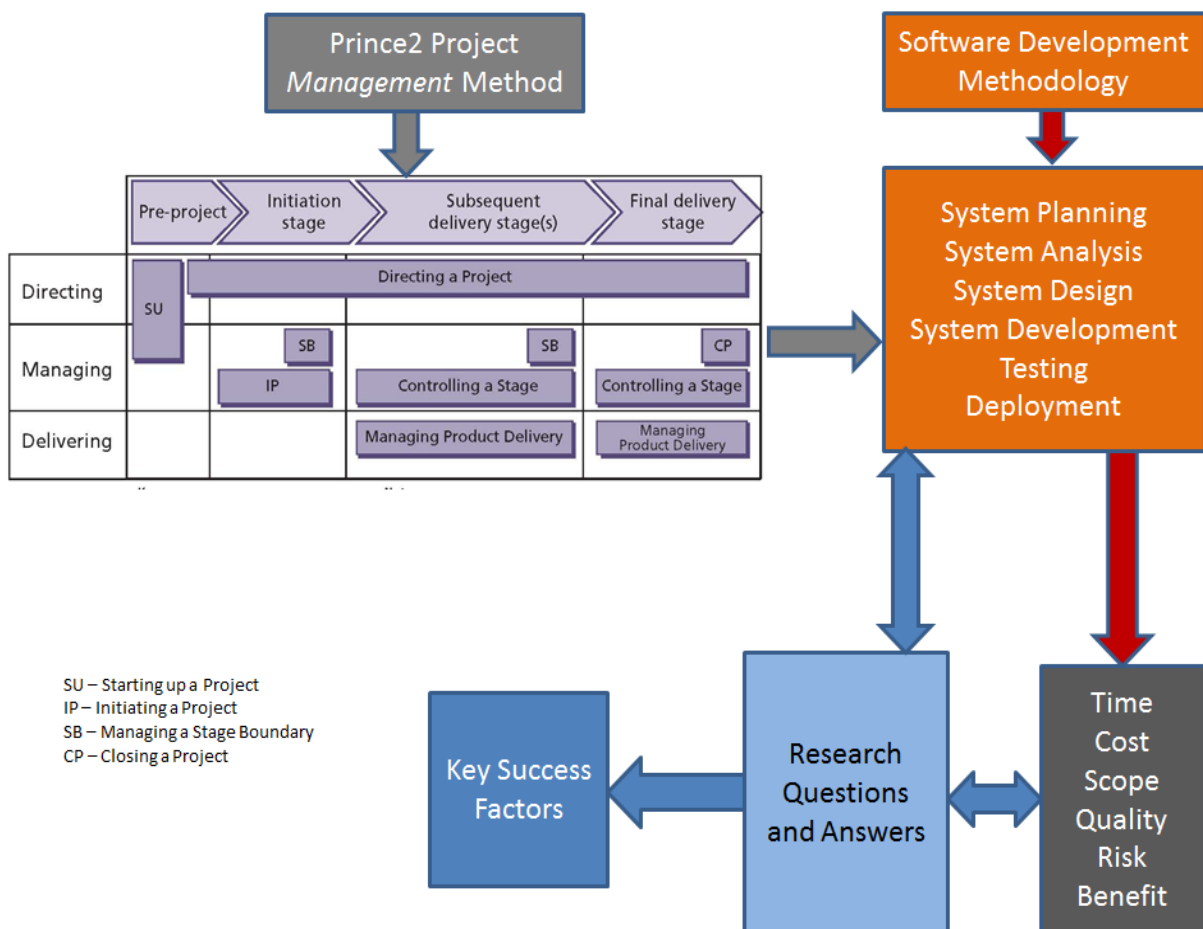

Figure 1: Theoretical Framework of Research Design

4 CASE STUDY SELECTION AND BACKGROUND

The researchers have been conducted in a software development company in India. They are a passionate team with a vast experience in financial domain and IT sector especially in the lending vertical. The researchers have selected this company for the case study because they implement full cycle of software development managed by PRINCE2 project management methodology. The researchers have selected loan management system integrated with accounting system and document management system which was their most successful and vast project where 45 team members worked. Loan management system deals with loan application process, loan approval, loan disbursement, loan rescheduling and loan repayment. The accounting system deals with general ledger, accounts receivables and accounts payables. The loan management system is developed in Java and Oracle and run in web logic application server which is integrated with SAP Financial Management System. The customers can access the system through both computer and mobile apps. There were 3 members in corporate management, 5 members in project board including executive, senior user and senior supplier, 1 project manager, 5 members as team manager, 29 members in development team and a project assurance officer and project support officer. The project was fully developed in two years. The project was developed in six phases including system planning, system analysis, system design, system development, testing and deployment. The other reason is that as the researchers were allowed to access data and were able to get detailed and in-depth interviews and questionnaires of the loan origination system development in this company. The loan origination system can perform loan quotation, loan application, loan approval, loan disbursement and loan collection in 220 branches of the client's organisation. The system is integrated with SAP Accounting System and Document Management System. Document management system captures the documents which are sent by customers during loan application process and save in the database. The documents can be retrieved by loan officers any time for the purpose of loan approval, disbursement and collection. The objectives of the project are: faster and more efficient payment collection processing, reduce human errors and potential leakages in collection, formal records for payments and loans, centralised and manage payment and collection processing, centralised and manage loan monitoring accounting system, centralised and manage loan application, real-time business control and management, real-time personnel tracking and planning, electronic payment collection processes and loan monitoring accounting system. The various core processes that are available within SAP Financial Management System are: basic settings, master data, document control, posting control, clearing, cash journal, special G/L transactions, parking documents, automatic payment, correspondence, interest calculation, reporting in financial accounting, closing activities, receivables & payables, profit and loss etc.

5 RESULTS AND DISCUSSIONS

The data collected from interview have been qualitatively analysed by template analysis. Once the initial template is created, the themes have been organized and modified into a smaller number of higher-level codes to develop the final template which are key success factors found by interview. The data collected by questionnaires have been quantitatively analysed and the higher ranked data are key success factors found by questionnaires. Then data triangulation technique has been applied by comparing the findings of key success factors from questionnaires data with the findings of key success factors from interview data. Data found from documents review and observation techniques have also been considered. Once the findings from questionnaires with findings from interview are cross-checked, the overall key success factors in this research project have been found.

Total 20 factors have been identified as key success factors by data triangulation process. Some of the factors are identified in all phases of SDLC including planning, analysis, design, development, testing and deployment and some of the factors are identified as key success factors in specific phases. The key success factors (KSF) that were identified are discussed below:

Defined Roles and Responsibilities: Defined roles and responsibilities is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Roles and responsibilities of business, user and supplier stakeholders were defined across the organisation according to objective of the project. Each person's knowledge, skills, experience, authority, credibility, commitment and availability are included to define their roles and responsibilities in the project that have great impact on the entire project. The Project Board's roles and responsibilities are defined in such way that they provide overall direction. The Project Board is accountable for the success of the project. The Project Manager's roles and responsibilities are defined to execute day-to-day management of the entire project. Team Member's role and responsibilities are defined to deliver project product within defined quality, scheduled time and estimated budget. The Project Board was aware of their roles and responsibilities in this research project and directed the project efficiently. The Project Board regularly monitored the project and provided support for any requirements to make the project successful. The Project Manager called meeting to the Team Managers and members to monitor the progress of the project. The Project Manager was aware of the timeline of the project and maintained the schedule. The Project Manager controlled budget as a part of his responsibilities. As defined roles and responsibilities, the Project Manager identified and managed risk, delivered work at acceptable standard. He was aware of the benefit of the project. The Project Manager defined the scope of the project and distributed the work to the team manager properly according to agreed roles and responsibilities.

Manage by Stages: Manage by stages is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system

development, testing and deployment. This project was monitored, planned and controlled on a stage-by-stage basis. Manage by stages provided the project board with control point with major intervals in entire project. The Project Manager updated project plan and business case that was vital for the project to be successful. At the end of each stage, the Project Manager produced stage end report and planned for the next stage. According to Commerce (2009), "breaking the project into a number of stages facilitated the project team control over project in the extent of business priority, risk and complexity involved". Breaking the work package into a number of small packages enabled the project manager authorised work package to the right person. This helped project manager to receive completed work package on time. It was easier for project manager to review project status, capture and examine risk and take corrective action for any issue. This provided project manager control over project.

Quality Management: Quality Management is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Quality management provides project team coordinated activities to direct and control the project in the context of quality. A quality management process provides complete set of quality planning, quality control and quality assurance. Quality management process of this project ensured that all necessary tasks of planning, analysis, design, development, testing and deployment are effective and efficient to satisfy the objective and performance of the project. Quality management process of this project ensured that project meet stakeholder's needs and expectations which was key for this project to be successful.

Time Management: Time management is a key success factor in this research study. Although analysis phase was not completed within time frame due to addition of new requirements in the project scope during analysis phase, the project completed within time line as the project team was able to complete other phases before deadline and recovered delay in analysis phase. An ineffective time management would have had a negative impact on the project. Any deviation from the project schedule could have influenced the cost and scope of the project. Ineffective time management can lead the project to unsuccessful. The project manager was aware of timeline of the project and maintained the schedule. Team managers delivered their job within deadline. So, an effective time management played a vital role in this project to be successful.

Scope Management: Scope Management is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Scope management process includes plan scope management, collect requirements of stakeholder's needs, define scope which is detailed description of the project and product, create work breakdown structure that subdivide project deliverables and project work into smaller and more manageable components, verify scope that formalise acceptance of the completed project deliverables and control scope that monitor the status of the project and product scope and manage changes to the scope baseline. Poor scope management can cause scope creep that may lead the project unsuccessful. The project manager controlled the scope in this research project throughout the life cycle of the project.

Monitor Project Progress: Monitor project progress is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Project needs to be monitored regularly otherwise it could go off-track. Project Manager should keep the project on-track to make the project successful. Project Manager has to monitor the project budget, track the project scope, watch the project schedule and oversee the project resources. In this research study, the project manager regularly monitored the project including budget, schedule, scope and resources. Therefore, he was able to provide support for any requirements. The project manager regularly called meeting to the team managers and members to monitor the progress of the project and compared the level of achievement with plans.

Well Planning: Well planning is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Planning is a major important process and a project needs to well plan process to be successful. This research project had well planning of scope definition, project definition, task definition, task sequencing, duration estimating, schedule development, cost estimating, cost budgeting and plan integration. In addition, some facilitating processes were performed sporadically throughout the course of project planning including quality planning, role and responsibility definition, organisation planning, project staffing, communication planning, risk identification, risk assessment, solution development, procurement planning, solicitation and procurement. The project manager reviewed plans and options against future situations. The project manager updated project plan and produced exception plan.

Change Management: Change management is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Any change in project impacts on project, task, process, structure, or job function. Project management team manage change by using tools and techniques within the project. A PRINCE2 project identifies, assesses and control any potential and approved changes to baseline. All issues and changes that could affect the project's agreed baseline were identified, assessed and either approved, rejected or deferred in this research project. Configuration management was active to create, maintain and control change of configuration throughout the life cycle of the project. The project used configuration management strategy, configuration item records, product status accounts, daily log, issue register and issue reports to establish and maintain the project's

controls for issues, changes and configuration management. Configuration item records and daily log were maintained regularly. Product status accounts and issue register were updated regularly. In addition, project team generated issue reports regularly. This procedure provided much improved performance and enhanced innovation to the product and reduces project cost.

Managing Product Delivery: Managing product delivery is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. The function of the managing product delivery is to confirm that the team is allocated authorised and agreed work package. Team managers, team members and suppliers understand what they need to produce and what is the expected effort, cost or timescale. The planned product should be delivered according to expectations and within tolerance. The team provide accurate progress information to the project manager at an agreed frequency to ensure that expectations are managed. In this research study, the team manager ensured that product was developed and delivered to the project by accepting and checking authorised work package from the project manager. Interfaces identified in the work package were maintained. Team manager developed a team plan for this assigned work package and ensured that product was developed in accordance with development method specified in work package. In addition, team manager ensured that product met its quality criteria through the quality management process specified in product description. The team manager obtained approval from appropriate authorities for completed product. While delivering the product to the client, the project manager ensured that host site was able to support the product when project was disbanded.

Top Management Support: Top management support is a key success factor in this research study. This is a key success factor in system planning, system analysis and deployment phase and overall this a key factor to project success. A PRINCE2 project is successful when Project Board is aware of their and responsibilities and direct the project efficiently, monitor project regularly and provide support for any requirements. They have to provide management authority and control to remain the project viable. In this research study, the project board played an important role in system planning, system analysis and deployment phase. Corporate management also adequately supported this project. The project board directed the project in system planning and analysis phase and regularly monitored the project. They provided necessary authorities to initiate the project. They gave new requirements during system analysis phase. They provided management authority and control to continue the project. The project team continued the project with this authority. The project board played an important role in deployment phase when the product was delivered to host site. They provided authority to deliver the project's product and close the project.

Risk Management: Risk Management is a key success factor in this research study. This is a key success factor in system planning, system analysis and system design phase and overall this a key factor to the project success. Risk management process involves identifying and assessing risks, planning and implementing risk responses. Risks should be identified, assessed and controlled for effective risk management. A risk management strategy should be developed to explain how risk management will be embedded in the project management activities. Risk management provides information to project management so that project team can make informed decisions on issues critical to project success. In this research study, risk was identified, assessed and controlled properly. Risk management strategy was prepared in planning phase. All risks were identified, assessed and controlled in planning, analysis and design phase. Assessing and managing risks is the best weapon to make the project successful. There was no risk involved in development, testing and deployment phase. Overall risk management is a key success factor in PRINCE2 project in software development life cycle.

Communication Management: Communication management is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Effective communication management process ensures timely and appropriate generation, collection, distribution, storage, retrieval and ultimate disposition of project information. In this research study, project manager communicated team members and other stakeholders to the project both internal and external and created a bridge between team members and other stakeholders including different levels of expertise to make a transparent communication to share their knowledge, skill and information which was key to project success.

Project Team Competency: Project team competency is a key success factor in this research study. This is a key success factor in system planning, system design, system development and deployment phase and overall this a key success factor for this project. The primary requirement of a project team competency is to have a competent project manager. A project manager should be a project champion in order to make the project successful. In this research project, the project manager had general management skills including leadership. He was able to provide direction, vision, mentor team members, sound judgment, issue and conflict resolution, effective decision, communication, and team building. He had project management skills including project management tools and techniques. He had proven industry experience. He was strategic in approach and provided clear definition of requirements and time table. He was able to deliver project within time and budget. He managed the team to bring success. He managed project scope, quality and risk. He was organised and efficient in work processes. He was key to make this project successful. The other team members were competent particularly they were technically sound. Their technical competencies were vital in planning, design, development, and deployment phase.

Learn from Experience: Learn from experience is a key success factor in this research study. This is a key success factor in system planning, system analysis, system design, system development and testing phase and overall this is a

key factor for this project to be successful. Lessons should be sought, recorded, and acted upon throughout the life of the project to make the project successful. These lessons are helpful while project progressing. In this research study, the project team developed similar project before. They learnt lessons from their previous experience which was key factor for this project to be successful.

Assign Work to Right Person: Assign work to right person is a key success factor in this research study. This is a key success factor in entire software development life cycle including system planning, system analysis, system design, system development, testing and deployment. Picking wrong person for project task is a major reason for failure. In this research study, the project manager assigned work packages to right persons who were capable of doing that particular work package. As a result, the team members were able to complete their assigned packages within timeline at acceptable standard which led to this project successful.

Cost Management: Cost management is a key success factor in system planning phase. Project cost management involves three processes including cost estimation, budget determination and cost control. Cost estimation and budget determination processes were developed during system planning phase in this research study. Project board decide whether they will continue the project or not that depends on budget. Then cost was controlled according to budget.

Prioritising Task: Prioritizing task is a key success factor in system planning phase. Project manager prioritises tasks during development of project schedule and the most important tasks are preferred to complete before less important tasks. In this research project, the project manager collected the list of all project tasks, identified urgency, assessed value, ordered the tasks by estimated efforts, and then prioritised the tasks. Hence the project manager managed teamwork load and deadline of the tasks. Although task prioritisation was done in planning phase, it had impact on the entire project to make this project successful.

Benefit Realisation: Benefit realisation is a key success factor in system planning and deployment phase. Project benefit realisation management process provides output that are new products or services delivered by the project and the objectives are achieved once the project concludes. The successful completion of a project provides benefits that are the value created for project beneficiary. Benefits can be tangible or intangible. Benefit realisation management process involves identifying benefits, execute benefits management and sustain benefits realisation. In this research study, benefits were identified during planning phase which was key success factor. Project team executed benefits management throughout the life cycle of the project. It was important that benefits were realised during deployment phase which was key to project success. This project sustained benefits realisation since the objectives of the project product are achieved and satisfied the stakeholder's expectation.

Being Agile: Being agile is a key success factor found in system planning and system analysis phase. The project needed to adopt tools, processes and a mind-set of being nimble and deliver value as fast as possible and as reasonable as possible during planning and analysis phase. In addition, the project management team required to accept a certain level of uncertainty in planning phase and perform validation on ideas and concepts ahead of the decision to implement the project.

Tailor to Suit the Project Environment: Tailor to suit the project environment is a key success factor found in deployment phase. A PRINCE2 project should be tailored to suit the project's size, environment, complexity, importance, capability, risk and user satisfaction. The project manager reviewed the performance of the project against its baseline at the end of deployment phase. The project was fit for purpose. The project manager ensured that provision had been made to address all open issues and risks. The product was installed in environment of host site and the host site was able to support the product when project was disbanded as all complexity of the product was resolved. The performance of the product was at expected level and users were satisfied with the system.

6 RELEVANCE TO OTHER FIELDS

These key success factors can be applied to different sectors but the importance of the KSFs will be different for different sectors. These key success factors are applicable to industrial plant erection project that is implemented in PRINCE2 project management method.

7 CONCLUSIONS

This study targets on the different dimensions of PRINCE2 project management method in SDLC context to investigate its impact on the project to be successful and provides comprehensive understanding of its implementation on software development project. The main contribution of this research is identification of key success factors of PRINCE2 method in software development projects. These factors are applicable to all project phases and are adaptable to different types of projects and companies. The key success factors are unique in nature as the functionalities of these factors are same in different projects. This research study provides theoretical contribution by enriching PRINCE2 project management method literature as it provided a comprehensive insight to the key factors that are considered important for successful implementation of SDLC project. The findings can assist the IT practitioners such as senior executive, project manager, team manager, team members and other stakeholders who are in charge of SDLC projects to better anticipate the future challenges of the SDLC project progression and how to subsequently manage them. These KSFs can be used as model of project management methodology. Senior executives, project managers, team managers, team members and other stakeholders of the project can follow this model for successful implementation of the project. This study is based on a single case, it has limited generalisation of the research results. But the finding of this case study research can be valuable to software practitioners in other

countries as well. It can also help senior executives, project managers and team managers to manage SDLC project more efficiently and effectively. The findings of the research can lead future project executives, project managers and team managers to practice better project management process including better planning, both short-term and long-term, leading to more predictable outcomes. The findings may provide an indication as to how an organisation should adopt a project management methodology or when they should implement a standard methodology. This study found several factors that can all contribute to the success of a SDLC project in PRINCE2 project management method. It is expected that the theory and research findings presented in this thesis can aid the development of the software project in PRINCE2 project management method.

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