An Actor-dependency technique for Modelling Hewlett-Packard SAP implementation (Real- World case)

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1. Abstract

This paper focuses on actor dependency modelling in case of SAP ERP implementation at Hewlett Packard. In order to model this, it uses i* modelling language under which, it forms SD and SR diagrams. This paper presents SD and SR diagrams for all phases of SAP ERP implementation at HP which includes Go-live readiness, ERP training, Post production support, stabilization and knowledge transfer management. During SAP ERP implementation, HP faced problems in inventory management, customer support and ERP training specifically, this paper models these processes and tries to eliminate the problems. This paper specifically focuses on actors like project management team, IT team, Technical support, customer support and inventory management team.

2. Introduction

With the rapid expansion in the consumer base, of both similar and highly differentiated products, the competitions in the industries, among firms, has tremendously increased. To compete with rival firms in an industry and improve the consumer base, a firm needs to improve its performance dynamically and needs to rationalize, and adapt to the changing needs of the market, to suit the demands of its customers. The adaption and implementation of these changes, though appear easy to follow, needs a whole comprehensive assessment of the market and also working methodology of the firm itself.

Sometimes the improvements are needed to be implemented in the business processes used by the firm. But to implement the changes in the business process, multiple parameters are needed to be taken care of. This becomes a tedious and complicated work for a firm, and also have high risk involved. Availability of different process models to implement these changes are utilized at different stages of design, analysis and implementation of the change. These changes and process models fall under the Business Process Reengineering (BPR) methodology.

2.1 Business Process Reengineering

Existing business processes are redesigned to improve the performance of business processes with introduction of certain sets of activities, this process of redesign is called Business Process Reengineering. The most important part, or element, of Business Process Reengineering is change management. Implementation of changes in technology or the structure of business process of a firm, first needs to be analyzed thoroughly and then they move to the implementation phase, which itself is an extensive process. These changes always has some associated risks, so the firm also needs to model the risk management along with change management as a BPR attempt. Risks can be reduced but they can never be completely removed, so risk management cannot be skipped while introducing the change in business process. We can say that both change and risks are specific to the business model in use and the new process to be implemented by the firm so, these needs to be modelled specifically for the firm.

Modelling business processes needs to model the interdependencies among the actors involved in the business processes and their roles and motives behind their actions needs to be modelled for better understanding the change and implementing them. Here, actors implies different individuals or organisations which are affected by the change and who themselves play an important role in bringing the change. Decision of these actors also influence the business process and hence the way the changes are to be implemented. Actors are also referred as the stakeholders. Some stakeholders include - customers, employees, employers, other institutions working with the firm etc. These actors are dependent on each other in one way or the other for fulfillment of some individual goals and their interdependencies changes with change in

reengineered processes. This paper tries to propose certain changes to the existing infrastructure and analyzes different possibilities with the change.

To model the interdependencies and analyze the change, different kind of tools are used. This paper tries to take advantage of i* modelling language to model the interdependencies and also to assess them. In order to accurately estimate cost efficiency, this paper tries to model different cases separately and analyze them simultaneously. Typically, such tasks take place at the Project Management Level.

2.2 i* Modelling

i* Modelling language is developed to model different business processes that is, the interdependencies among the actors and also the motives behind the actions of the actors. It is used to model the early phase of implementation of the project and helps to understand the associated problems with both existing and reengineered process. It allows the user to model the situation as it is and as it is expected to be. It has been developed keeping in mind that actors are different and so their goals. These goals can be sometimes competing or conflicting with each other which depends on each other for fulfillment of these goals. Other approach of modelling includes the UML, the KAOS approach etc. Basically, i* modelling enables the user to model with actors involved and their individual goals and interdependencies on each other and the user is supposed to analyze the model. In case of change management modelling using i* modelling language, there exists two types of representations. These includes -

Strategic Dependency (SD) Model

SD Model is used to model the interdependencies of the business processes. It answers the question that who depends on whom for which reason. Different elements of a SD diagram can be marked as the depender, dependee and the dependum based on their dependencies. Here, depender is an actor who depends on another actor i.e. dependee for fulfillment of some goal, task or some resource etc. These goals for which the depender depends on dependee is called as the dependum. These dependum can be of four types

1. **Goal Dependency** - Under goal dependency, an actor depends on another for fulfillment of some tangible condition. That is we can say that the depender depends on dependee for some tangible condition fulfillment.
2. **Task Dependency** - Under task dependency, an actor depends on another, i.e. depender depends on dependee for performing an activity (i.e. dependum). It represents that the goal of the depender is directly dependent on the accomplishment of the task.
3. **Resource Dependency** - Under resource dependency, an actor depends on another for availability of some entity i.e. resource.

4. **Softgoal Dependency** - Under Softgoal dependency, an actor depends on another for fulfillment of some fuzzy condition. Fuzzy implies the goal is unclear or is not specified accurately.
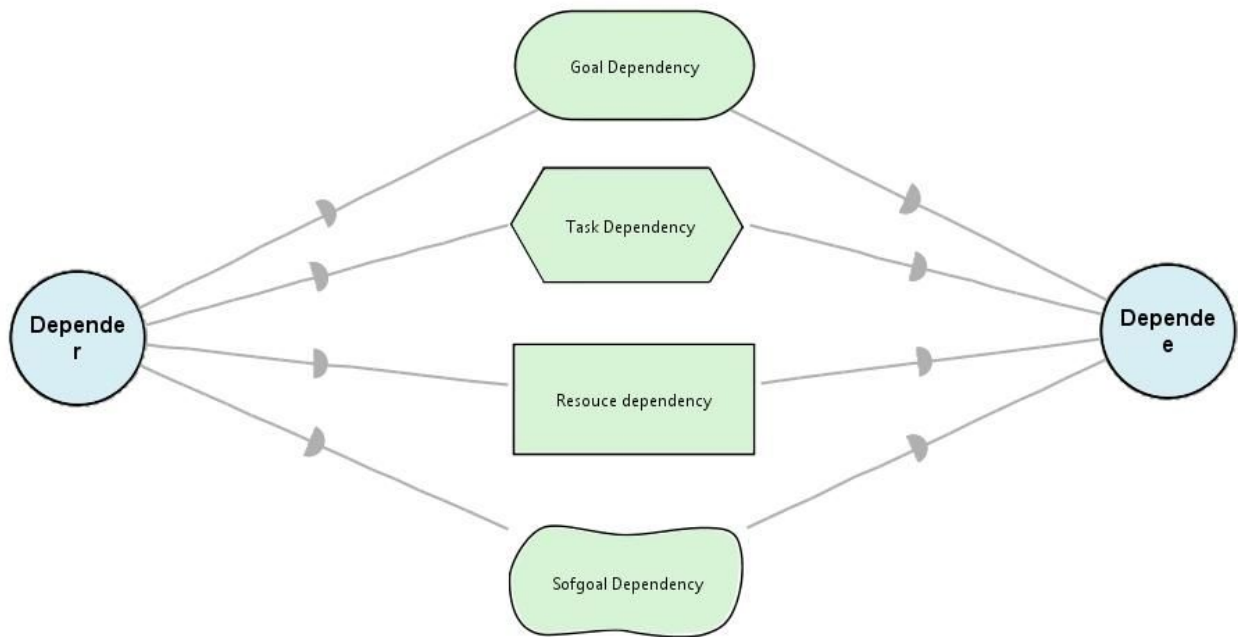

Figure 1 Illustration of dependencies between depender and dependee through various dependums

Strategic Rationale (SR) Model

SR diagram helps to model the actors involved in the business process internally which helps to justify their dependencies. Though SR diagram also models the external relationships among actors like SD diagram but it focusses inside the actors and models the reasons for which the actors depends on other i.e. it models the individual goals and their relations with goal. It also models how these goals or tasks depends on other subgoals or subtasks. It uses means-end and task-decomposition method to model these dependencies among tasks or goals. These tasks may have positive or negative contribution to other actors' goals.

This paper uses i* modelling language i.e. SD and SR diagram to model the case of expansion of Hewlett-Packard SAP ERP implementation.

2.3 CASE : Hewlett - Packard SAP Implementation

Introduction to Hewlett-Packard

Bill Hewlett and Dave Packard, students at Stanford University, founded Hewlett-Packard in 1939. They first built an audio oscillator which was used by Walt Disney Studios for sound system testing in their movie, Fantasia. Later, with development in technology, HP developed many other new and useful technology products to meet the continuously evolving needs and demands of their customers. HP also supplied technology products to businesses. And now have become a worldwide IT company with its headquarters in Palo Alto, California. It has created $85 billion in revenue. Currently, the products and services supplied by the company can be categorised as - Personal Systems, imaging and Printing, and Technology Solutions.

Intro to Case : Expansion of HP

Hewlett Packard has successfully implemented some change management for implementing ERP system in their business processes. ERP (Enterprise Resource Planning) system is a business process management software suite which is used by organisations to manage their business efficiently and automate many business processes using its human resources (employees), technology and various services. It integrates various business operations and helps to do the work in real-time. HP adopted the ERP while it purchased Compaq to integrate its activities and it worked successfully at that time for HP.

Hewlett-Packard implemented new ERP system, SAP in its much larger North American division, being inspired by successful ERP implementations in its previous divisions. In spite of having a good, well experienced team and Go-live plan which allowed nearly 3 weeks of issues related to interfacing between SAP and the legacy order entry, this time implementation failed. Technical side problems got resolved in 4 or 5 weeks but in this duration about 20% orders were stopped, creating backlog of orders. Manual workarounds were not able to keep the flow of orders so customers diverted to their competitors. Its financial impact to HP was about $160 millions.

Actually some very minor technical problems made the implementation a disaster. There was lack of continuous training till Going live, as it stopped 2 weeks before actual Go-live date. This new ERP system SAP was unable to successfully develop a robust test plan, and the test data, along with testing using "real" data and "real" customer information. The contingency plan needed to be expanded including technical issues and workarounds. After testing the system and interface between SAP and the legacy system, implementation team did many things right. The team revised five major phases of ERP implementation: Go-live readiness, ERP training, stabilization,

postproduction support, and knowledge. This paper deals with each of these phases separately one-by-one.

3. ERP implementation : Processes for successful SAP implementation in HP

3.1 Go-live Readiness:

Go-Live Readiness assessment is necessary for any change in the business process and it holds for the SAP ERP implementation in Hewlett-Packard too. Without this process some important steps might be missed and go-live quality will be affected. IN that scenario, Hewlett-Packard would be better off using the old legacy system that using the new and more effective integrated SAP ERP system. Readiness process should ideally start several months before the actual Go-live date. The main goal of this process is to clarify the progress towards completing the SAP ERP implementation in Hewlett-Packard as BPR attempt. In the readiness process all areas (i.e. infrastructure, development, configuration, conversion, testing, training, communications, operations, command central, reporting, and users etc.) needs to be assessed. Based on the assessment, the Project Management Team needs to prepare and submit a summary of review, to be presented to senior management, which is prepared from inputs collected from main actors like project teams, users, and team leaders. This assessment provides an idea of developments and modifications needed in the ERP system, to the senior management at Hewlett-Packard.

Hewlett-Packard needs to undertake several reviews before going live for ERP implementation, as significant project progress can be seen in this duration and then the projects will be needed to be improved and improvised accordingly. First readiness review may not guarantee completion of many tasks or activities but it gives management and the project team, a good idea of the tasks, goals, and other activities which need to be completed and tested again before going live. Project management team at Hewlett-Packard might choose to solve these issues with additional staff or in any other way they see fit.

Go-live readiness process is a very long and monotonous process. Current metrics related to what remains to be completed is documented and communicated with the project team and senior management of HP and verified for accuracy. The actual Go-live date for the SAP ERP implementation is evaluated with each review. The actual go-live date needs to be changed only in case where a significant number of changes are required and several new issues and challenges comes up in the review. Hewlett-Packard should have at least two alternative dates which help in determining the actual go-live date and it should be communicated with all the members involved (necessary for the credibility of the process).

Senior management in HP needs a detailed report of executive summary of the progress. It allows senior management to be updated with the status of implementation in HP. Each category is assigned with a list of tasks and activities; this information is incorporated into the readiness review.

A series of meetings and discussions with team leaders, team members, and subject matter experts determine readiness. PMO should possess key skills of listening during these meetings.

Actors involved- Management and Project teams, user, team leaders, conversion team, testing and development team, Project Management office, Senior management, Subject Matter Experts etc.

SD diagram :-

The dependencies of the main actors can be mapped using a Strategic Dependency diagram as presented below. These main actors are PMO and senior management .PMO occupies position of Project Manager in SAP ERP implementation process. PMO notify Senior management about project progress so senior management depends on project manager for this. A detailed report with executive summary should be given to senior management so that he can ask question related to further ideas in project to project manager and other team member of HP .
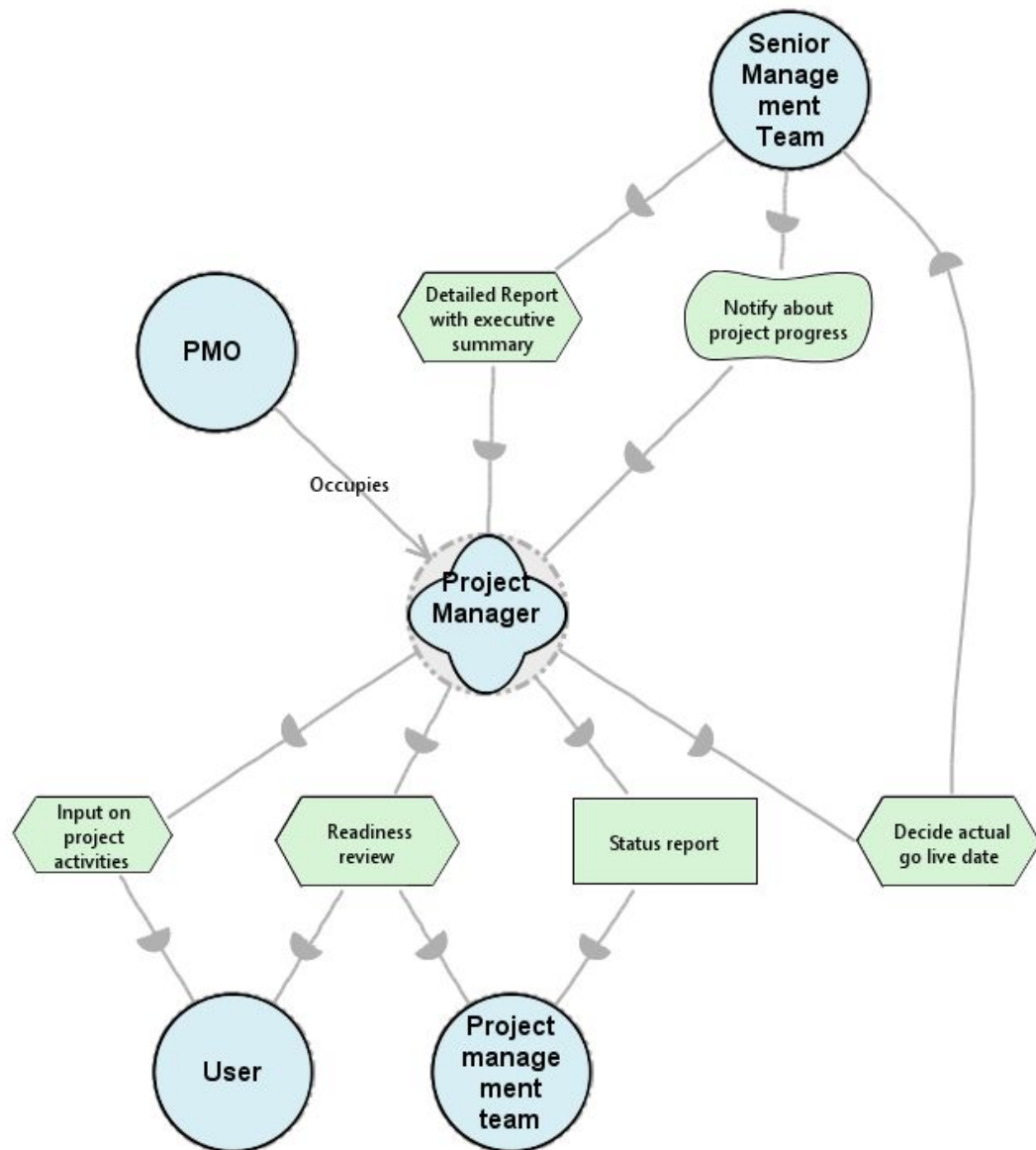
Figure 2. SD diagram for Go-live readiness

PMO which occupies the position of project manager depends on the user for getting inputs on project activities. He also depends on user and the project management team for getting the readiness review done. Project management team submits the status report to the project manager, on the basis of which it submits a detailed executive summary report to the senior management. Senior management reviews the report and decide about the final go-live date.

SR diagram :-

As it can be seen PMO occupies the position of Project Manager having the main goal of deciding the actual Go-live date. It can be achieved by detailed report with executive summary for Senior Management and by accessing overall implementation readiness after each meeting. So Project Manager is depender and Senior Management is dependee here and detailed report with executive summary is the dependum. This resource can be achieved by the task of evaluating data and progress which has means end relationship with the task of gathering input on project activities. Senior Management's task is to ask question related to project progress which depends on detailed report with executive summary. Senior management notifies Project Manager about project progress.
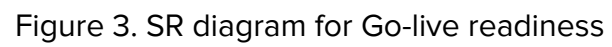
Figure 3. SR diagram for Go-live readiness

3.2 ERP Training:

Hewlett-Packard needs a well-thought-out training plan as an important part of its SAP ERP implementation and it should must be provided to every user. Training uses real data and post Go-live examples. A continuous training needs to be provided before and during Going-live phase. Users should be trained about using the system and transactions for daily processing. A proper training regime should make sure that end users come across 90% of transactions at the training place that they will face in real life. Training Program in HP provides trainees a practice environment (training labs and user desktops) having real data with all security and configuration in place.

HP can also use training environment as a testing place to "certify" users that they are qualified to use the new ERP system. This also helps in identifying people who need special help in adjusting to the new system in HP.

A variety of personnel use different methodologies to deliver ERP training in HP. These personnel include in house staff who often have less experience with ERP system, trainers working for software vendor, or third party trainers with specific experience in ERP system. Several training formats are available (e.g. Web-based virtual classrooms, knowledge warehouses, self study books etc.) depending on the needs of any sized company with small or huge budgets. Developing several ways of training users with different learning skill ensures overall success of implementation in HP.

ERP training in HP is independent of ERP applications. It is the underlying flow of information through business. Although training seems to be technical but most issues during and after an implementation in HP are people and culture related. Users must be aware of inconveniences to other parts of business due to poor data entry processes (e.g. questionable data inputs from sales department may result in invoices not getting sent or being paid). Sometimes training is cut (due to lack of budget) or gets put into the post implementation schedule affecting adversely.

Training must be put forth to middle management because pre implementation decisions in HP may be problematic in an ERP post-implementation environment. Thus short-term benefits of conducting a poor business process must be avoided by the managers. Main goal of training can be achieved by a broad education in HP's ERP-mediated business process and here comes the role of senior management.

Actors involved : In-house staffs, Software vendor trainers, Third Party Trainers, End-Users
So, here basically the above mentioned actors have interdependencies for various reasons, their interdependencies can be modelled using a Strategic Dependency diagram. Also, the actors have been modelled internally using a Strategic Rationale diagram.

SD Diagram

Before drawing the SD diagram for the ERP training at Hewlett-Packard, we need to have a conceptualisation of various actors who will play the role of trainers in this ERP implementation process. The actors who played the role of trainers in the ERP training process include the in-house staffs, third party trainers, and also the trainers from the Software Vendor (i.e. SAP) side. All the three occupies the same position of trainer but they have somewhat different roles in the whole process.

Here, the in-house staffs of Hewlett-Packard include the IT staffs from Hewlett-Packard who are not well acquainted with the new system but have proper knowledge of the old legacy system and the required IT knowledge. On the other hand, the staffs from the Software vendor side include the well trained professionals who have all the needed expertise and knowledge of the SAP system and can help in training both the end users and the in-house staffs of Hewlett-Packard. These trainers also collect feedback data from the users and the in-house staff to improve the performance of the software package and promote it alongside. Another group of actor who occupy the position of trainers include the third party trainers, who are equipped with the all ERP systems and are expert in that. The importance of third party trainers in today's world can be understood by seeing the growth in the market size of firms involved in providing third party trainers, it has grown as a
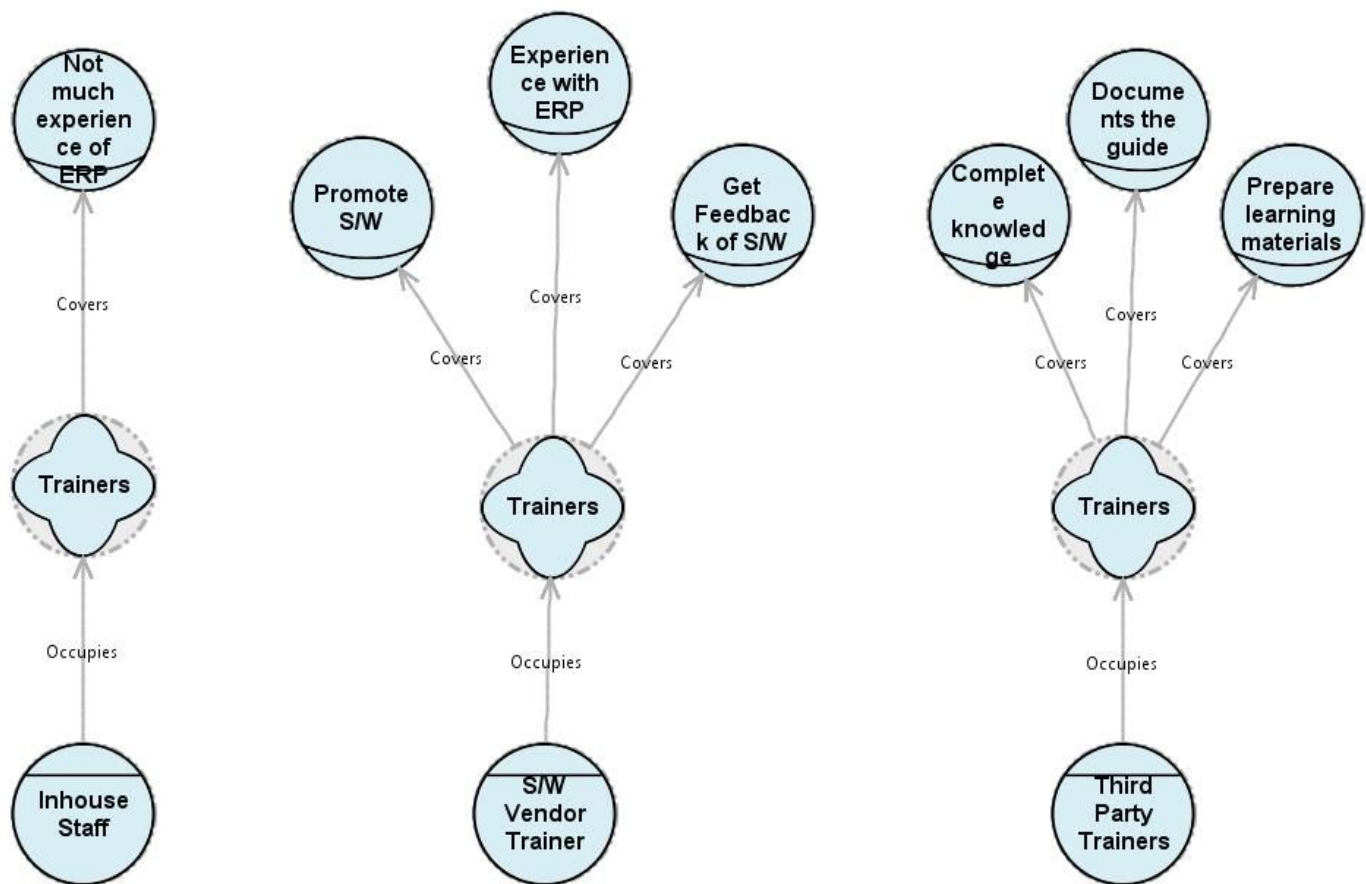
Figure 4. SD diagram for training

profitable business option. These third party trainers covers the role of documenting the guide for use of ERP and also prepare learning materials on behalf of Hewlett-Packard to be provided for ERP training to its end-users.

Now, the SD diagram representation of the ERP training phase of the SAP ERP implementation at Hewlett-Packard is presented in this paper to model the actor dependency relationships in this phase i.e. how and actor depends on another and what are the different goals or tasks for which the one depends on another,
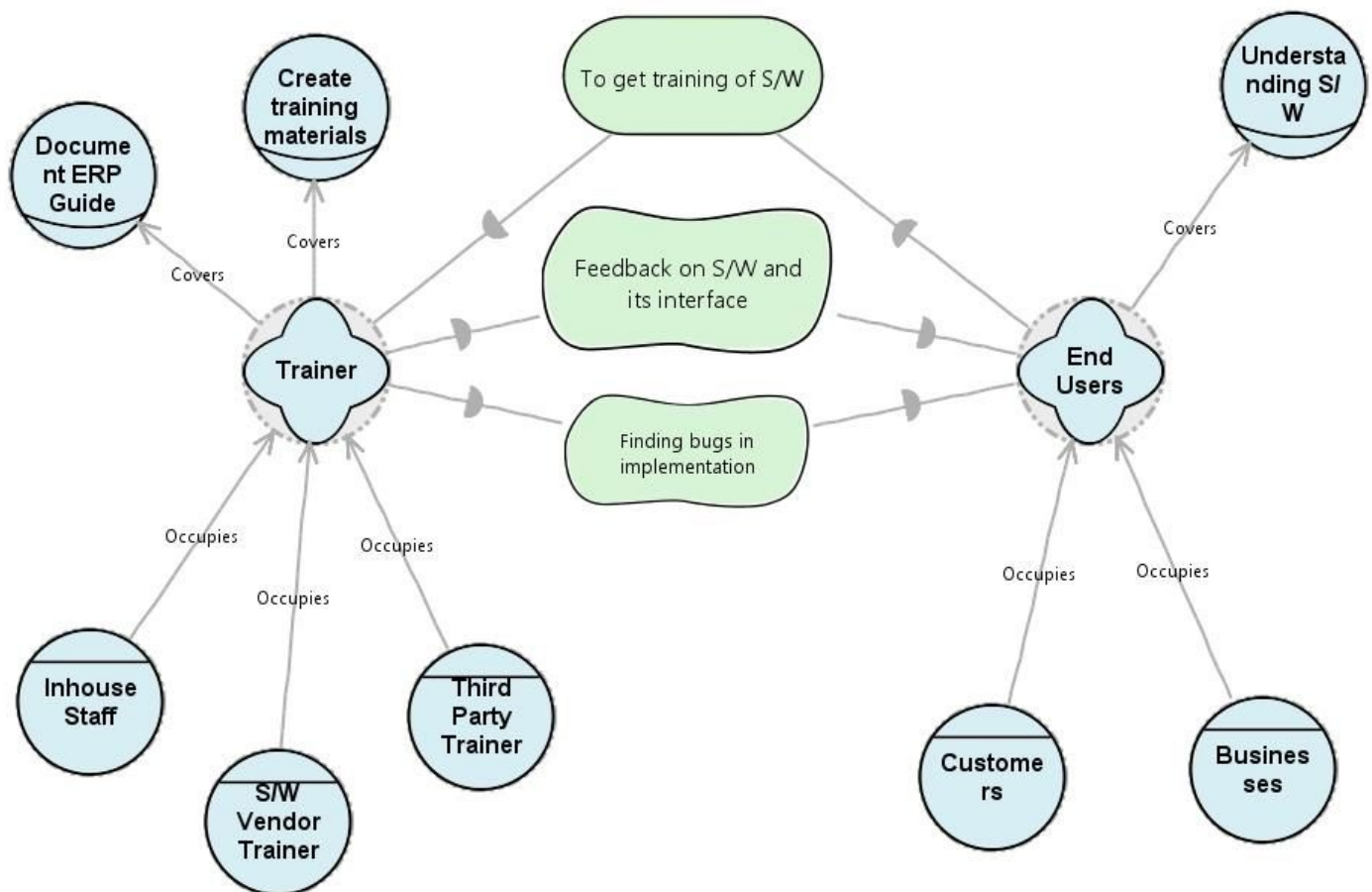

Figure 5. i* modeling for training

Here. in the above SD diagram we can see that in the ERP training phase of SAP ERP implementation at Hewlett-Packard, in-house staffs, software vendor trainers and third party trainers occupies the position of trainers, who have roles of documenting the user guide and creating learning materials for the users, while different businesses and customers of Hewlett-Packard occupies the position of End-Users for the software package. These end-users depend on the trainers for attaining the goal of getting trained for using the software or the new ERP system. While

the trainers at also depend on end users with softgoal of getting feedback on the s/w use and the interface. Also end-users help the trainers to find bugs in the s/w and report it to the developers.
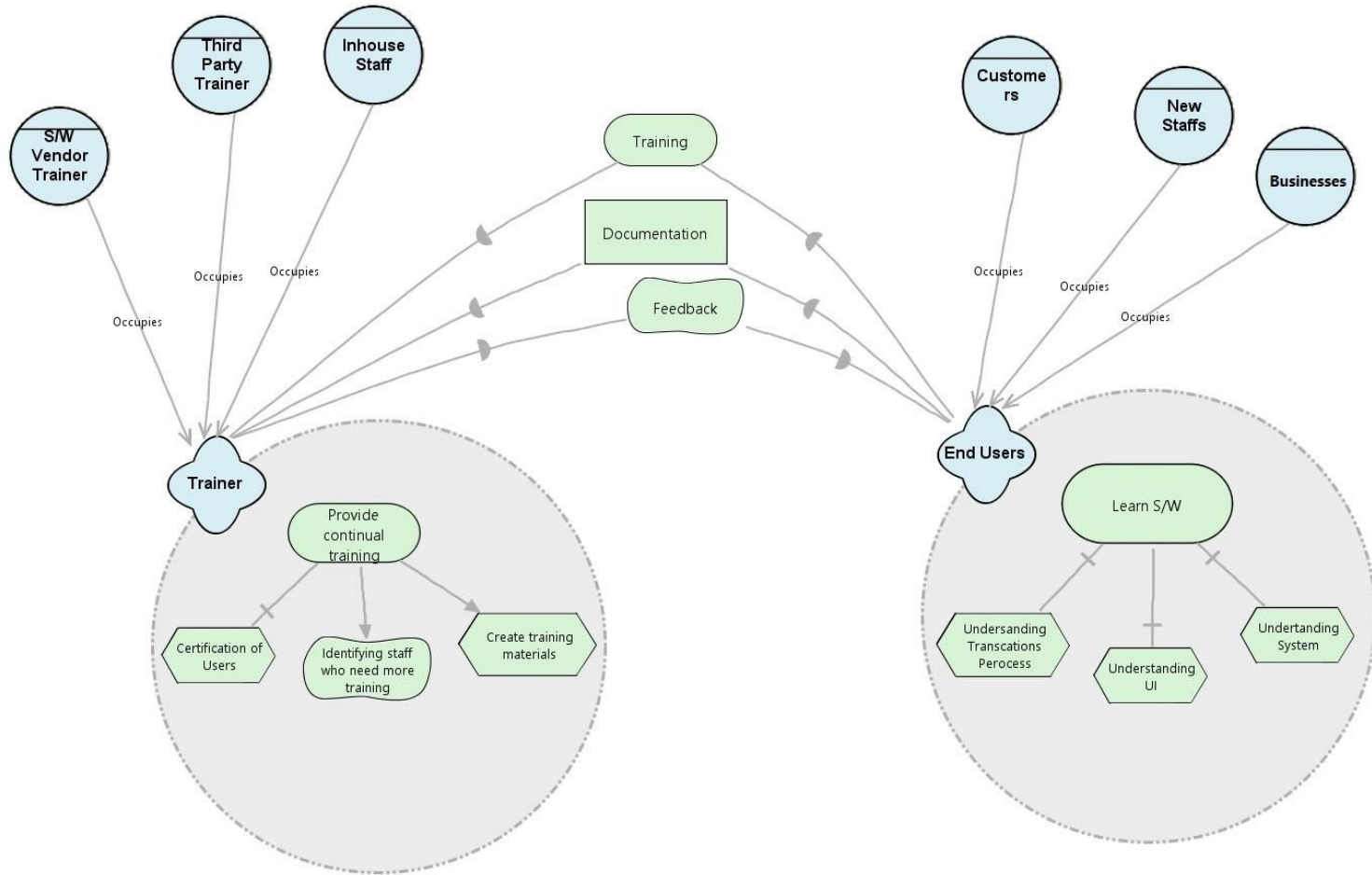
SR Diagram

Figure . SR diagram for training

SR diagram enables users to model the actors internally. Here, we can see that the in-house staffs, third party trainers and software vendor trainers occupies the position of trainer and they have the goal of providing continuous training to the end-users. In order to achieve this, they need to identify staffs who need more training, create training materials for them and also certify the users.

On the other hand, customers, new staffs and other businesses occupies the position of end users and they want to learn the software and its interface. In order to do so, they understand the transaction process, the user interface and the whole system. These end users depend on the trainers for training and documentations while the trainer depends on the end user for feedbacks which helps to improve the system by finding the bugs and making it easier to use,

3.3 Stabilization:

After completion of ERP training Hewlett-Packard need to focus on the stabilization process and conversion of critical data when SAP ERP system software is in production. Hewlett-Packard will need about 60 to 90 days, according to the number of problems, to complete this process. It can be observed that there exists a means end relationship between Stabilization and SAP ERP implementation at Hewlett-Packard. This stabilization process will familiarize the users with new system and new processes at Hewlett-Packard. Main objective of the stabilization process is to provide a timeframe to fix problems, and bugs in the system, by the IT staff of Hewlett-Packard. Questions and issues (i.e. how the system is working, incorrect data conversion, and system stability) needs to be resolved by the technical support team of Hewlett-Packard. HP also needs to conduct a parallel research, and fix problems, where IT staff monitors the infrastructure and ensures that backups are taken appropriately for all H/W and S/W. All the elements of SAP ERP implementation in HP work together, if not then undiscovered problems arise and IT support center gets calls.

Stabilization is characterized by many time consuming problems. Insufficient training,inability to perform ad-hoc activities and poor communication and documentation can add more troubles for the development and project management team. Although these business processes are not completely new to HP implementation team and users, but mistakes during the implementation of the processes are inevitable and needs to be taken care as they cannot simply duplicate their earlier business processes and needs modifications. HP needs to operate the old legacy system parallely to the new ERP system, during SAP implementation but this can be labour-intensive and confusing process for the management team and also the IT team. It needs to validate the inputs and outputs between the new and old ERP system.

Strategies to minimize business disruptions due to stabilization problems can be applied in advance or in real time. Implementation team can provide frequent communications with its suppliers and customers, understanding the errors that result from running the new system software in HP. Changing business processes to match the system functionality and customization of the software to match the business process can help to some extent here.

Actor involved -

There are many actors involved in SAP ERP implementation of HP. Some of these are users , subject matter experts,IT staff , IT support center ,project team management etc .
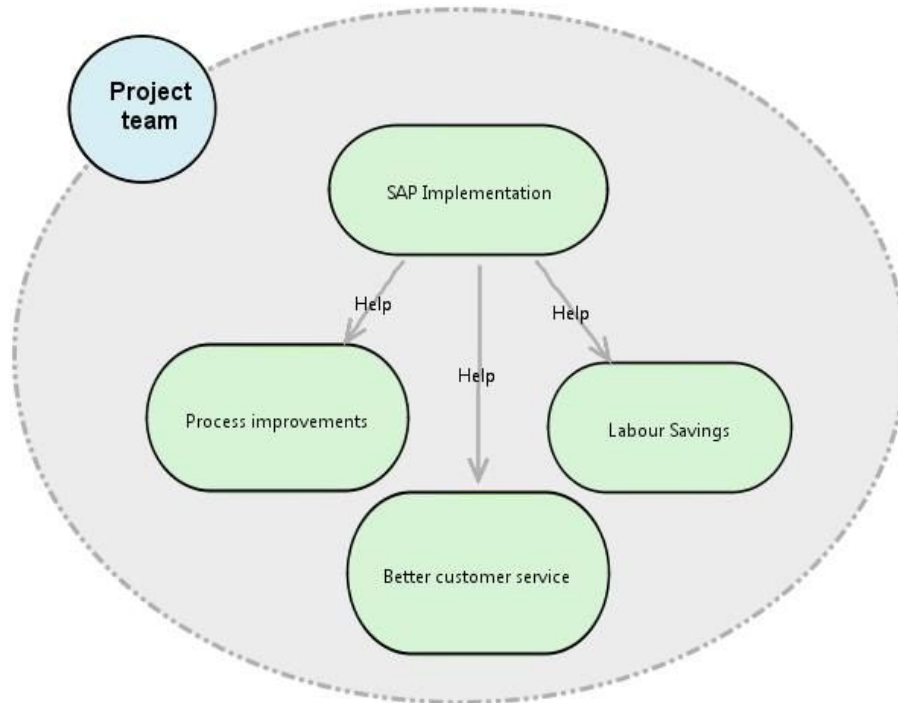

Figure . Illustration of SAP implementation as main goal of Project team

Main goal of Project team is implementation of SAP ERP system. In order to attain its goal, it tries to improve various processes involved, provide good quality and better improved customer service, and it also focusses on labour savings. These were some of the goals and subgoals of Project team in order to achieve the proper implementation of SAP system at Hewlett-Packard.
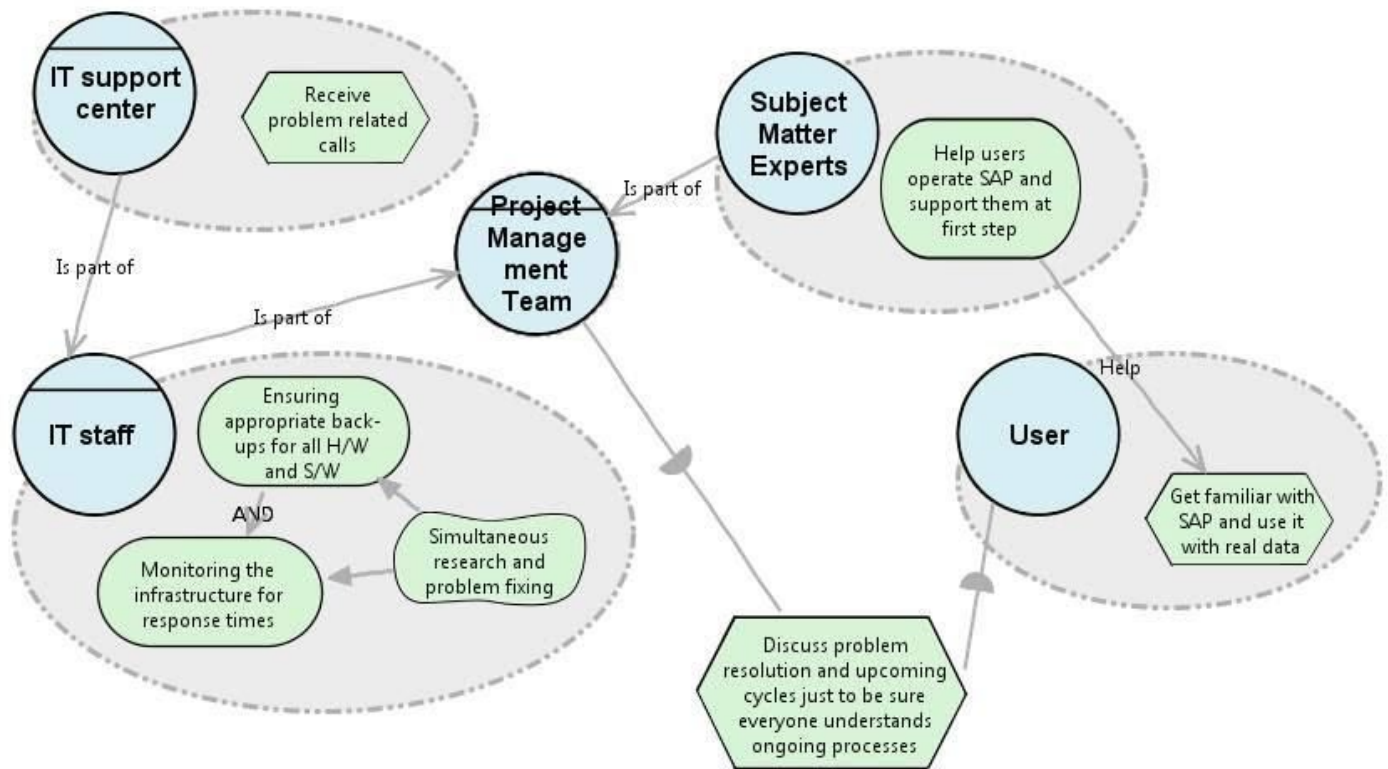
SR Diagram -

Figure . SR diagram for stabilization

Here are mainly four actors/ agents involved: Subject Matter Experts, IT staff, IT support centre and users.Subject Matter Experts and IT staff are two parts of Project Management Team. Project Management Team holds meetings with users and discusses problem resolution and upcoming cycles just to be sure everyone understands ongoing processes. Subject Matter Experts help users operate SAP and support them at first step which helps user in getting familiar with SAP and use it with real data. Agent IT staff ensures appropriate back-ups for all H/W and S/WI. The another goal is to monitor the infrastructure for response time. There exists means end relationship between these two goals and the fuzzy softgoal of simultaneous research and problem fixing. Soft goal is fuzzy due to its subjective nature IT support center is a part of IT staff whose task is to receive Problems related calls related to poor system performance of SAP in HP and to resolve them.

3.4 Post Production Support

Post production support is one of the most important phase of process which helps to manage daily operations at Hewlett-Packard and ensures that system is doing what it is required to do for successful implementation. This is an important process as activities are outlined during this development phase. Core project team members and subject matter experts provide general support to explain about simple process and answer system questions asked by users.

To gain the advantage of SAP implementation new processes have to be understood and spreaded among management team and users. If one doesn't have data then users and management may have questions and dissatisfaction regarding SAP system's effectiveness. So it is very necessary to know what effects does this new ERP system has on the organisation.It is important to have a solid user support program for SAP implementation otherwise many questions might go unanswered.These questions are related to effective use of SAP ERP system by users, regarding its benefit in business/ organisation.

The main goal of the actors such as subject matter experts and core project team members is to provide support to answer simple development process and system related questions. Generally users face problems due to lack of understanding of the business process interactions with the system .Task of subject matter experts here is to provide ongoing support to people who faces problem .The support process is divided into three tiers -

Tier 1: It is considered triage and is typically the Help Desk or Call Center in HP. This gathering will attempt to address extremely clear issues or inquiries, frequently identified with password problems issues or resets or general access issues in HP.Beyond this the Help Desk will forward the inquiry or issue to Tier 2.

Tier 2 - In this Subject matter experts are used.They try to resolve the system process question in HP .If SME is unable to the resolve the problem ,the issue is transferred to tier 3.

Tier 3: It is a combination of technical staff and vendor or implementation partner support.These are generally difficult issues that will require the specialized technical staff to research and alter.

Agent involved :- Different actor involved in this SAP ERP implementation process are Subject Matter Experts , technical staff ,vendors ,helpdesk,users etc .

SD diagram :- The main goal of postproduction in HP is to manage the daily system operation and to ensure that system is working in correct manner.SD diagram explains dependency between different actors.In this subject matter experts needed to resolve HP system process question about the progress of SAP ERP implementation. This solid user support system of HP is divided into 3 tiers - Tier 1 ,Tier 2 ,Tier 3.

In this tier 2 that is usually SME depends on tier 1 (Help desk) for forwarding the question (Information) and tier 3 (Technical staff and vendor) depends on tier 2 for the same. Tier 3 often takes complex problems that need technician to resolve and fix.
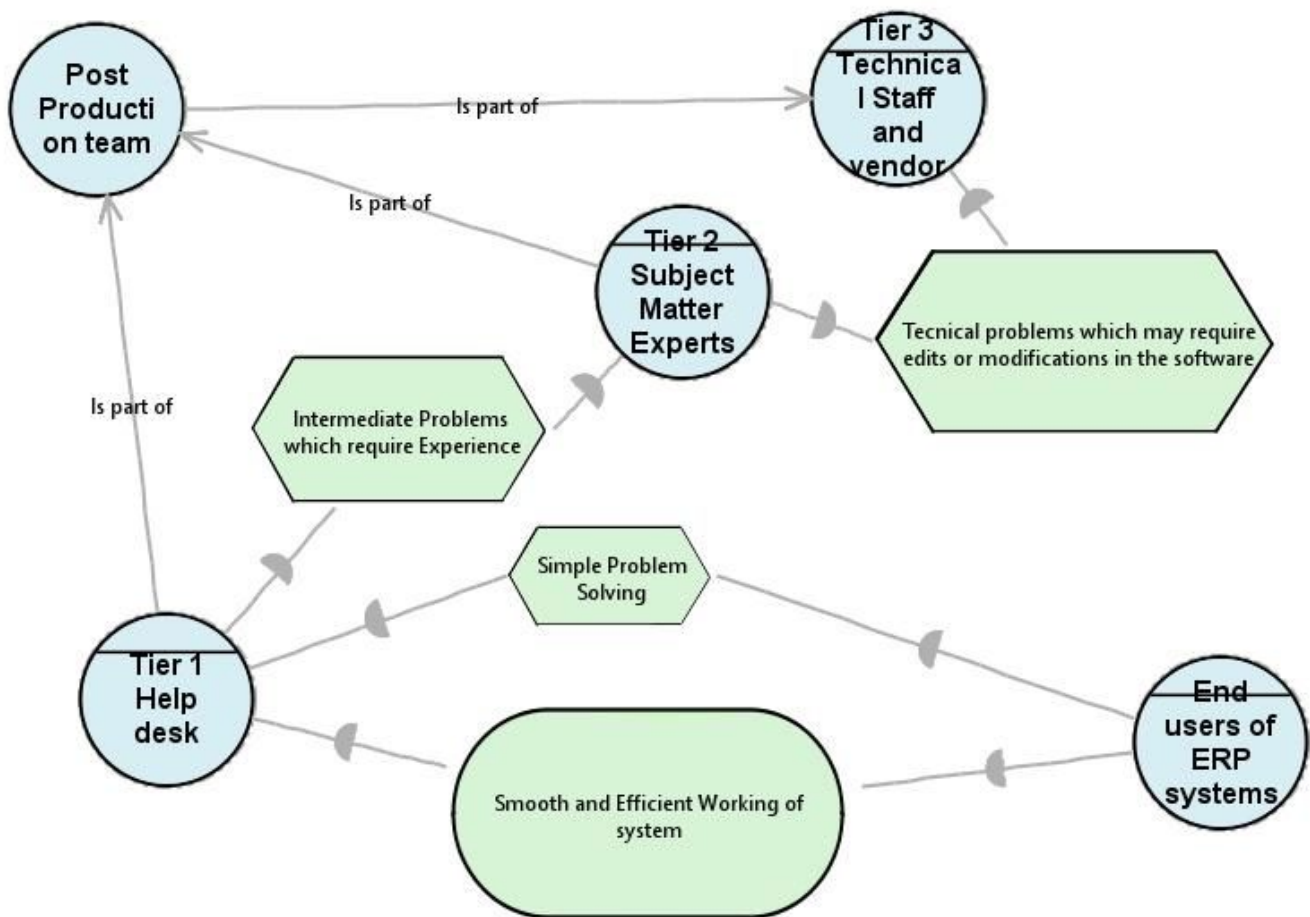

Figure . SD diagram for post production support

Users depend on tier 1 help desk for quick and simple problem solving. The help desk refers the unsolved queries to higher tiers. The tier 2 subject matter experts solve all the problems except the ones which require changes in the software itself. These changes/ queries are taken care of by tier3 technical staff.
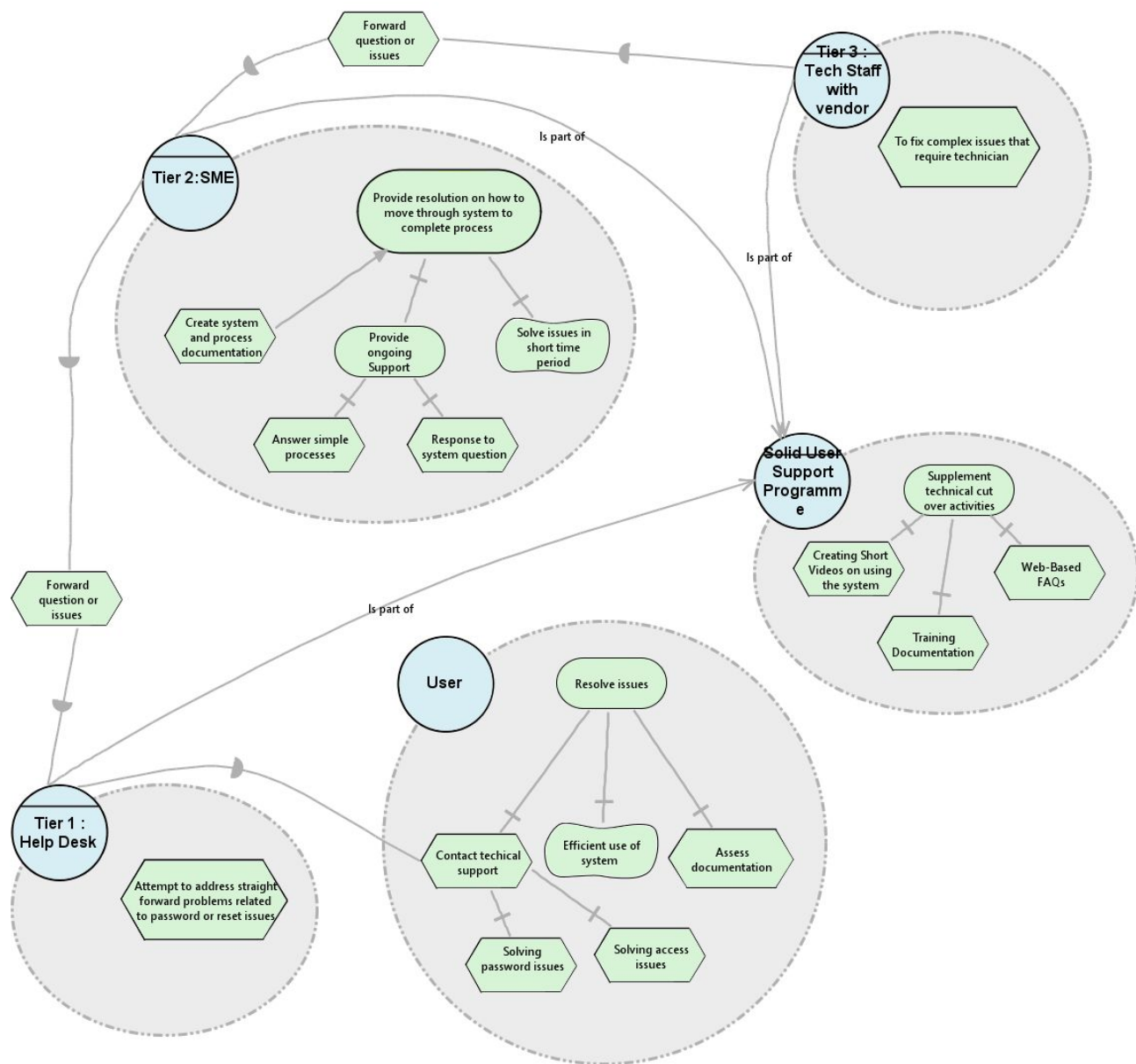
SR Diagram

Figure . SR diagram for post production support

Tier 1, Tier 2 and Tier 3 are the part of Solid User Support Programme. Tier 1 attempts to address straightforward problems related to password or access issues. Beyond that it forwards questions or issues to Tier 2. Tier 2 provides resolution on how to move through system to complete process. When issues don't get resolved in short time period then Tier 2 forward it to Tier 3. Tier 3 fixes complex issues that requires technicians. So overall Solid User Support programme's goal is to supplement technical cutover activities.

There are five area involved in the in post production support-

Training - It starts before going live and continue after go live with varying rate depending on the training method that is used.

Go-live Support - It is a framework used when clients require help related to any defects and mistake in the new system .Call center play key role in this process .

Data Validation - It is a approach to test users and ensure that they are expert in using the new system and data entry done by users are correct.

Data Correction - It is a way to identify and update bad data .If it is not done carefully it can lead to other data and system issues .

New Features - New features are added while incorporating the evaluation of the solution that was already implemented. It increases the level of confidence towards the system.

3.5 Knowledge Transfer

Knowledge transfer is the key element in the successful long-term implementation of any new system or business -process. It applies for the SAP ERP implementation in HP also. But there are certain problems related to knowledge transfer which includes loss of knowledge when an employee leaves the company. In post implementation phase high learning curve for new users, forgetting system features, and misuse of the system are important issues during production and extensive use for any change in business process.

SAP ERP implementation in HP can be categorized into various phases: Requirements Gathering and Definition, Build, Go-live, Stabilization, and ongoing support. Knowledge is acquired and lost during these phase. Transition from one phase to another creates problems. In case of changes in personnel during these timeframes requires skill to new or existing staff of HP through knowledge transfer. Help of implementation partners or external consultants can be taken for this purpose.

Definition phase:

Hewlett Packard needs project monitoring and tracking, collaboration and communication, subject matter expertise, hardware and software architecture, lesson-learned repository, network configuration, and the like to be documented at time of SAP ERP implementation This will help to eliminate or reduce knowledge loss and will enable easy and swift transfer of knowledge.

Go-live and stabilization phase:

Team composition is likely to change in this phase. Tasks include training guides, user guides, known problems and troubleshooting guide.

On-going support phase:

Departments and users in HP are likely to change again. Customers, vendors and analysts are added to the user base. All this change in composition of actors leads to loss of knowledge and hence needs to be addressed properly by the Knowledge Management Team.

Knowledge management system helps implementation team of HP to store documents by streamlining one centralized data repository. It reduces confusion, duplication, and data losing events.

Advantages of knowlegde management plan:

1. Knowledge is retained
2. Reduction in the cost of support due to lower numbers of support calls
3. Faster learning
4. Better maximization of system capabilities

Actors - Implementation team, Knowledge Management Team, Project Management Team, IT Staff, New Staffs, Centralised Data repository

SD Diagram

The main goal of HP during this phase of implementation is to retain the learned data and reduce or eliminate the loss in knowledge due to various reasons. In order to achieve this goal HP can create a knowledge management team which will enable HP in managing the Knowledge transfer process.
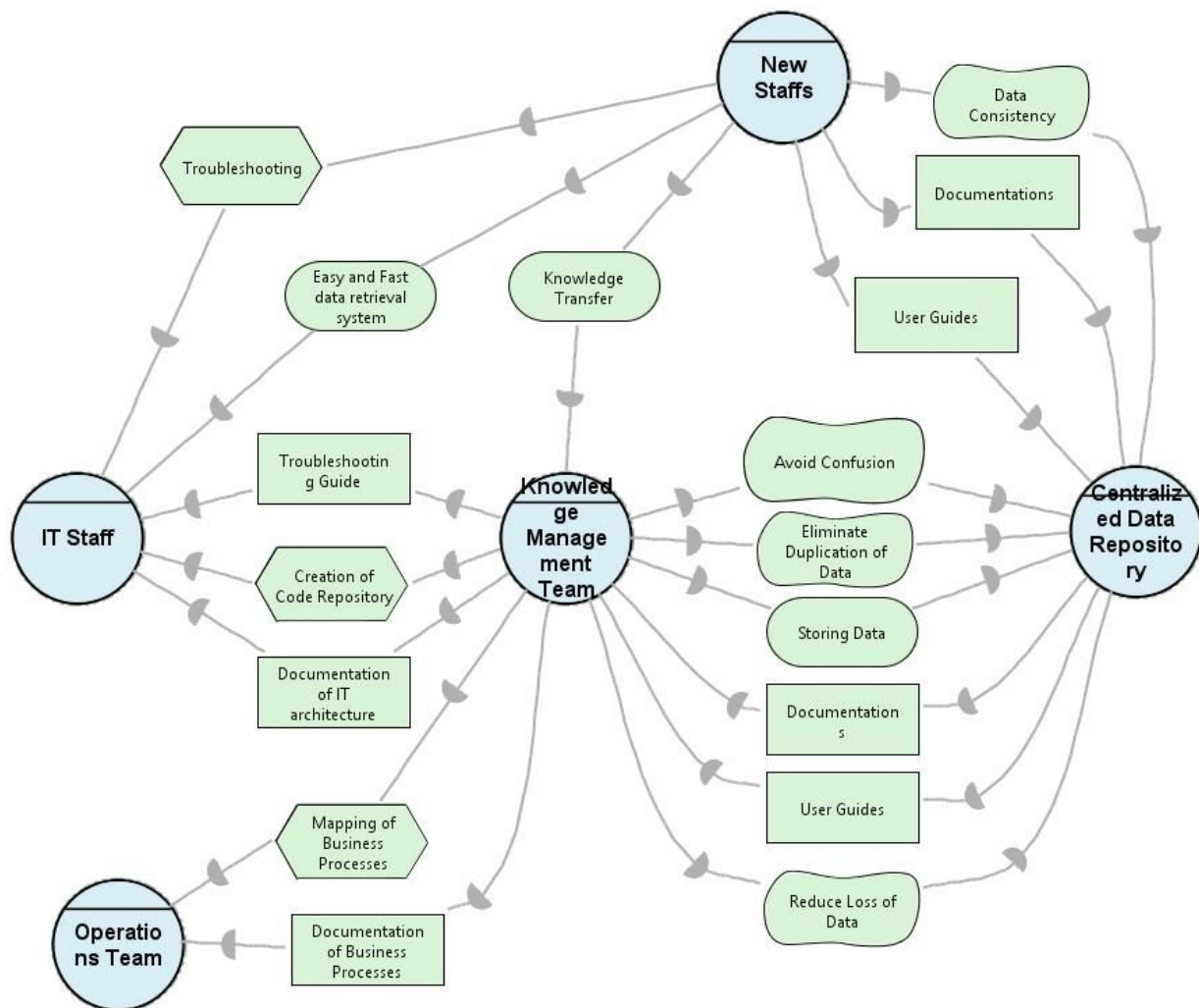
Figure . SD diagram for knowledge transfer

Since, knowledge transfer is crucial at all the phases of implementation and loss in knowledge can be found while change in team occurs or the process crosses the borders of various departments, so the knowledge management team of HP needs to interact with various departments and processes of SAP ERP implementation. For efficient work, HP can form the knowledge Management team with members from various teams. So, the Knowledge Management Team of HP will be a culmination from the Project Management Team, Operations Team, and the IT Staffs. All of these different departments will provide their inputs like the user guide, documentations, learning materials etc. to the knowledge management team which will provide this data to Centralized Data Repository.

So, here dependencies among the actors are modelled using a SD diagram. The Knowledge Management Team (KMT) will depend on the IT staffs for creation of code repository, an extensive troubleshooting guide, and also for the various documentations of the Network configuration, IT architecture and H/W or S/W configurations. On the other hand, the KMT will depend on the Operations Team for the creation of documentation of various business processes, and their mapping.

KMT depends on the Centralized Data Repository for storage of data of all types in a consistent format which is available to all the users. KMT also depends on centralized data repository for the attainment of softgoal of avoiding confusion, reduce data loss, and eliminate duplication of data. While the centralized data repository depends on the KMT for getting the documentations, user guides and the troubleshooting guides.

Knowledge transfer is important for the new staffs entering the system. These new staffs will depend on the centralized data repository for the documentations, user guides and consistency of data. These staffs will also depend on IT team for the troubleshooting guides and will have the softgoal of easy and fast data retrieval system.

SR Diagram

SR diagram models these actors internally. Here, we can see that the KMT is a culmination of Operations Team, Project Management Team and the IT Team. All of these departments have the goal of reducing or eliminating the knowledge loss. For this, IT team documents the network

Objective of the IT team is to avoid knowledge loss and the system misuse. In order to avoid knowledge loss it documents hardware and software architectures, and network configuration. It also monitors transition in phases and create code repository which enables saving the code for future uses in order to avoid system misuse it is the responsibility of IT team to create a troubleshooting guide and also a Training guide which will help the new users to understand the whole system and and work efficiently.

Project management team plays a crucial part in all the phases of ERP implementation. Here, the main goal of project management team is to create a plan for knowledge transfer. In order to

achieve this, PMT document lesson learned repositories, SMEs documentation, and collaboration and communication. Another goal of Project Management team is to avoid misuse of system for which it traces and monitors project development, creates SME documentation and also documents collaboration and communication.

Operations team faces problem of knowledge loss while the team composition changes. In order to avoid loss of knowledge, it documents different business processes and also mapping of business processes to enable the user understand inter-relationships between those processes. It also has the task of skill and knowledge transfer to new employees so that they can perform their work efficiently.

Knowledge loss occurs while new staffs are being added to the different business processes. These staffs depend on the IT team for getting the troubleshooting guide, and they also depend on the centralized data repository for getting the documentation like user guides, learning materials and other documentation. The staffs depend on the knowledge management team for the knowledge transfer process

Task of knowledge management team is to create a knowledge management plan which it achieves by avoiding knowledge loss, due to personnel transfer, and avoid misuse of system. To avoid loss due to personnel transfer, it keeps monitoring different transition phases of business processes. It also has the softgoal of smooth transfer of knowledge and documents user guides which enables it to avoid system misuse.

Centralised data repository is created to avoid knowledge loss. It maintains a code repository and stores different documentation and guides. It also provides single interface for use by all staffs which helps in avoiding confusion and enable user to work efficiently. It stores data in one consistent format. Knowledge management team is dependent on centralised data repository for elimination of duplication of data, reducing lost of data and eliminate confusion
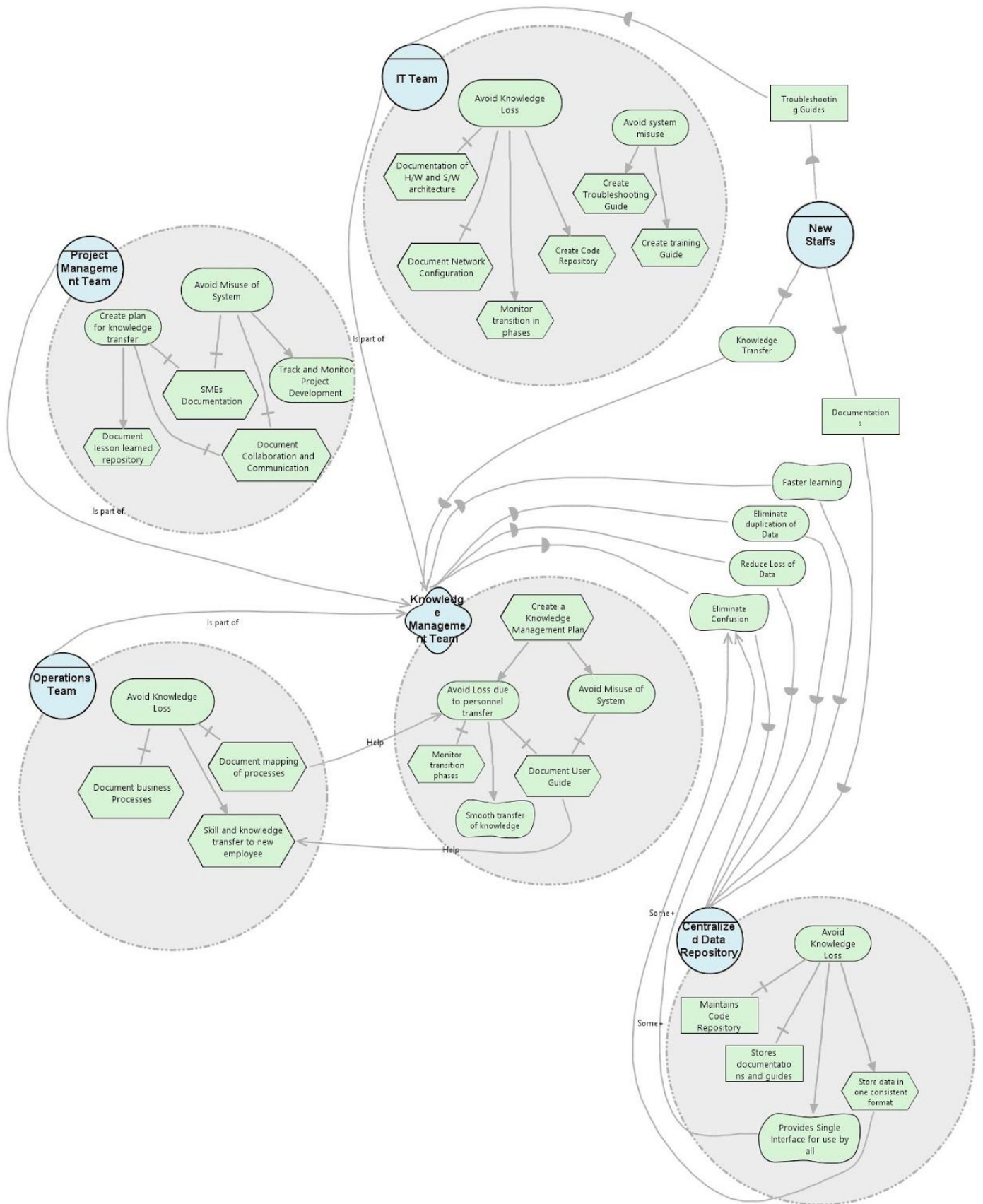
Customer Support and Inventory Management

Like any other business, in HP also customers can contact to the customer care or the technical support team for different queries and updates. They depend on the customer care for filing complaints, getting the order updates, and also for getting the response of different queries. On the other hand, customers depend on the technical team for getting real time updates on products, offers, etc, filing complaint for the product and tracking their order updates. While the technical team depends on the customers for placing orders, customers place their orders which are sent to order management team. So, we can say that the order management team depends on the technical term
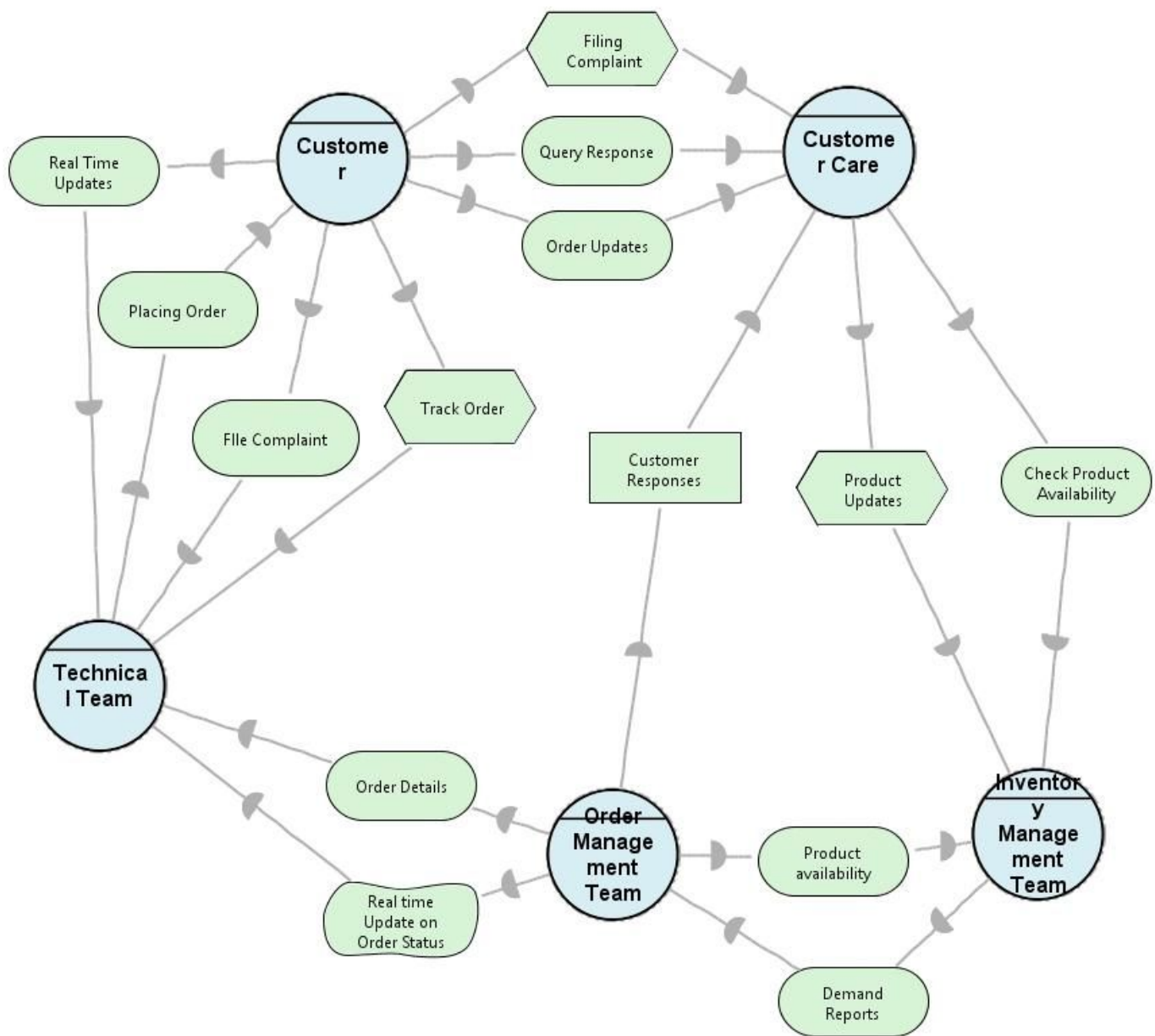
for getting order details and getting real time updates on any order status, that is if someone cancels the order, it should be updated by technical team to the order management team and the order management team has the responsibility to check the product availability with the inventory management team which manages the product inventory. The inventory management team gets the report of the demand for a product from the order management team. Any queries or complaint filed to the customer care is intimidated to the order management team, i.e. the order management team depends on the customer care for getting the response on the service delivered by the company and product updates. The customer care depends on the inventory management team for getting product updates on their availability. In case the product is not available with inventory, it is responsibility of inventory management team to inform the customer care and order management team about the product non-availability, in such a case customers should not be allowed to place the orders. It can be connected to a centralised system of order management which will allow the technical team and the customer care to know the availability of product and hence update it instantly, and not allow the customers to place order for any product that is not available.

4. Conclusion

In our HP case the ERP implementation failed mainly because of two reasons : 1. No Proper testing was done 2. The training and Go live did not coincide. To resolve these issues we have explained 4 processes a. ERP training b. Stabilization c. Post production support d. Knowledge transfer. All these processes can make sure that a company like HP can smoothly transition from their old legacy systems to ERP systems.

  Our recommendations to HP would have been that they follow a proper training regime where people can learn to use the system to do their day to day tasks. This regime should last till the go live date so that people don't forget what they have learned and fall into the bad practices of legacy system again. The second recommendation is on the software side. There should exist a rigorous testing plan in place from day one which includes testing the software at various stages of development. This will keep the Senior Management notified about the progress as well as keep the technical bugs to a minimum. This will also help in deciding if we need to change the GO live date if faced by a particularly daunting task in technical side.

  All the companies switching to ERP must follow the processes explained in this paper to ensure that they do not follow HP's footsteps into a disaster that cost them 160 mil dollars.