
CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction

This chapter will discuss theories and methodologies that will support the work of this thesis. The literature review mind map will give the big picture of what things will be discussed in this chapter. Since the main topic is about implementing ERP, the branches will be about factors in ERP implementation.

It is important for organization to understand the basic concepts of enterprise resource planning if they want to implement and use it for their personal use. Companies must understand why they need ERP before even consider implementing it. They need to know what they can do what they cannot do from ERP software.

After understanding the ERP, organization start to choose the software to be configured. Choosing the software can be quite a troublesome because they need to choose the best one that suits the business of their company. For instance, this thesis work will choose ADempiere as the software to be configured for CV. Surya Agung. And later on, it will be explained why ADempiere is chosen.

Before going into the implementation steps, study and analysis of the company must be done in advance, in order to know things to be configured later on in the software. When implementing ERP software, theories that will be discussed are methodology chosen for implementation, how it will be implemented (the phase), and key factors of successful ERP implementation.

Enterprise Information System is also important as it serves as the basic structure of the information system in the company. The architecture of enterprise information system will also be discussed in this chapter for readers to understand the importance of it.

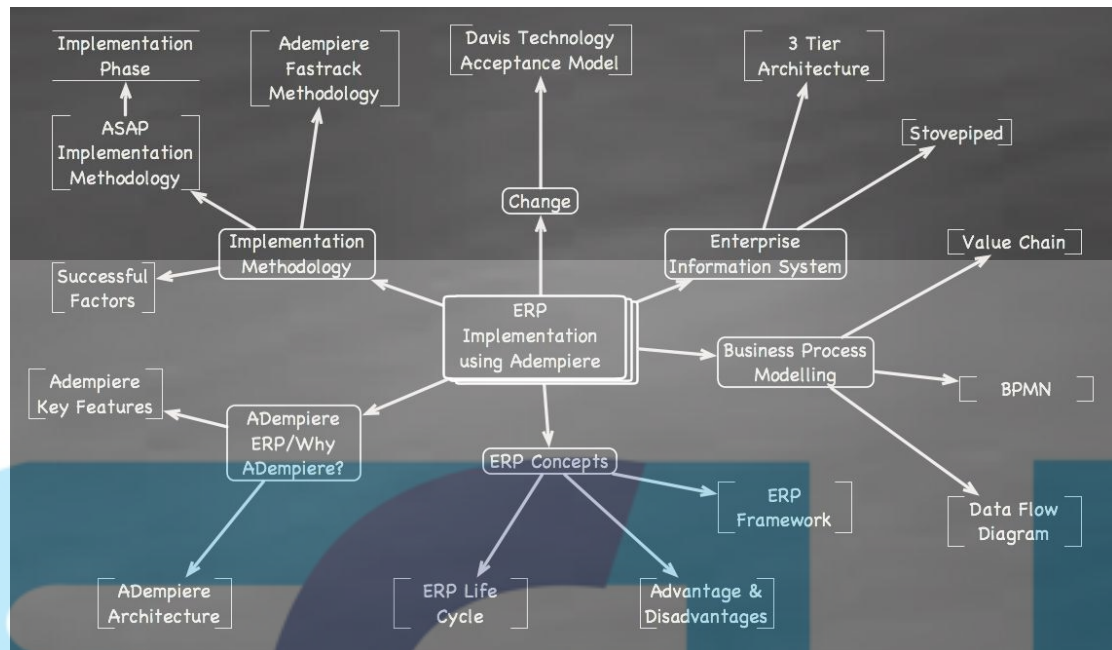


Figure 2.1 Literature Review Mind Map

2.2 Enterprise Resource Planning Concepts

Understanding the basic concepts of ERP is required for one to know what ERP can do for you. Monk & Wagner [1] define ERP systems are core software programs used by companies to integrate and coordinate information in every area of the business. The business areas are such as sales, finance, manufacturing, logistics, and human resources.

From the data integration within each area, ERP provides accurate reports and statistics for better decision-making. Those business areas or activities serve as the modules in the ERP software and acts as the ERP framework. After understanding the basic concepts of ERP, reader must know the benefits or advantages and disadvantages of ERP system.

2.2.1 ERP Framework

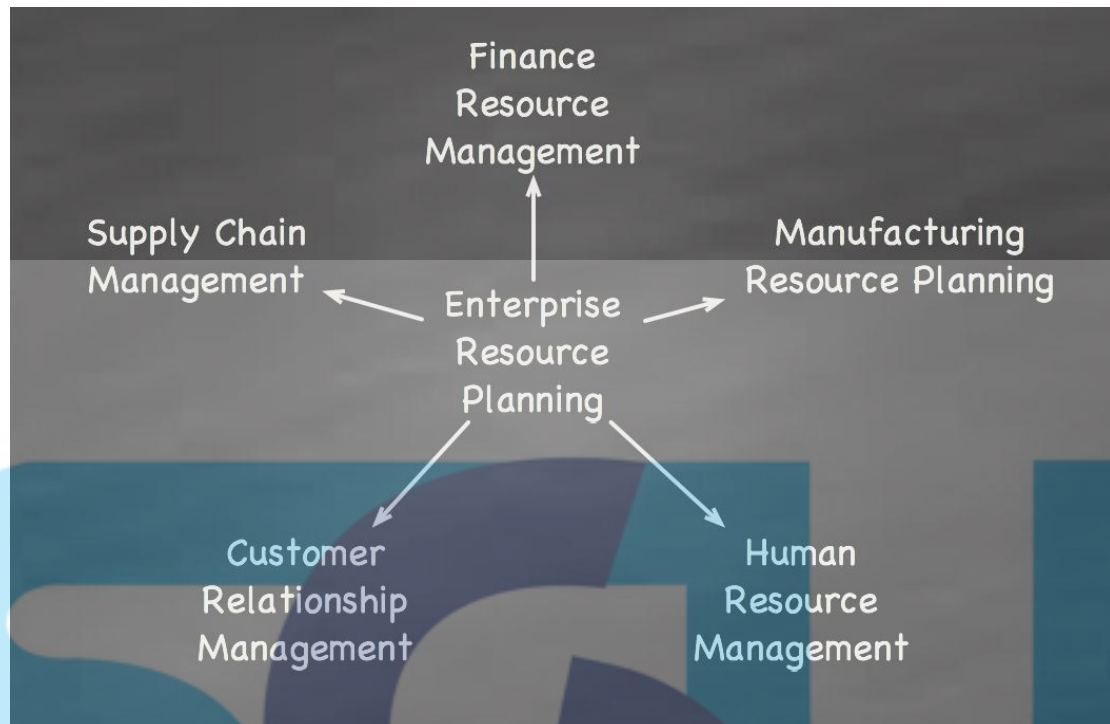


Figure 2.2 ERP Framework

ERP Framework gives the big picture of the functional areas in the ERP system. Those functional areas are:

- **Finance Resource Management** is the management section of financial and accounting activities. This managements section comprises of activities such as cash-flow management, planning and budgeting, cash receipt, sales transactions, and so other.
- **Manufacturing Resource Planning** is a management method for manufacturing companies to operate and financial planning. Manufacturing Resource Planning is the extension of Material Requirement Planning.
- **Human Resource Management** deals with activities that involve employees within the company. HRM stores data from the activities and reports information of each employee. This information can be used to develop skills and view the performances of the employee. HRM can also be used for hiring new people.

- **Customer Relationship Management** manages interaction between company and current or future customers. CRM helps the interaction by organizing customer data and information, which can be useful for business activities. CRM uses technology so that customers can interact in an easier way.
- **Supply Chain Management** is the management of material flow including the movement and storage of materials, inventory information, and procurement. The interactions in SCM are usually between the company and its supplier and customers.

2.2.2 Advantages and Disadvantages of ERP

Enterprise Resource Planning is already very well known for all business users if they want to improve their business. ERP Systems make it easier to track the workflow across various departments and reduce the operational costs involved in manually tracking. Well the foremost advantage of an ERP system is bringing down the costs and saving the valuable time, which would have been wasted in procedural manoeuvres and unwanted delays. But there are still a lot of advantages with specific details that ERP can give to an organization. Even so, every system will always have disadvantages and so is ERP. In this subchapter, the advantages and disadvantages will be discussed so that readers can understand more of what value can ERP give.

O’Leary [2] has defined some values or advantages that ERP can give. Those are:

- ERP Integrates Firm Activities
- ERPs Employ Use of “Best Practices”
- ERP Enables Organizational Standardization
- ERP Eliminates Information Asymmetries
- ERP Provides On-line and Real-Time Information
- ERP Allows Simultaneous Access to the Same Data for Planning and Control
- ERP Facilitates Intra-Organization Communication and Collaboration
- ERP Facilitates Inter-Organization Communication and Collaboration

While Koch [3] explained five major reasons why companies undertake ERP, or we might say the advantages that ERP can give to companies.

- Integrate Financial Information
- Integrate Customer Order Information
- Standardize and Speed Up Manufacturing Processes
- Reduce Inventory
- Standardize Human Resources Information

In a more specific explanation of what are the advantages and disadvantages of ERP systems, Rajesh [4] discussed that the advantages are:

- Complete visibility into all the important processes across various departments of an organization (especially for senior management personnel).
- Automatic and coherent workflow from one department / function to another to ensure smooth transition/ completion of processes.
- A unified and single reporting system to analyse the statistics/ numbers/ status etc. in real-time, across all the functions / departments.
- Since same software is used across all departments – this can avoid individual departments having to buy and maintain their own software systems.
- Certain ERP vendors can extend their ERP systems to provide Business Intelligence functionalities as well.
- Advanced e-commerce integration is possible with ERP systems that can handle web-based order tracking/ processing.
- There are various modules in an ERP system like Finance/ Accounts, Human Resource Management, Manufacturing, Marketing / Sales, Supply Chain / Warehouse Management, CRM, Project Management, etc.
- Since ERP is a modular software system, its possible to implement either a few modules (or) many modules based on the requirements of an organization. If more modules implemented, the integration between various departments might be better.
- Single Database is implemented on the back-end to store all the information required by the ERP system and that enables centralized storage / back-up of all enterprise data.

- ERP systems are more secure as centralized security policies can be applied to them and all the transactions happening via the ERP systems can be tracked.
- ERP systems provide visibility and hence enable better/ faster collaboration across all the departments.
- It is possible to integrate other systems (like bar-code reader, for example) to the ERP system through an API (Application Programming Interface).
- ERP systems make it easier for order tracking, inventory tracking, revenue tracking, sales forecasting and related activities.
- ERP systems are a boon for managing globally dispersed enterprise companies.

And the disadvantages are:

- The cost of ERP Software, planning, customization, configuration, testing, implementation, and the others is too high.
- ERP deployments take 1-3 years to get completed and fully functional.
- Too little customization may not integrate the ERP system with the business process & too much customization may slow down the project and make it difficult to upgrade.
- The cost savings/ payback may not be realized immediately after the ERP implementation & it is quite difficult to measure the same.
- The participation of users is very important for successful implementation of ERP projects – So, exhaustive user training and simple user interface might be critical. But ERP systems are generally difficult to use (and learn).
- There maybe additional indirect costs like new IT infrastructure, upgrading the WAN links, etc.
- Migration of existing data to the new ERP systems is always difficult to achieve as with integrating ERP systems with other stand alone software systems.
- ERP implementations are difficult to achieve in decentralized organizations with disparate business processes and systems.
- Once an ERP systems is implemented it becomes a single vendor lock-in for further upgrades, customizations etc.

2.2.3 ERP Life Cycle

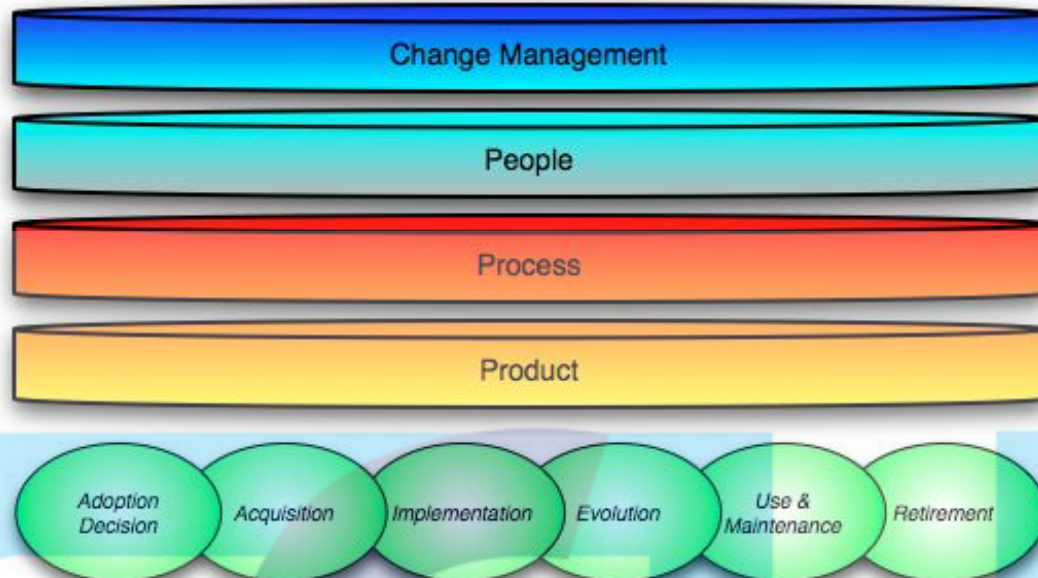


Figure 2.3 ERP Life Cycle Framework

Figure 2.3 is the framework of ERP Life Cycle. It consists of the phases and dimensions. The different stages of an ERP system life cycle within an organization are called phases, while the different viewpoints by which the phases could be analysed are called dimensions.

Esteves & Pastor [5] explained that the dimensional vision of the framework presents a set of related issues. For example, dimensions of change management are cultural issues, organizational structures, roles and skills, management of strategic change and business process re-engineering. Issues relating to vertical markets, mid-market focus, componentization, data warehousing, business modelling, and technology changer or skills are important issues to vendors.

The framework was made in a flexible and generic way for people to make possible the allocation of research issues and to give a better understanding of the whole ERP life cycle. This framework can be used to identify the impacts of change and its origins, and providing a way of identifying and characterizing research issues in the ERP system.

2.2.3.1 Phases of ERP Life Cycle

As mentioned in Figure 2.3 above about the ERP life cycle framework, the phases of ERP life cycle consists of adoption phase, acquisition phase, implementation phase, use and maintenance phase, evolution phase and retirement phase. And each phase is described as:

- **Adoption decision phase.** In the adoption decision phase, is the situation where questions are asked of the need for a new ERP system as the general information system approach that will best address the critical business challenges and improve the organizational strategy is selected. System requirements will be defined with its goals and benefits.
- **Acquisition phase.** This phase minimizes the need for customization by selecting product that suits best with the requirements of the organization. In this phase, factors such as price, training and maintenance services are analysed and contractual agreement is defined.
- **Implementation phase.** Customization or parameterization and adaptation of the ERP package, are the work done in this implementation phase. People who prove the methodologies, which is usually the consultants usually do those work.
- **Use and maintenance phase.** During this phase, an organization start to use the product in a way that returns expected benefits and minimizes disruption. Once a system is implemented, organizations must maintain it, because the system must be corrected, special optimization requests have to be met, and general systems requirements have to be made.
- **Evolution phase.** This phase integrates new capabilities that can be made into the system such as supply chain management and customer relationship management.
- **Retirement phase.** Requirement phase occurs when managers thinks that the ERP system is no longer adequate according to the needs. Decisions will be made whether they will substitute the ERP software with other system approach.

2.2.3.2 Dimensions of the ERP Life Cycle

The four dimensions by which the different phases of the life cycle should be analysed are product, process, people, and change management.

- **Product.** This dimension focuses on aspects related to the particular ERP product in consideration, such as functionality, and on related technical aspects, such as hardware and base software needs. A thorough understanding of the software tool's capabilities must exist in order to make an alignment with the business strategy in order to determine whether the software is being used effectively, in accordance with the needs of the organization, and how it can best be applied to further the goals of the organization.
- **Process.** Each organization has its own core capabilities and functionality that must be supported by an ERP system. Also, an ERP system must help the decision-making required to manage the resources and functions of the organization. Usually, the main ERP investment focus is on re-engineering processes to enable the organization to adapt to the new business models and functional requirements of the ERP system in order to achieve better performance.
- **People.** This dimension refers to the human resources and their skills and roles in an ERP system life cycle. These skills and roles must be developed to minimize the impact of the introduction and diffusion of an ERP system, in order to reduce risk and manage complexity, while facilitating organizational change.
- **Change Management.** The change management approach tries to ensure the acceptance and readiness of the new system, allowing the organization to get the benefits of its use.

2.3 ADempiere ERP / Why ADempiere?

ADempiere is an open source ERP and CRM software under a free software license. ADempiere provides integrated Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), and On-line Analysis Processing (OLAP). ADempiere puts the power of timely and consistent communications within reach of small to medium-sized businesses by offering superior ERP software that is affordable, adaptable, and scalable, ensuring that companies always have exactly the solution they need. [6]

2.3.1 ADempiere Key Features

Tsang [6] defines the explanation of the key features in ADempiere ERP:

- Complete ERP

A complete ERP is an information system that integrates all the activities and business process within a company. All of it is based on a single server that can maintain all the data and user activities. Complete ERP had to be accessed live and simultaneous in a centralized architecture.

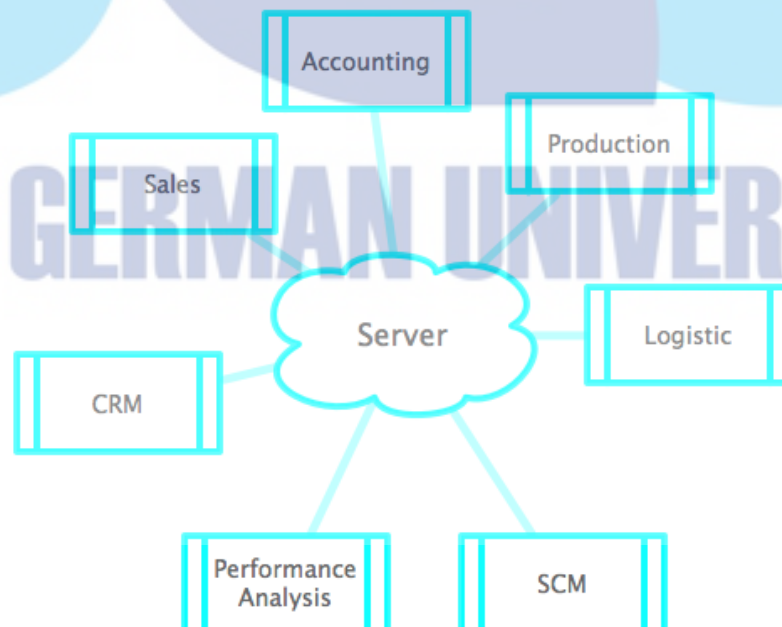


Figure 2.4 Complete ERP

- Supply Chain Management

Supply Chain Management covers all material management activities including inventory receipts, shipments, perishables moves and counts within a client and its organizations and to suppliers and customers. ADempiere can handle any type of products from its warehouse model.

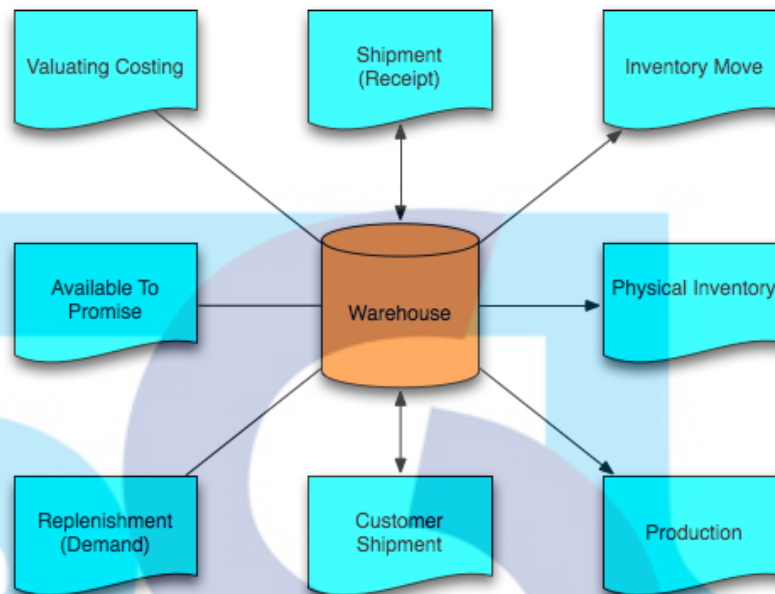


Figure 2.5 Supply Chain Management

- Customer Relations Management

CRM is another module that has the goal to optimise revenue by improving customer satisfaction from more interactions with the customers. In the ADempiere CRM, it allows company to have the ability to look over a complete view of customer data. Any information's needed by the staffs can be viewed immediately throughout the system.

- Performance Analysis

In ADempiere, there is a tool called Performance Analysis, which covers the costing and accounting dimensions of the application and it is transactional based. The Performance Analysis tool allows operational data to be collected, analysed, and centrally managed from a wide variety of angles. As it combines the details of all transactions, it is easy to retrieve and analyse reports according to the level of details needed.

2.3.2 ADempiere's Strengths

Adaxa [7] explained that there were some strengths provided by ADempiere and those strengths are stated as:

- Flexibility

ADempiere has a benefit in flexibility for adopting open standards. From that flexibility, ADempiere allows disparate software to act in complementary ways. Hardware and operating system are independent in ADempiere. Also, ADempiere gives clear, public and viewable descriptions of data and behaviour.

- Long-term viability

For the long-term viability, ADempiere shields itself from obsolescence by ensuring availability of a larger developer support base, knowledgeable in the tools used. ADempiere also provides source code availability which allowing support for the long-term aspects.

- Lower Total Cost of Ownership

Since ADempiere is an open source system, there are no software license fees needed. Whenever a required upgrades that happens annually, there is no need to pay for it.

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2.4 Implementation Methodology

2.4.1 Successful Factors

Success Rate of IT Implementation Projects

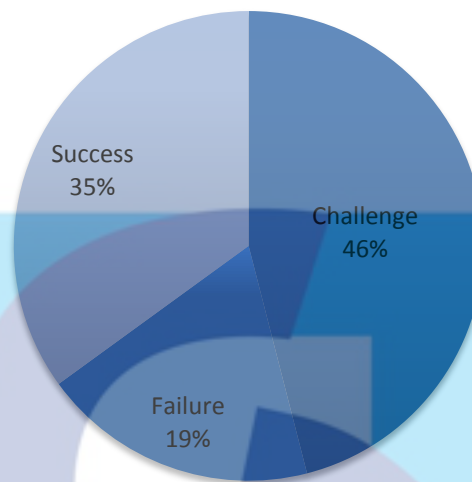


Figure 2.6 Success Rate of IT Implementation Projects [8]

Figure 2.6 is the chart of the success rate of IT implementation projects and it was stated that 65% of projects are not successful because the costs overrun the budget, the working time takes longer than what it was expected, and functionality delivered does not fulfil what was promised. The conclusion is if 65% of IT projects are not successful, then the successful factors behind this issue became a huge topic.

Seo [9] created a research about challenges in implementing ERP system. And in the paper work it was stated that Rabaa'i [10] researched previous studies identifying critical success factors (CSFs) for ERP implementation. This research presents the top 12 most frequently cited CSFs from previous studies: Top management commitment and support, change management, project management, business process re-engineering and system customization, training, ERP team composition, visioning and planning, consultant selection and relationship, communication plan, ERP system selection, ERP systems integration, and post-implementation evaluation measures.

- Top management commitment and support

Successful ERP implementation depends on management to prepare for challenges that might be faced [11], as well as senior management who are involved in overall strategy of the company and are not familiar with technical aspects [12]. Also, top management commitment and support leads to overall organizational commitment across an organization. It results in the successful ERP implementation [13].

- Change management

Ehie and Madsen [14] stated that ERP implementation involves more than changing software or hardware systems. Ideally, by reengineering business processes, ERP implementation can help an organization to benefit from higher levels of efficiency and improved performance. Therefore, ERP implementation may cause changes that lead to resistance among employees Glover [15]. Consequently, balancing conflicts between staff and technology and effectively managing employees in the change process are key elements for the successful ERP implementation [16].

- Project management

Effective project management is critical for the successful ERP implementation [17] [18]. Bingi, Sharma, and Gola [19] found that “a lack of proper understanding of the project needs and the inability to provide leadership and guidance to the project” are the main factors when ERP implementation fails. Thus, effective project management should define clear project objectives, develop a work and resource plan, and carefully track the project’s progress.

- Business Process Re-engineering and system’s customization

There are two approaches to implementing ERP systems in an organization: reengineering business processes and ERP customization [20]. Business process reengineering creates deep changes in organizational processes in order to fit them to ERP functions. On the other hand, when an organization wishes to maintain its existing processes using an ERP system, it can customize ERP functions. However, many researches indicate that ERP customization should be avoided or minimized in order to achieve the full of benefits offered by ERP systems [21] [22] [23].

- Training

End user training has been recognized a critical factor for ERP implementation. Due to the complexity of the integrated ERP system, end user training is essential for a robust understanding of how the system works and how to use it. Consequently, appropriate end user education and training will maximize ERP benefits and increase user satisfaction.

- ERP team composition

Since ERP covers diverse functional areas across an organization, ERP team composition is also important for the successful ERP implementation; an ERP project team should consist of representatives from all functional units related to ERP.

- Consultant selection and relationship

ERP consultants play a critical role in ERP implementation. Consultants can be essential knowledge resources for ERP's hardware, software, and personnel. They also can help staff, have responsibility for project management, and audit the project. On the other hand, in order to be successful system maintenance after post-implementation, knowledge transfer from consultants is crucial for the organization.

- Communication plan

Strong communication within the entire organization during the implementation process increases success for ERP implementation. It allows the organization's stakeholders to understand the goal and the expected benefits of the project as well as to share the progress of the project. An "open information policy" protects the various communication failures for the project. [24].

While the critical success factors can lead to success of ERP implementation, they do not guarantee it. Al-Mashari, Al-Mudimigh and Zairi [24] stated that the delivery of the critical success factors is one major condition to lead to benefits from ERP implementation, and they suggests that IT projects can be considered successful as according to the following terms:

- Correspondence success, which occurs when there is a match between IT systems and the specific planned objectives.
- Process success, which occurs when IT project is completed within time and budget.
- Interaction success, which occurs when users attitudes towards IT are positive.
- Expectation success, which occurs when IT systems match users expectations.

2.4.2 ASAP Implementation Methodology

ASAP Implementation Methodology was developed by SAP, to provide customers with the perfect methodology to implement an ERP system. ASAP, or Accelerated SAP, explained by Hong [25], means to go through the SAP implementation process efficiently. ASAP methodology is proven, repeatable and successful approach to implement SAP solutions across industries and customer environments. Accelerated SAP provides content, tools and expertise from thousands of successful implementations. Based on the Accelerated SAP (ASAP) Implementation Methodology, there are 5 phases to be processed. Figure 2.7 shows the 5 phases.



Figure 2.7 ASAP Implementation Phase

Table 2.1 Five Basic Phases of ASAP Methodology [26]

Phase	Activity	% of Effort
Project Preparation	Scoping, planning,	10 %
Business Blueprints	Enterprise modelling/business process design	25 %
Realization	Configuration & customization/interfaces	35 %
Final Preparation	Data migration, End user training	25 %
Go-Live	Cut-over and support	5 %

Table 2.1 shows again the phases that occur in the ASAP Methodology, and the activities of them. The most effort of work in this methodology will be in realization phase. As of the explanation of each phase will be explained in the next subchapter.

2.4.2.1 Project Preparation

The first phase in the implementation is to provide initial planning and preparation. Since every implementation has its own unique objectives, those objectives must be declared in advance. Organizational readiness must be prepared before hand, in order to reduce the risk of failure. After settling the agreements between the consultants and the clients, a kick-off meeting should start. The kick-off meeting gives everyone a clear imagination of how the implementation should be done. System availability such as required hardware and Internet availability are also prepared in this step.

2.4.2.2 Business Blueprints

A Business Blueprints a file consisting of documents that explain all the company's bone structure. Business blueprints should have the information of company's organizational structure and business processes. This activity can be done by interviewing high executives and staffs or using a Business Process Modelling tool. Gap analysis should provide the room of improvements for the new proposed business process or business model. We cannot use the old process because that is the way it is done. So, new blueprints will be defined, matched with the ERP system.

2.4.2.3 Project Realization

The Realization phase is practically the hardest part within the implementation phase. A lot of work is being done in this phase. This is when the ERP system starts to be configured based on the Business Blueprints. Consultants should provide a simulation of the system, validation, and testing. Networking configuration is also done in this phase.

2.4.2.4 Final Preparation

Before even obtaining a user acceptance, training must be conducted for each user. The training material must be defined and explained specifically in order for users to run the system smoothly. Cutover activities such as importing the last data of the cut-off date are also prepared. Cutover plan can be many types such as Big Bang or Parallel Running, depends on the agreement. The goal of this Final Preparation phase is to have the total readiness before going live with the system.

2.4.2.5 Going Live & Support

This is when the actual system starts to run independently. Users will start to use the software and manage all daily activities. Any issues and problems are resolved with live support from the administrator. Transition is finalized and the project is signed off. Subsequently, the continuous improvement will start, as there are possibilities for new improvements in the organization such as new organizational structure or the chance for Business Process Re-engineering. The review of the implementation project is conducted for the company.

2.4.3 ADempiere Fastrack Methodology

VisualApps [27] developed an implementation methodology to deliver rapid and on-budget (time and money) ERP deployment for clients. The main goal of this methodology is to ensure successful delivery of ADempiere. Fastrack business objectives include:

- Support for client's business concepts, processes, opportunities, and visions in the form of standardized IT business applications that combine flexibility with cost effectiveness.
- Delivery of relevant client solutions consisting of standard modules and components that meet both needs for the moment, and provide a platform for future development.
- Rapid implementation of standard modules and components, and if necessary, customizations to meet the critical business needs of the client.
- Services that are delivered is clearly defined, assembled, quality controlled and validated deliveries. Emphasis is on rapid implementations that which can be delivered together, rather than waiting to deliver everything at once. Benefits to client should be obvious.
 - Faster implementation leading to a faster payoff.
 - Less complex installations, thereby reducing risk of failure.
 - Easier adaptation of work routines.
 - More efficient training; training sessions need not be comprehensive. Just teach users what they need to know and increased probability that user learning will be more efficient.
- Prepare client to efficiently and effectively manage their ERP after implementation
 - Post-implementation Support
 - Continuous refinement and upgrading of their business processes and in turn their ERP processes.

Fastrack is divided into 3 implementation phases, namely:

- Pre-Implementation Phase
- Implementation Phase
- Post-Implementation Phase

In Fastrack implementation, all is done by step by step. That's the approach of implementation. No Big Bang terms are applied. No throwing out legacy systems that are working well, but just a smooth transition into ADempiere. The Fastrack implementation methodology is to be modified accordingly with client requirements and prevailing circumstances of the client business environment.

2.4.3.1 Pre-Implementation Phase

This is the phase where the prospect determines, with or without the assistance of a ADempiere consultant, the suitability of ADempiere for its business. The evaluation process can be complex but with the following steps the process can be painless.

- ADempiere Overview
www.adempiere.org offers a broad overview of ADempiere capabilities, its model-driven platform and lots of other information needed for making informed decision about ERP for business.
- Learn More
Get hold of a copy of ADempiere Documentation, which covers the range of ADempiere features and capabilities. Attend training Classes that further provide detailed ADempiere process workflows, functional capabilities and customization techniques.
- Practice with Garden World Demo
 - Experience ADempiere's flexibility by installing ADempiere software and working with the "Garden World" demo environment and data. Experience navigating in the ADempiere application, and working within the user interface.
- ADempiere Partners
 - Contact a ADempiere partner near you to do all the above of you. However, please note that this may be a chargeable service.

2.4.3.2 Implementation Phase

You have decided to implement ADempiere in your organization, which is a big monumental step in the right direction. Whatever are your reasons for choosing ADempiere is from this moment on, UNIMPORTANT. Everyone involved in the pre-implementation phase, whatever their ERP choice was, must now focus to make sure ADempiere is successfully implemented in their organization/department within the time and budget allocated. Management must make it their priority to give their time and attention to the project to ensure its success.

As ADempiere transactions will cut across entire organizations, management involvement is important to smoothen the processes between companies and departments.

Fastrack requires that the planning and subsequent getting the data for use in ADempiere is of outmost importance. If this task requires more time to prepare, it is better to spend more time preparing rather than jumping straight into implementing ADempiere itself. Your vendor/consultant will be able to advise you. If you are doing this by yourself, prepare your data in detail, as this will save you issues later. The list of tasks in the implementation phase is:

- Requirements
- Setup and Configure Hardware
- Basic Hardware
 - Network topology
 - Server specifications
 - Workstation specifications
 - Detailed network diagram sent to your consultant
 - Network printers functional
- Software Installation
 - SQL Database (Oracle or PostgreSQL)
 - ADempiere and working on all workstations

- Specific Hardware
 - Barcode scanners installed and functional
 - Barcode printers installed and functional
 - Point of Sale equipment tested
- 3rd Party Software Products
 - 3rd party software installed, if any, including OS eg. Linux, Windows etc.
- Company Profile
 - Company profile created
 - Configured e-mail in the company profile
 - Financial Periods
 - Chart of Accounts and balances
 - Departments/Locations
 - Payment terms
 - Sales/Purchase taxes of configured
 - Item and item categories
 - Customer and Vendor files imported or Sample File Approved
- Optional data pre-entered
 - Users created and passwords assigned
 - Groups created and users assigned
 - Delivery methods created
 - Payment methods setup
 - IMPLEMENTATION Security group configured
- Have the following prepared
 - Initial inventory count on spreadsheet
 - Detailed list of outstanding sales orders, purchase orders and pending customer and vendor returns.
 - Detailed outstanding A/R & A/P spreadsheet
 - Bank balance information including statements, outstanding checks and deposits
 - Trial balance
 - List of customer profile categories and sub-categories

2.4.3.3 Post Implementation Phase

The Post Implementation phase consists of tasks below:

- Project Scoping & Planning

Refine MS Project Schedule and Tasks. Ensure that project team understands the budget of time and costs

- Confirm Checklist

- Verify Network and Hardware
- Quick check of the server
- Workstation configurations
- Third Party software check
- Other hardware

- Preparation of Source Documents

- Understanding of Business Operations
- Data Preparation
- Identify any customization

Review data in spreadsheet format ready for data import into ADempiere. Also important is whether there any identified customization needed from the source documents.

- Installation

- Install Database & ADempiere
- ADempiere Client Setup
- Import Sample Data (Data Sampling)

This phase will be conduct only if client has not installed ADempiere and DBMS. Besides Garden Demo, also create Production and Test Organizations. Use Test for the training.

- **ADempiere Overview Training**
 - Review ADempiere business model and provide everyone with basic understanding of the software and its process.
 - Training for users of ADempiere. Basic ADempiere navigation, reporting, getting help etc., training.
 - Discuss with team about the role of the consultant and review what can be expected during the training process.
- **Base Configuration**
 - Check company setup
 - Clients, Periods, Chart of Accounts, Departments
 - Sales Tax structure, payment methods, payment terms
 - Preferences, defaults, and flow control
 - Ensure proper setup of multi-level categories and accounting links
 - Check items for proper configuration of inventoried and non-inventoried items.
 - Third Party software links setup and test
 - Setup non-inventoried items codes such as shipping charges, standard labor codes, etc.
- **Business Partners**
 - Customers and vendors, import vendor list, import customer list, Setup basic customer tracking groups and selections
 - Import A/R and A/P
- **Material Management**
 - Import spreadsheet/train receiving to turn initial inventory
 - Scanning in manufacturer serial #s + attaching
 - ADempiere's serial #s, and/or Batches, and print barcodes if necessary
 - Pay attention to costing and opening balances
- **Backup Data**

For restore purpose when needed.
- **ADempiere Implementation Checklist Template**

Table 2.2 ADempiere Implementation Checklist Template

Checklists	✓	✗
Hardware		
Does all the Server(S) meet the minimum requirements?		
Do all the Workstations meet the minimum requirements?		
Are printers installed/functional on workstations?		
Software		
SQL Database installed, configured and functional?		
ADempiere is installed & functional?		
ADempiere client is on workstations with shortcut?		
3rd Party software installed?		
ADempiere Setup		
Client/Organization has been created in ADempiere?		
All default Chart of Accounts (GL) setup?		
Year and periods are defined in ADempiere?		
Multiple locations/departments setup?		
Sales Tax has been configured?		
Payment methods are defined?		
Payment terms are defined?		
Delivery methods are defined?		
Categories are defined?		
Items are defined?		
Have vendors been defined?		
Have customers been defined?		
Users defined and passwords assigned?		
Multi-currency defined?		
Information needed to be entered		
Initial inventory count/valuation as of the cut-off date?		
Entered all open sales orders as of the cut-off date?		
Entered all open purchase orders as of the cut-off date?		

Other materials needed		
Company Logo (address/phone # is included on logo)?		
Checks and envelopes		
Pre-printed stationery		

2.5 Change

Implementing a new system such as implementing ERP requires an organizational readiness to change from the old system, to the new ones. Therefore, a structured approach is needed for a perfect transition into the desired state. Change management is the most popular approach. Change is important because it also one of the factors that make successful ERP implementations. A change management method can be many types depend on the company's decision when choosing better principles that fits the requirements. Kandt [28] stated that there are four principles underlying organizational best practices. Those are:

1. Business process must support business needs
2. Staff an organization with people that can successfully support and execute the business processes.
3. Plan change efforts to maximize return on investment and minimize risk
4. Measure process and product quality

To use a change management for implementing a new system can be many types of model. Lewin [29] believed that "the idea that change, especially at the psychological level, is a journey rather than a simple step. This journey may not be simple and may involve several stages of misunderstanding before people get to the other side." Lewin [29] recognized that there are 3 journeys for a change:

1. Unfreeze

In this first journey, most people will make a huge effort to resist change. To overcome this issue, tasks such as motivation are applied.

2. Transition

Once change is initiated, strong leadership plays a huge role for the process to be successful.

3. Refreeze

After the organization start to accept the change and all are successfully implemented, the organization is back to stable again and refreezes their behavior in the new system.

2.5.1 Davis Technology Acceptance Model

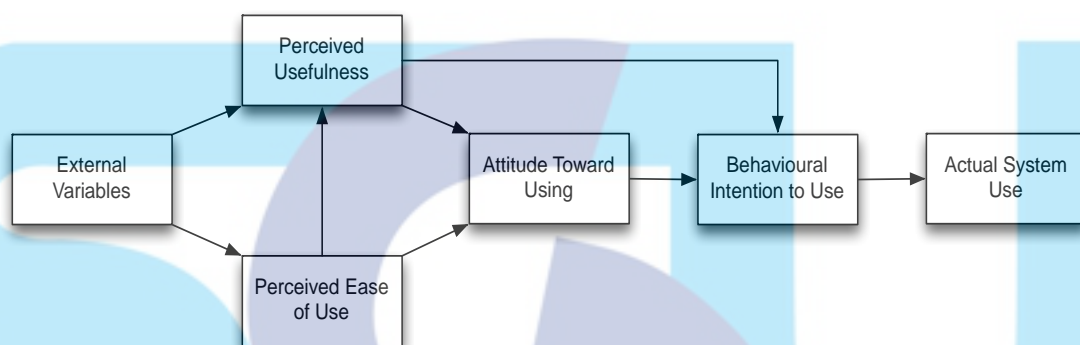


Figure 2.8 Davis Technology Acceptance Model

The Technology Acceptance Model (TAM) is a theory developed by Davis [30] about user acceptance about how users accept to use a technology, especially information systems technology. By using TAM, it is very helpful for predicting issues and identify why the system may be unacceptable and from that a better appropriate approach steps can be done. TAM is more specific and applies only to the use of computers. Davis [30] explained there are a number of factors that determine the user decision of using a technology:

- Perceived Usefulness
A state when a person agrees that using the system will improve his or her job performance
- Perceived Ease of Use
A state when the person believes that using the system will not add more effort.

2.6 Enterprise Information System

Enterprise Information System (EIS) is an information system technology used for all business nowadays in order to improve the business process by integration. EIS is suitable for handling larger amount of data and communicating between organizations. From the integration, organizations can share information across all departments and stored in one single database.

2.6.1 Multi Tier Architecture

In information systems, a multi-tier architecture is a client-server architecture, which presentation, application processing, and data management functions are physically separated. The most widespread use of multi-tier architecture is the three-tier architecture. The purpose of creating multi layers for the architecture is that developers can modify or update changes for the specific layer without affecting the other layer. Kambalyal [31] described the difference between 2-tier and 3-tier architecture in which that 2-tier architecture:

- Is a client/server architecture consisting 2 main components, a client pc and a database server.
- Have some considerations in database client program accesses in which requires a code change to port a different database and considerations in executing application logic, because it is limited by processing capability of client workstation (memory, cpu).

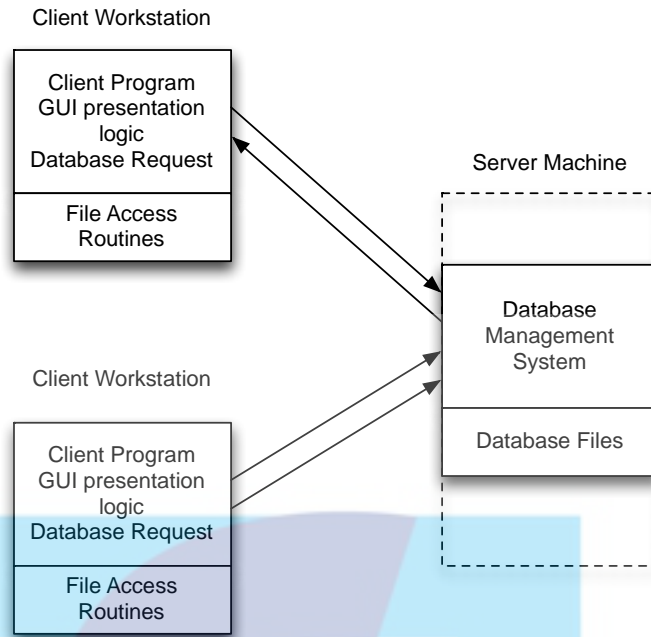


Figure 2.9 2-Tier Architecture

While 3-tier Architecture is:

- A client-server architecture that have 3 essential components, a client pc, an application server, and a database server.
- Considerations in a 3-tier architecture are that client program contains presentation logic only because fewer resources needed for client workstation and one server handles many client requests so that more resources are available for server program.

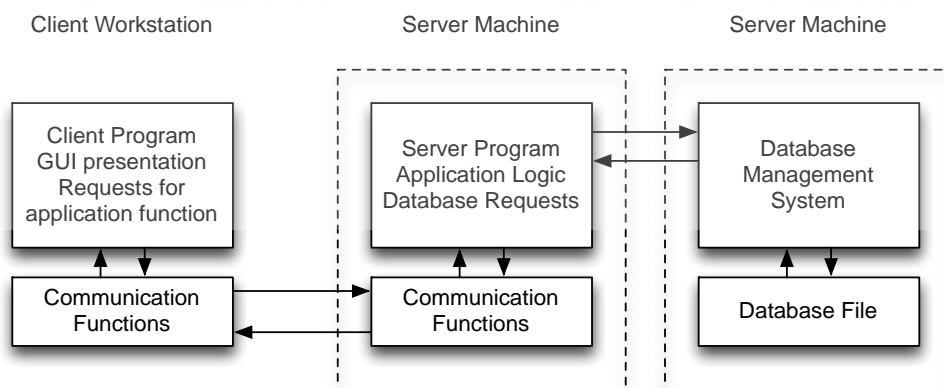


Figure 2.10 3-Tier Architecture

2.6.2 Stove Piped

Stove piped systems do not share information such as data and resources between organizations. In a stove piped system, there is a barrier in each functional area causing it to work individually. Generally, stove piped concept is lack of coordination and planning across the system. Objective of Stovepipe systems is to solve the narrow goals or meet the specific needs in a way that is not readily compatible with other systems because these are developed in an isolated environment with no aim to integrate with other sub-systems.

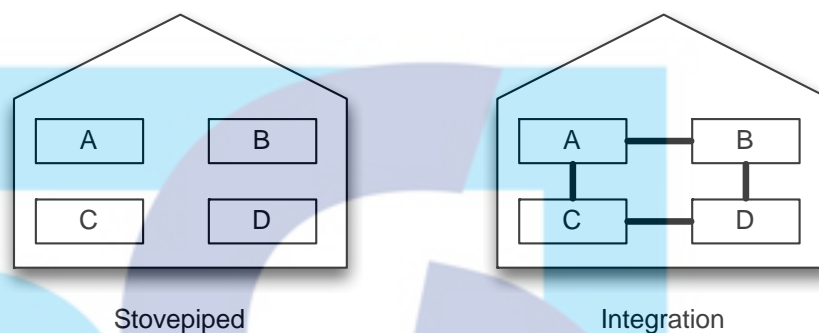


Figure 2.11 Stove Piped vs Integration Systems

2.7 Business Process Modeling

2.7.1 Porter's Value Chain

Porter [32] described value chain as an analysis of the activities the organization performs and links them to the organizations competitive position. The value chain is based on the process view of the organization, in which the manufacturing (or service) company is seen as a system made up of many sub-systems, each with inputs, transformation processes and outputs involving the procurement and consumption of resources. Porter said that, "A firm's value chain and the way it performs individual activities are a reflection of its history, its strategy, its approach to implementing its strategy, and the underlying economics of the activities themselves."

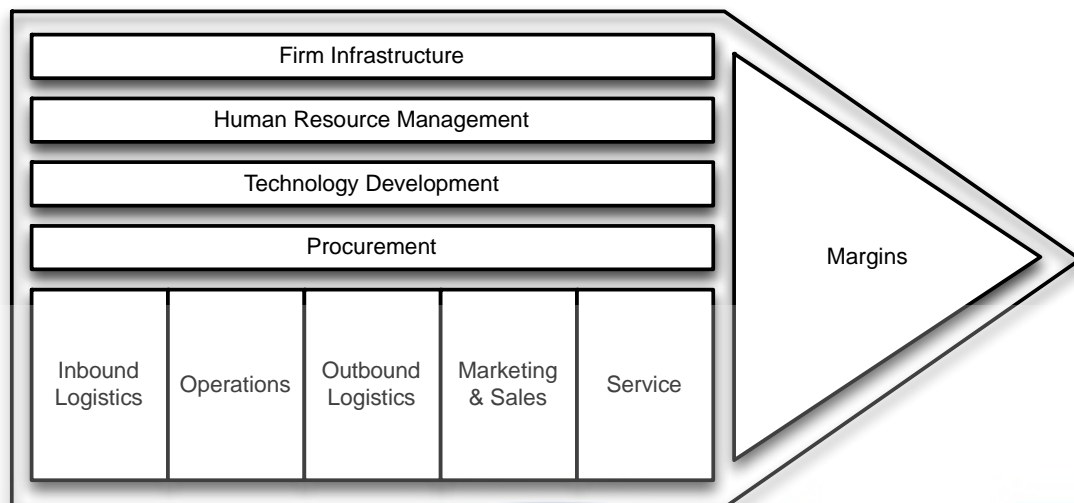
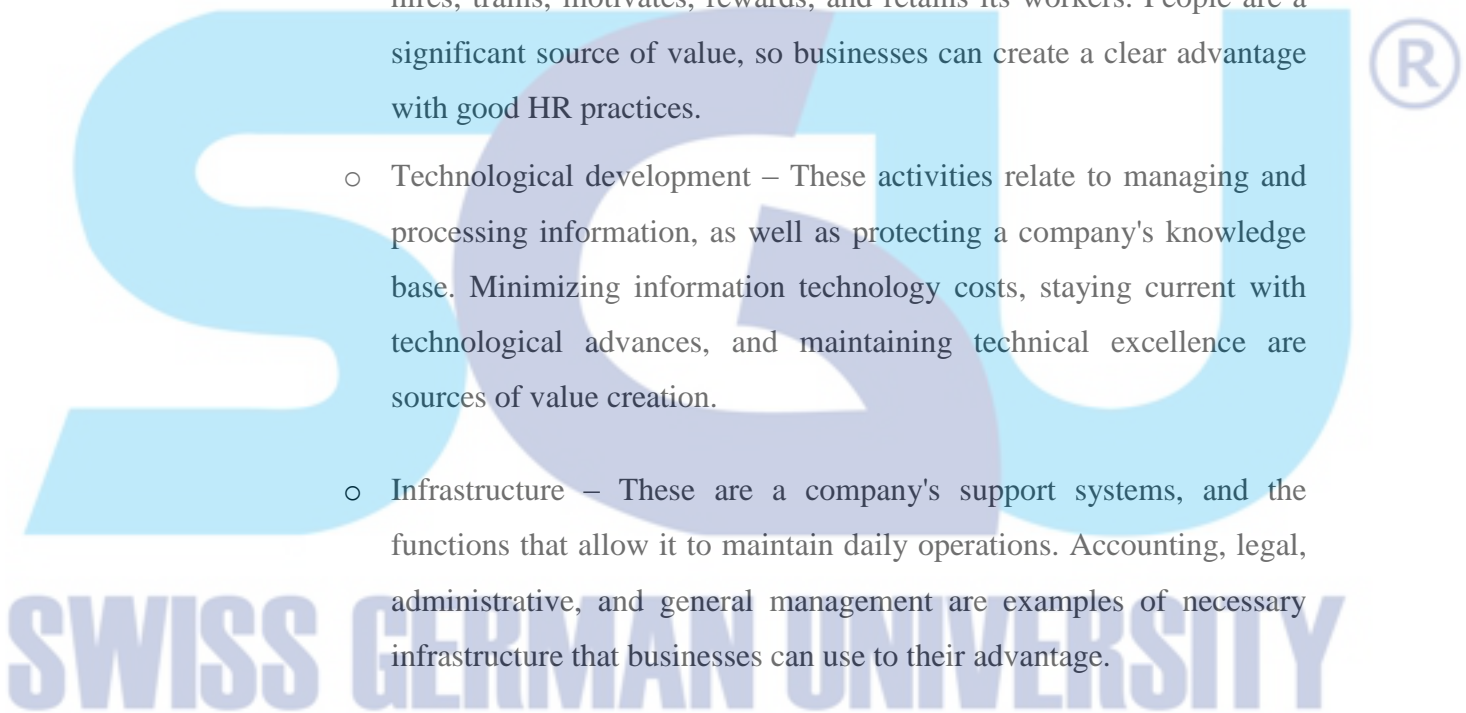


Figure 2.12 Porter's Value Chain

Porter [32] separates the value activities into two types:

- **Primary Activities**
 - Inbound logistics – These are all the processes related to receiving, storing, and distributing inputs internally. Your supplier relationships are a key factor in creating value here.
 - Operations – These are the transformation activities that change inputs into outputs that are sold to customers. Here, your operational systems create value.
 - Outbound logistics – These activities deliver your product or service to your customer. These are things like collection, storage, and distribution systems, and they may be internal or external to your organization.
 - Marketing and sales – These are the processes you use to persuade clients to purchase from you instead of your competitors. The benefits you offer, and how well you communicate them, are sources of value here.

- Service – These are the activities related to maintaining the value of your product or service to your customers, once it's been purchased.
- **Support Activities**
 - Procurement (purchasing) – This is what the organization does to get the resources it needs to operate. This includes finding vendors and negotiating best prices.
 - Human resource management – This is how well a company recruits, hires, trains, motivates, rewards, and retains its workers. People are a significant source of value, so businesses can create a clear advantage with good HR practices.
 - Technological development – These activities relate to managing and processing information, as well as protecting a company's knowledge base. Minimizing information technology costs, staying current with technological advances, and maintaining technical excellence are sources of value creation.
 - Infrastructure – These are a company's support systems, and the functions that allow it to maintain daily operations. Accounting, legal, administrative, and general management are examples of necessary infrastructure that businesses can use to their advantage.



2.7.2 Business Process Modeling Notation

Business Process Modeling Notation is a graphical presentation that describes an organization's business process by modeling the processes in a detailed diagram. Oliva and Gerosa [33] explained that the scope of BPMN is that it only covers the concepts of modeling that are applicable to business such as strategies and business rules. OMG [34] mentioned four basic elements in the BPMN:

- Flow Objects
 - Events, Activities, Gateways
- Connecting Objects
 - Sequence Flow, Message Flow, Association
- Swimlanes
 - Pool, Lane
- Artifacts
 - Data Object, Group, Association

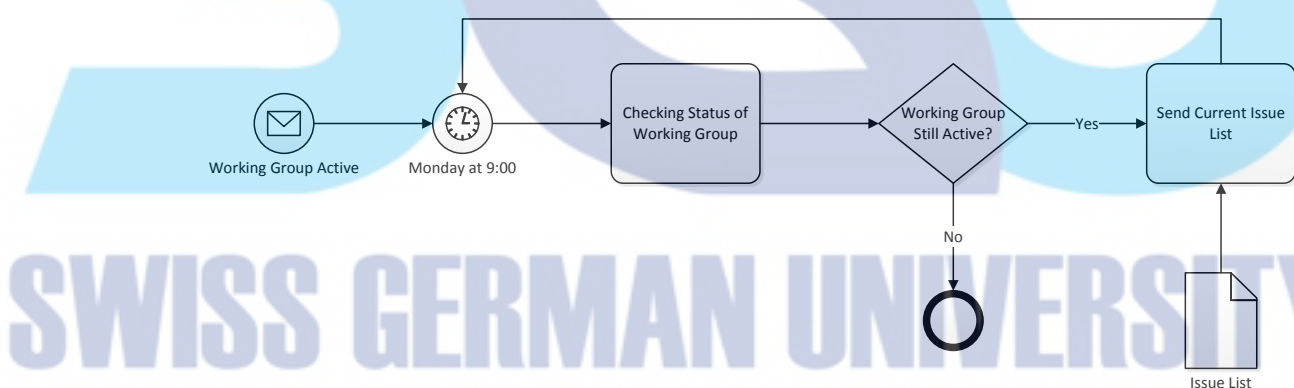


Figure 2.13 BPMN Example

2.7.3 Data Flow Diagram

Data Flow Diagram is a graphical representation of the flow of data through an information system. Le Vie [35] gave a clear explanation that “Data flow diagrams (DFDs) reveal relationships among and between the various components in a program or system. DFDs are an important technique for modelling a system's high-level detail by showing how input data is transformed to output results through a sequence of functional transformations.”

2.7.3.1 Gane & Sarson Notation

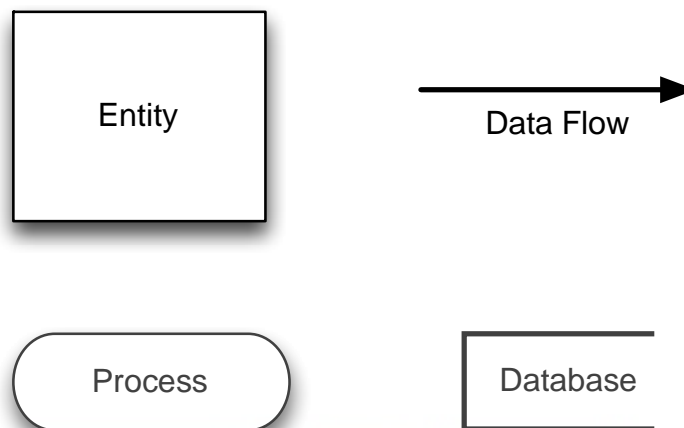


Figure 2.14 Gane & Sarson DFD Notation

"The Gane & Sarson method is based on the building of a logical model of the system, using graphical techniques to enable users, analysts, and designers to get a clear and common picture of the system and how its parts fit together to meet the user's needs. The methodology involves building a system top-down by successive refinement. First, an overall system data flow is created. Then, detailed data flows are created. Next, the details of the data structures and the process logic are determined. Finally, design of modular structures is begun. The focus of analysis in the Gane and Sarson method is the Data Flow diagram, which is used to describe the processes of the system, and how the processes transform data." [36].