

## **Attaining Agility At The Enterprise Level**

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### **Abstract**

An agile enterprise is an enterprise which can rapidly adapt to tomorrow's unpredicted and unexpected changes. However, there is no consensus on the meaning of agility. People often misunderstand that lean, flexible and agile are interchangeable terms. The objective of this paper is to present an understanding of the concepts of agility, leanness and flexibility. This paper presents a methodology to help any company attain agility at the enterprise level. Issues considered in the model include the strategic plan, training, product development, interaction among people and technology, and enterprise integration and improvement.

**Keywords:** Agility, Agile Enterprise.

### **Enterprise Engineering**

Enterprise Engineering may be viewed as the process of designing, analyzing, and implementing change from the perspective of corporate culture, enterprise, processes, and technology. In a more formal definition, Enterprise Engineering is an integrated set of disciplines for building and changing an enterprise, its processes, and system. As a discipline, it also answers the fundamental question: "how to design and improve all elements associated with the total enterprise through the use of engineering and analysis methods and tools to more effectively achieve its goals and objectives" [3].

There are two key aspects of Enterprise Engineering. They are: (1) "What should the enterprise be?" and (2) "How do we get there from here?" [5]. By answering these two questions, an Enterprise Engineer is expected to be able to establish a strategic vision and appropriate change methods to design the future enterprise and manage the change projects.

In order to transform the complex system of the manufacturing enterprise, several assumptions have to be made in Enterprise Engineering. First, the enterprise can be viewed as a complex system. The reason for this assumption is that an organization consists of many interacting components in a system. Second, the complex system of the enterprise can be engineered individually and holistically. The final assumption is the use of engineering rigor is required in transforming the enterprise. [7]

### **Agile Enterprise**

Businesses worldwide are experiencing a common phenomenon - increasing uncertainty and unpredictability in the business environment. The situation is getting worse as most of the uncertainties and unpredictability are fast becoming the norms of everyday life. Since most businesses were designed based on the assumption of certainty and predictability, many of them are not able to cope with large uncertainties and unpredictability. There is no way to know these uncertainties in advance and plan for it. At the same time, people really want to know what tomorrow will bring to their businesses so that they can be ready to respond. Unexpected changes are considered as surprises to businesses and nobody likes surprises. It is because enterprises are so fragile that the unexpected changes and events can easily bring damage to them. In order to stay in business, a company has to become agile. The agile enterprise is not easily damaged and broken by the unexpected and unpredicted changes and events. An agile enterprise can rapidly adapt to tomorrow's surprises. [2]

## Agile, Flexible, and Lean Manufacturing

A dominant definition of an agile enterprise is one whose processes are able to respond effectively to rapid and unexpected change. Flexibility is the ability to respond to the expected change and implies adaptability and versatility in the manufacturing domain. To some extent, we can say flexibility is a subset of agile. In other words, it means a flexible manufacturing does not necessarily have to be an agile manufacturing. In particular, flexibility is agility limited to the physical infrastructure, where we measure modularity, scalability, reconfigurability, relocatability and storability. [1]

One of the biggest problems to overcome is the misunderstanding that lean and agile are synonymous. Most of what are presented as agile practices is in a post lean production paradigm. Lean manufacturing is concerned with less of everything - less time to design, less inventory and less defects. [2]

Although the ideas of lean production diffuse very slowly, many companies are still implementing lean production. Due to the popularity and the ease of understanding, many people have mistakenly assumed that lean manufacturing and agile manufacturing are the same. Agility and lean are different. The following are the contrasts between lean manufacturing and agile manufacturing. Lean manufacturing focuses on profitability today by delivering mass customization at a mass production price. This enables a company to produce at lower costs while also reducing production time. Agile manufacturing also considers profitability tomorrow. Agile manufacturing focuses on the ability to respond to change, uncertainty and unpredictability in the business environment, in order to improve cost, time and quality. [1][2]

## Modeling Methodology

Based on the findings from the research, Attaining Agility at Enterprise (AAE) level is constructed using the IDEF0 methodology. IDEF0 is a modeling tool used to produce a model or structured representation of the functions of a system and of the information and objects that tie those functions together. The five elements in the IDEF0 functional model as shown in figure 1 are the Activity, Inputs, Controls, Outputs, and Mechanisms. The box represents the activity or function. The arrows entering and leaving the boxes (activities), respectively represent Inputs and Outputs. The activity transforms inputs into outputs. Arrows that enter from the top are the Controls or things that constrain the activity. Whereas the arrows that enter from the bottom of the boxes are the Mechanisms. Mechanisms are usually people or resources required conducting the activity. An IDEF0 model is made up of several diagrams. Each diagram describes in more detail a box from a more general diagram. IDEF0 models are read in a "Top-Down" fashion. The top-level diagram, A-0 Diagram summarizes the overall function of the system which is represented by a single box. The A0 diagram represents the first decomposition of the system. The A0 and all subsequent diagrams must contain 3 to 6 numbered boxes. The location of the boxes on a diagram does not necessarily imply sequence or time. [4]

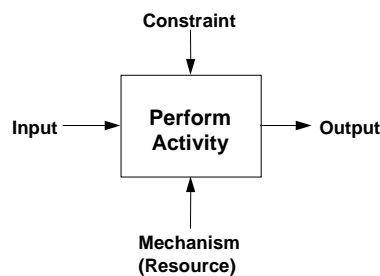


Figure 1: IDEF0 Nomenclature

## Attaining Agility

A company has to transform customer needs and current existing performance or technology to an agile enterprise by producing high quality product/service while reducing the production cost. This can be achieved with the help of the company's management and also the evaluation methods and tools used. At the same time, constraints like the environment, budget, time, employees' motivation and culture are taken into consideration.

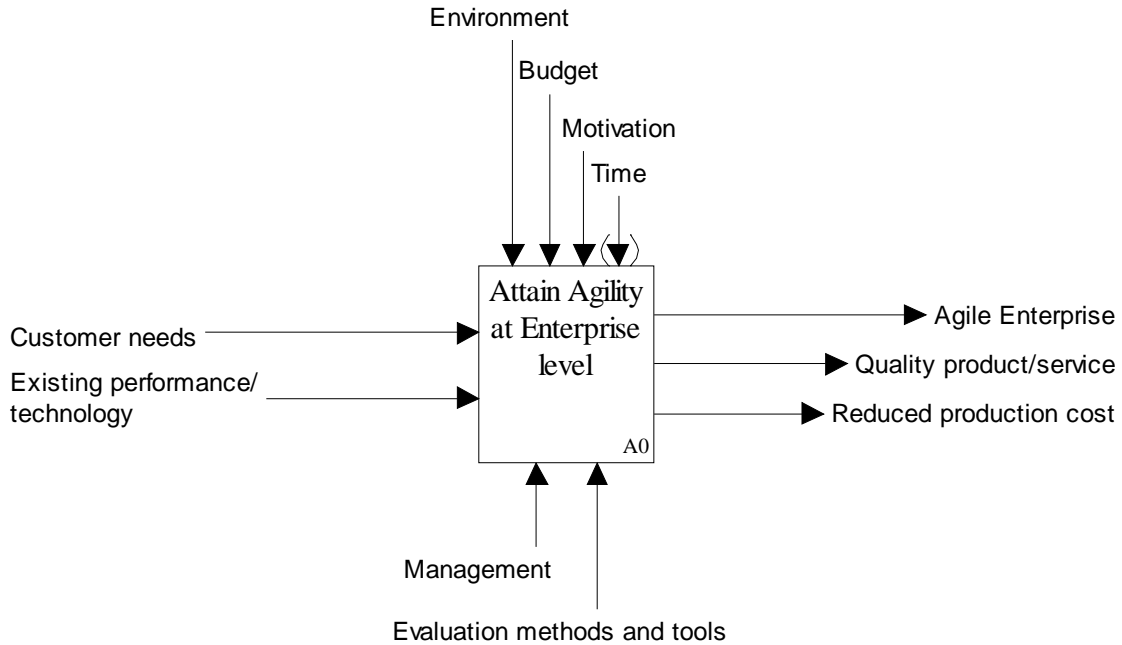


Figure 2: A-0 level of Attaining Agile Enterprise

The A-0 diagram is shown in figure 2. The purpose of this model is to Attain Agility at Enterprise level. This methodology is composed of five primary activities: *Develop vision and business strategy*, *Provide education and training*, *Set and enhance product development performance*, *Foster interaction among people and technology*, and *Integrate and improve Enterprise*. Interactions among these five activities are shown in the A0 diagram in figure 3.

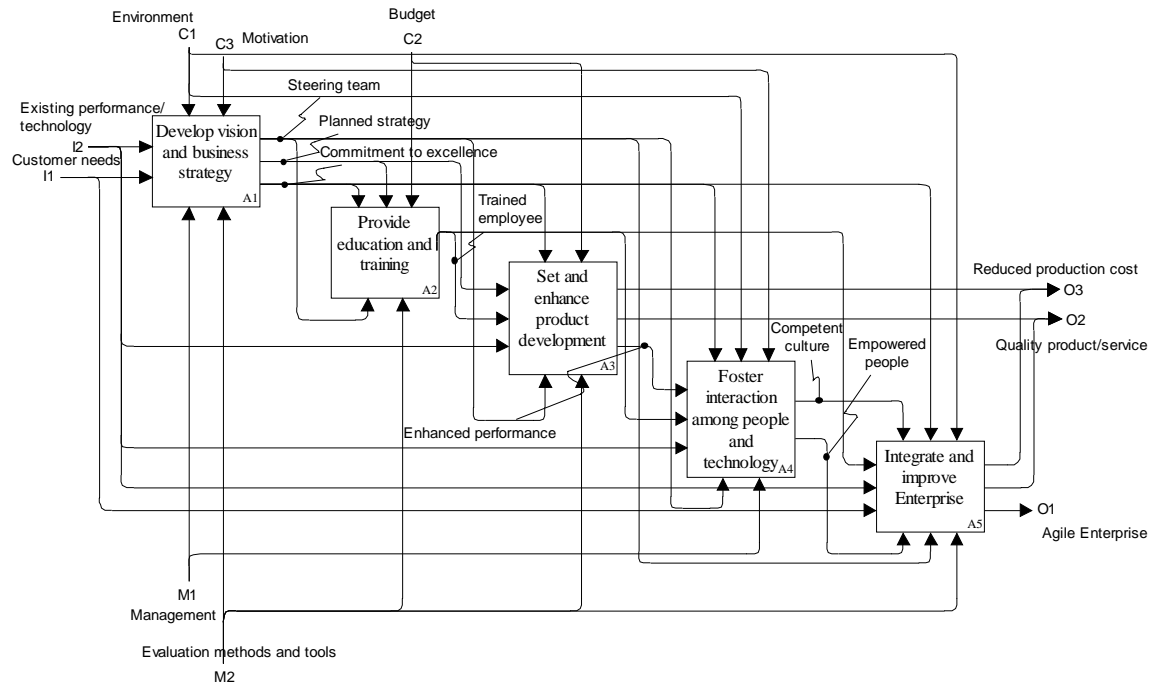


Figure 3: A0 – Activities to attain Agility

The AAE begins with developing a vision of what the enterprise aspires to be. By understanding the capability of the current technology and customer needs, steps are established to accommodate a strategic business plan that motivates employees towards work of excellency, as indicated in *Develop vision and business strategy*. As a result, a group of steering teams who understand the vision will be formed to help the company achieving long-term goals.

When the vision and strategy plan is developed, activity *Provide education and training* begins. In this activity, a series of training programs are introduced to the employees. It is a process of continuous learning, which helps to increase the knowledge, skills and develops critical thinking skills to the employees.

Once we have skilled employees, next activity, *Set and enhance product development performance* begins. This activity is the process of studying the market needs and setting specification standards of products in order to increase the quality of the product or service while reducing the production cost.

When product development is enhanced, next activity, *Foster interaction among people and technology* begins. In this activity, everything including people and technology are integrated into a coordinated and interdependent system. To achieve this integration, it will be necessary to develop systems based on three types of integration: people integration (people communicating and cooperating with people), human-computer integration (people interacting with computers) and technological integration (machine interfaced with machine) [2]. As a result, an enterprise will yield a competent culture within the organization.

Once a competent culture is achieved, the final activity, *Integrate and improve Enterprise* begins. *Integrate and improve Enterprise* transforms how work is accomplished. These activities focus on increasing the efficiency and effectiveness of all enterprise processes. As process improvements are made in the *Integrate and improve Enterprise* activity, technologies that enable the improvements to become reality are identified [6]. As a result, an agile enterprise is achieved.

By looking at the five basic activities established, this methodology has shown a path to achieve agility. By practicing these activities, a company will have a set vision to achieve what they want to be. This methodology also shows the importance to have a vision. Having a vision helps the company to set their direction to achieve their objective. In addition, the company now sees possible improvement as a whole.

## Conclusion

The world is changing and the only chance for an enterprise to survive is to cope with unpredictable changes. There is a need for an enterprise to stay agile regardless of the change. The model presented in this paper provides a common understanding of the enterprise and also an approach for the enterprise to achieve its future condition. Based on research, five activities are determined to be factors for agility. These five basic activities defined in this model is *Develop vision and business strategy*, *Provide education and training*, *Set and enhance product development performance*, *Foster interaction among people and technology*, and *Integrate and improve Enterprise*. Further development of agility has been presented by building an IDEF0 model to attain agility at Enterprise level. It has shown that the methodology presented provides useful strategic plan for a company to advance in product development as well as forming a competent culture within the organization. Without the basic elements of planning and a competent culture, it is impossible to become agile. When this methodology is properly used, a company can become agile regardless of the company size and sectors of manufacturing.

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