Chapter 2

Literature Reviews

Since the purpose of this study is to gain insight into from the perspective of an industry leader on how it shapes its corporate strategy in anticipation of future threats and opportunities, the theoretical framework needed is one that will link firm's dynamical capabilities to its technology strategy. In terms of implications to a corporate strategy, the author makes use of the well-known Michael Porter's Five-Force Model, as a systematic investigation into the nature of threats and opportunities shaping the software industry, but focused specifically on the educational software sector. While it serves as a useful tool for industry analysis, from a conceptual point of view this model does not adequately address the dynamical changes in the competition arising from technological innovations. There is a whole body of knowledge in the innovation literature that deals with this issue with its implications to strategic management. What has emerged in the past thirty years is the treatment of strategy not from a purely 'planning' approach, where all factors of competition are identified and put them into a corporate's Strategic Plan, but to also view strategy as one that must be adaptable whenever changes are necessitated by key variables in the environment. This is because of the fact that technology innovation as a key factor in competitive strategy inherently involves a learning process that must deal with uncertainties that arise both from the technical progress and market needs'

changes. These uncertainties are impossible to know *a priori*, hence, the proper strategy must have a built in flexibility yet clear enough to identify possible future paths.

Another important concept that has emerged from the innovation literature in the 1980s is the development of a firm's *core capability* as a key dimension in the formulation of a long-term strategy. While management studies prior to this have recognized the importance of firm-specific capability, the incorporation of this concept in the overall corporate strategy with profound implications in structuring the organization has only been appreciated with a growing understanding of the dynamics of innovation. Understanding what constitutes a firm's core capability is not an easy task to begin with nor is it something that is generally agreed upon among top and middle management. To a large extent, the specific type and nature of what capability does a firm need is intricately connected to how the firm sees in the words of Prahalad and Hammel, the "Architecture Vision" of its industry. This vision may not be something that is obvious to industry players at the moment, but those who correctly predict how the industry will evolve in the future stands to gain a lot by making the necessary investments in their core capabilities.

Creating an architecture vision is an exercise that still involves many uncertainties, which may not be in the top agenda for strategy even for an industry leader, such as PT. Pesona Edukasi. Management still needs a prescriptive tool to how best to allocated and coordinate its resources. For this purpose, the author will take

advantage the works of Dorothy Leonard-Barton who had extended the concept of core capability into some key activities within an organization. Her seminal contribution to the innovation studies is at the extreme implication for firms who have successfully developed their core capabilities but unable to modify them in the face of a quickly changing environment. The core capabilities then become in her words, “core rigidities”. Lessons from how to avoid of becoming core rigidities are what the author wishes to draw from and use them as the central analysis of this study.

This chapter therefore contains reviews of the selected works in the innovation literature as the underpinning theories to this study.

2.1 Five-Force Model—An Analysis of Competitive Strategy

In recent study, the five-force model (Michal Porter) is used to understand where power lies in a business situation. As noted by **John E. Gamble** the model as schematically shown in Figure 2, will help the manager understand the strength of the current product’s competitive position, and the strength of the product’s future position into which the manager is considering. Superimposed on these five forces is the government’s policy that could affect some if not all of these forces. In the case of PT Pesona Edukasi, one must consider the implication from changes in the government budget on the education software project as well as on the education sector in general.

Figure 2.0 Five Force Model by Michael Porter

Threat of new entry

- The government has announced that portion of the national budget to be allocated for the education sector is 20% (total national budget is Rp. 195,6 Trillion). The budget for education software amounts to Rp. 4 Trillion. Because this huge amount, there have been many new companies that enter into the education business. According to marketing intelligent of PesonaEdu it is very easy for a small software house company to enter education market, for example, by simply producing video tutorials.
- The threats not only come from newly established firm's entry but also from existing companies. Here, the existing companies can be divided into two

(2) groups. First, companies that are normally focused in the non-education sector, but are expanding their businesses into the education sector as part of their diversification strategy. Most of these firms have their main line of businesses in the telecommunication and consumer goods industries, such as Telkom Indonesia, Indosat, Unilever, and others that already possessed capabilities in the information technology. For them entering the software market would be a relatively easy thing to do. Second, the threat can come from those companies that are in the education sector but not in the software market, for instance: Learning Management System. Compared to the first group, these types of companies will need to invest into developing capability around software development. The barrier of entry for this group is higher than the first group. Nevertheless, certain of these companies have success made some innovations for their product and in fact have released them on the market during the year 2010.

- And then there are certain international companies that try to enter the Indonesian market. Companies like Ask&Learn from Singapore and the Crocodile Software from United Kingdom has entered the Indonesian market since 2009. According to the manager of marketing intelligence of PesonaEdu, the international companies made the education business in Indonesia really tough for the year 2010 and he predicted that the competition is going to be strong next year. The reason was that they were willing to get lower margin so they could enter the education business in Indonesia. The quality of the product was usually above the standard

quality, and they are also rivals to PT Pesona Edukasi in the international market.

The Bargaining Power of Customer

- In terms of product, the variety of the education software made the parents have a lot of choices.
- In terms of software quality, the customers have less bargaining power, because only few product categories as premium quality software.
- In terms of price, the customers have less bargaining power. Typically, most of Indonesia parent selected the good school for their child's and they are willing to pay more. In this case, the parents have the perception of unwilling to pay additional materials (for tuition / bought education software) unless their child having problem in study.

Bargaining power of Supplier

- In terms of main supplier, such as computer seller, their ability to pose a threat to the education software is considered very low. Their core business was distributed the electronic to end user. They have no experience to develop education content. If they could, they should have a lot of budget to learn and develop.
- In terms of supplier of security dongles, PT Pesona Edukasi has identified that they have less interested to education sector. Their core business was

protecting the software from piracy. They have difficulty to enter education industry in the term of market, experiences, and skills.

- In terms of raw materials for production, PT Pesona Edukasi has identified the possibility for the vendor to start up education business. As the result, they have fulfilled the raw material for production but they do not have education content. So, threats from vendors of raw material are considered low.
- The threat from software program companies is also considered low. PT Pesona Edukasi used the software program as tools to develop and compile the education software. They do not have knowledge to develop education content.

The Competitive Rivalry

- The competition in education sector today was different from the old days. The number of rivals increases in correlation with increases in the budget allocation from the Indonesian government.
- There are certain rivals are roughly equal size and competitive capability. Most of these come from international companies such as Ask&Learn from Singapore and Crocodile Software from United Kingdom.
- The international company is active in making fresh moves to improve their market standing and business performance. The typical international company “weapon” for battling rivals and attack buyer is through

aggressive pricing, feature differentiation, product customization, and higher level of advertising.

- According to Marketing Intelligent PT Pesona Edukasi, Ask&Learn firm has strong in education technology such as Learning Management System (LMS), and support SCORM compatibility. This technology helps them to easily embed or store the education content into schools management system / learning management system. While the crocodile software has strength in production process. They were able to produce a new premium interactive simulation every two (2) weeks. This could be seen regularly in the crocodile website.
- There are a lot of education software for mathematics and sciences in the market. The customer is easy to switch to other software if it is on the basis of price alone.
- However, in terms of quality software, substitute products are rare. Most rivals have different strengths from PT Pesona Edukasi. For example, PesonaEdu is strong in mathematics and sciences, while Software Biology from Biotekh Multimedia Interaktif is strong in biology.
- In terms of distribution, PesonaEdu is sold directly to school for the offline version, while for the online version it is sold through the internet. Other education software is sold in retail, such as in Gramedia bookstore. The business model for PesonaEdu software as a premium quality software does not allow it to be sold through retail.

Threat of Substitute to PesonaEdu Products

- The author identifies that under the category of ‘threat of substitute product’, it comes mainly from innovation in technologies that would allow channels of learning other than current practice of classroom teaching supplemented by digitized materials through online and standalone computers. This must be coupled to the methods by which each student is free to pursue it’s his or her own interest in certain fields of study.

- For the present market niche in which PT. Pesona Edukasi holds clear superiority, the real threat comes from the change in national education policy. At present, a Pesona Edukasi product is designed in close alignment with the national curriculum. In the event a policy change occurs where the standards of education is mostly decided in the marketplace, where it is left to the primary and education schools to establish its curriculum to meet demands in higher education or even in the job market, then more opportunities will emerge for individual learning. This condition will spur in using the best available technology available for each student to choose its locus of learning, whether it is via the internet, formal school system, tutoring/training sites, or any other means.

In conclusion, the threat from all assessment was considered low from suppliers, product substitute, new entry, and rivalry. The threat from new entries does not change the education paradigm today. Still, PT Pesona Edukasi must consider the trend of new entry as a potential threat in the future. New entrants, particularly those from abroad, have the potential to bring in new technologies that could alter today's education paradigm.

2.2 Learning as Strategy of Innovation

In their recent book, **Joe Tidd** and **John Bessant** have highlighted two schools of strategy as rationalist and incrementalist. In short, the rationalist strategy emphasizes on the understanding, analyze, and determine the course of action. This strategy focus on Planning every conceivable factors in the environment at the outset. While the incrementalist strategy emphasizes on step changes toward the stated objective, measure and evaluate the effect of the steps, and adjusts the objective and decides on the next steps. For example, Design → Development → test → adjust design → retest → operate. This latter is also known as learning process, and it is further argued that this is the most appropriate strategy for managing innovation, precisely because of the uncertainty nature inherent in the innovation process itself.

Related to this case study, there are two (2) sets of implications for PT Pesona Edukasi. The first concern was practice of corporate strategy, which should

focus on the form of corporate learning, from analysis and experience, and how to cope more effectively with complexity and change. Below was the table of implication analysis defined by the consultant. PT Pesona Edukasi should improve their core competency in order to stay in competitive market.

Table 2.0 the implications analysis for PT Pesona Edukasi

Element of Implications	**Remarks**
Corporate Training	PT Pesona Edukasi depends on the self-learning by each employee. The management still does not have the formulation of training development programs or training center programs. They have dilemma with the cost of training and employee performances. The management looks for / hires the employees which fulfill the criteria. Look like solve the problem, but in fact, looking for someone who has specific knowledge was not easy. Something took about a year, and this does not worth for the company.
Leadership and management	Each employee have different characteristic of leadership in PT Pesona Edukasi. This could be seen from each project handle by the employees. For example: Project Manager of developing new education

	software, handled by Mr Aryadi. He has produces the reward/incentive for the group of employee which finish the job on time. Others, he does do judgment to decide the best course of action needed for each situation. *For Instance:* he was confronting an employee for inappropriate behaviors.
Communication Training	From the example of development education software project, Mr Aryadi has built 2 way communications by brainstorming and sharing for each problem.
Performance Management	PT Pesona Edukasi has a good performance in Indonesia market. But they shouldn't complacent with the result. The threat of new entries/barriers will come in the near future.
Skill in Human Resources	PT Pesona Edukasi has lack of building principles of leaderships. Only the new employee who has experience shares their leadership skill during previous project from the former company. The HR Manager lack of helping employees understanding the company overall business strategy, and how they contribute to achieving key business objective.
Skill in Information	The company has followed the trend of technology. There are certain technologies adopted by PT Pesona

Technology	Edukasi such as MultiPoint Technology in collaboration with Microsoft Redmond, encryption protection software in partnership with Aladdin. In the term of employee, the IT employee required a further training in order to have expert knowledge / skill for those new technologies. While this was not happen presently.

The table above showed the implication analysis happen in PT Pesona Edukasi presently. The list of implications above should solve in order for the firms to enabling the core competency within their organization.

According to Tidd and Bessant, the second implication was successful management practice is never fully reproducible. There is a framework to identify the useful learning through experience and analysis:

1. Analyze and identified the critical evidence which underlying any factors associated with management success.
2. Do the comparison between the context of successful management practice and the context of the firm, industry, technology and country, which might be reused in the practice.

Table 2.1 the implication of Experience and Analysis of PT Pesona Edukasi

Element of Implication	Remarks
Build others' self-esteem	When employees are in a situation where you are made to feel good about yourself, you feel good. You can do the same with others by call others by their names, and encourage your loved ones to explore their talents and interests, etc.
Show empathy for others	Empathy means recognizing emotions in others. And understand how they view their reality and how they feel about things.Being aware of our emotions and how they affect our actions is a fundamental ability in today's people-intense workplaces. These emotions often not recognize by top management and HR manager. So the empathy to others was not appreciated by employee-to-employee or management in PT Pesona Edukasi.
Encourage people to cooperate with each other	Whether employees are managing a work group, there are some specific things they can do to create an environment where others work together such as Treat everyone the same, Ask for others' ideas, make sure people have clear instructions for tasks to be completed. All this have been done by PT Pesona Edukasi but still have intervention by top management sometimes.
Communicate assertively	Develop of assertive behavior within employees. Employees are not born assertive; their behavior is a combination of learned skills. Creating assertive behavior for employees such as express your honest

	feeling, assert your personal rights without denying the rights of others, and self-expressive. It the way to develop communicate assertive in PT Pesona Edukasi, this was happen rarely and should begin to develop it.
Respond productively to emotional statements	Enables Employees to demonstrate that you understand what the other person is saying and how he or she is feeling about it. This demonstrates that you are listening and that you are interested and concerned. Often employees have difficulty to share with others or HR because of the gap of communication happens in PT Pesona Edukasi. So every people like strange.
Prefer doing and Experiencing	The development of experimental / trial and observe was not manage by HR manager. The experimental done by employee itself and was not documented as company assets.
Share experience to others	The sharing experience / skill to others employee were not happen often. The reason was ineffective communication within organization. This is made the flow of information left off in PT Pesona Edukasi.
Individual Expertise and Team Success	The employees of PT Pesona Edukasi have public knowledge from their education background. But the specific knowledge of this firm was not enough to develop and take care of it.
Underlying Values	Values critical to creating learning environments are: respect for the individual, tolerance of failure, and openness to idea from outside

The entire component above was the implication happen in PT Pesona Edukasi. Although not all the component has been listed in the table but the component

above was enough to illustrate the situation happen in the PT Pesona Edukasi. All the analysis above was the indication for the firm to begin planning their future development of core capability.

2.3 Source of Innovation

Where does innovation come from? This question has been asked in every situation on business performance. ***John Bessant*** has been illustrated the source innovation come from in certain cases. For instances: Newton, dozing under the apple tree until falling apple kick his brain to think about science of gravity, or James watt also sleep until woken by the noise of boiling kettle (Steam Engine). He concluded that the source of innovation could come from various situations, but how does the innovator look different thing in several situations. Most of the innovator has successfully combining the scientific research with the source of innovation their found. But the question was where do innovations come from? Joe Tidd has provided the framework of analysis to help us determine the source of innovations. Here:

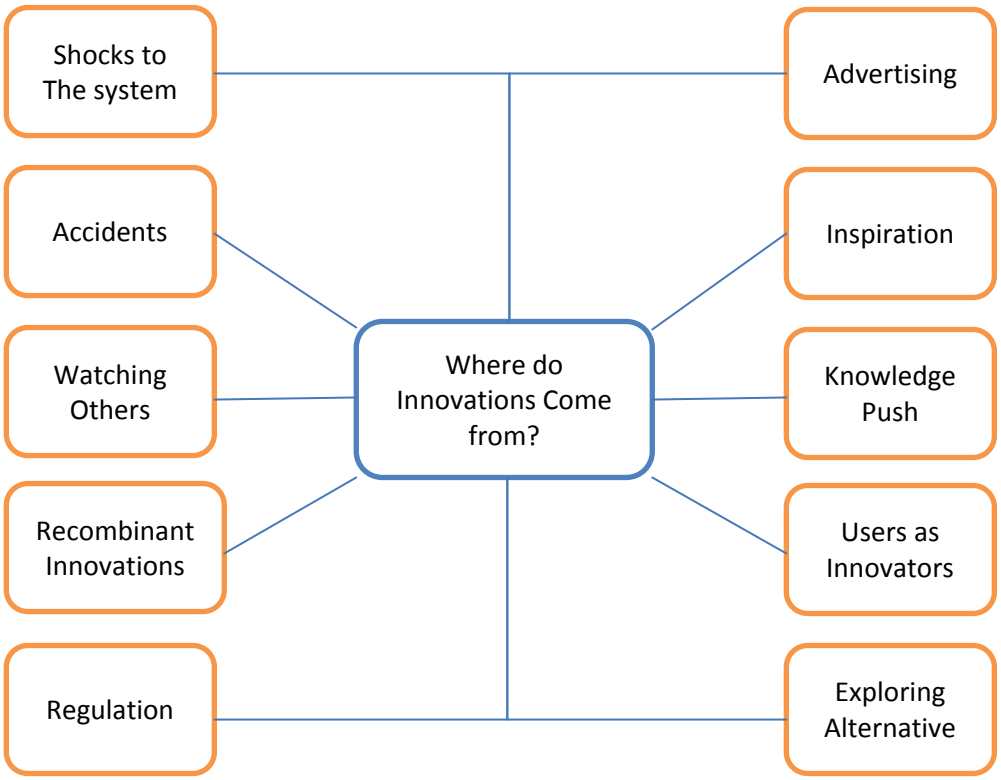

Figure 2.2 where do Innovations come from? (Tidd and Bessant, 2009)

Figure 2.2 shown the source of innovations come from various situations such as during accidents – unexpected and surprising things which offer new directions for innovation or watching others – innovation arising from imitating or extending what others do – benchmarking, reverse engineering, and copying. Those are the example of thinking process of innovation.

In the case of PT Pesona Edukasi, they have been done a great job on product innovation. But the working process inside business was not improved; there are should be drivers of process innovation inside the company. User as innovator was one of the trigger to drive process of innovation in PT Pesona

Edukasi. One of the trigger approach could be used was experiment and prototyping. In recent study, John Bessant believes that both of these components become the early version of mainstream innovations.

2.3.1 Innovation Process

Below is the process of innovation as defined by Tidd and Bessant:

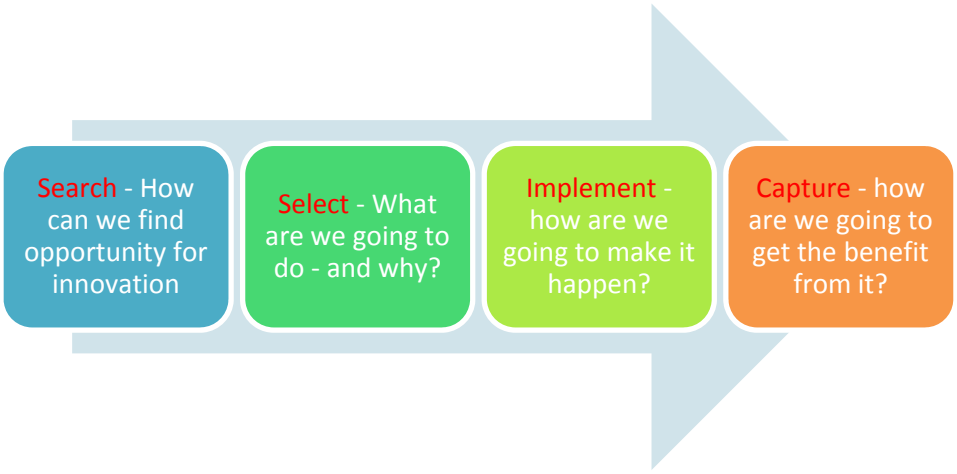

Figure 2.3 Do we have an innovation organization?

The challenge in managing innovation is to seek out and find the relevant triggers early and well enough to do something about them. In one word mean “Search”. In order to the firms deploy a range of approaches to organizing and managing the search process, the R&D manager should gain much experience to enable applied research and more wide-ranging ‘blue-sky’ activities. The ‘blue-sky’ activities referred to exploration, exploitation, and absorptive capacity. The term of exploitation by innovation researcher refer to the use and development of things already

known. Mean, utilize the resource within the company such as human resources, experiences, and skill/knowledge. This is to ensure a 'safe' way of doing so is to harvest a steady flow of benefits derived from 'doing what we do better'. While the exploration was refer to doing something differently. The potential uncertain environment and competitive position made the company to have secure position in the marketplace. Mean, maximize the internal resources to create an invention product. The balancing of exploration and exploitation brought the core capabilities for the firm. The strategies of extending search could be done in various ways:

Table 2.2 Extending Search Strategies for Innovation (Bessant, 2007)

Search Strategy	**Mode of Operation**
Sending out Scouts	Dispatch idea hunter to track down new innovation triggers. (Sending out people)
Exploring multiple futures	Use future techniques to explore alternative possible future, and then develop innovation options.
Using the web	Use the power of web, through online communities, and virtual worlds, for example: To detect new trends.
Working with active users	Team up with product and service users to see the ways in which change and develop existing offerings. (Find the way to identify and working with them)
Deep Diving	Study what people actually do, rather than what

	they say they do.
Probe and Learn	Use prototyping as a mechanism to explore emergent phenomena and act as boundary object to bring key stakeholders into innovation process. (Continuing learning process)
Mobilize the mainstream	Bring mainstream expertise into the product and service development process.
Corporate Venturing	Create and deploy venture units. (identify and develop new business) For example: Nokia.
Corporate Entrepreneurship and Intrapreneurship	Stimulate and nurture the entrepreneurial talent inside the organization (Maintain)
Use Brokers and Bridges	Cast the ideas net far and wide and connect with others industries. (Innovator broker)
Deliberate Diversity	Create diverse teams and a diverse workforce
Idea Generators	User creativity tools (Learning to search at the frontier)

The issue is that search strategy very difficult to predict which one going to be important or where the initial emergence will start. The best organization can do is to try and place itself within the part of its environment where something might emerge.

Regarding the process of ‘Select’, John Bessant described that the challenge of innovation decision making is made more complex by the fact that it isn’t simple matter of selecting amongst early defined options. By its nature

innovation is about the unknown, about possibilities and opportunities associated with doing something new. So the process involve and dealing with uncertainty. In additional, he explained the innovation management was different from gambling. Innovation management tries to convert that uncertainty at the outset to something closer to a calculate risk. Of course there is still no guarantee of success but at least is an attempt to review the option and assign some probabilities as to the chances of successful outcome.

In many business cases, the project might be used incremental approach in nature and construct on establish experience. The purpose was to move the outline idea to something with clearer shape and form in which decisions about resource commitment could be done. The manager has problem when they are successful in persuading most of the workforce to make innovation proposals, then how will they manage the volume of ideas that result? Here the stage-gate tools and approaches to managing risk in innovation projects.

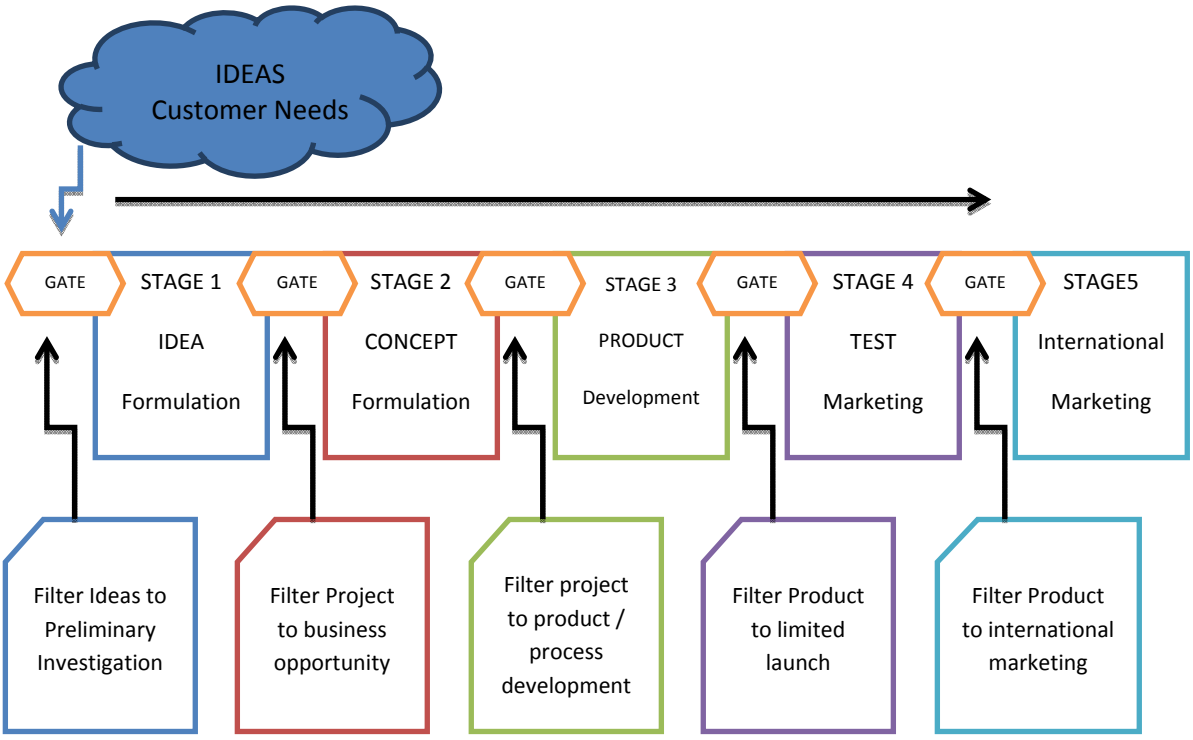

Figure 2.4 Stage-Gate tools and approaches to managing risk in project

The process AIM (Acceleration Ideas to Market) divides the development of new product / services into five manageable stages. Each stage is followed by gate, a decision point at which the project is reviewed by the gatekeeper/project manager. The project manager has authority to keep worthy project moving ahead quickly. The gates become the critical point for quality control between the stages. The objective of the AIM process is to ensure a high, constant level of professionalism in product development of high quality products.

With regard to the ‘Implement’ part of the process, Joe Tidd started with introducing the most common process for development. One of the key challenges facing the organization of new product and service was organization not evolved, structured for different purpose. In the most organization new product or service development is a rather unusual and infrequent requirement, so the first decision is what sort of team to put together to do this. He was introduced the four main type of team structure:

a) Functional Structure – a traditional hierarchical structure where communication between functional areas is largely handle by managers.
b) Lightweight product manager structure – part of traditional hierarchical structure but focus on the project where project manager provides complete structure to the inter-functional work.
c) Heavyweight product manager structure – essentially a matrix structure led by a product (Project) manager with extensive influence over the functional personnel involve.
d) Project execution teams – a full time project team where functional staff leaves their areas to work on the project.

All the structure above was tell us above the concept structure of doing process development in the organization.

Finally, in the ‘Capture’ part of the process, the manager will examine how organization can have better capture the benefit of innovation, and minimize

the drawbacks of change. John Bessant begins to describe the weak relationship between innovation and performance. The firms must decide between two broad innovation strategies:

1. Innovation *'Leadership'* – where firms aim at being the first in the market, based on technological leadership. And linkages with major sources of relevant new knowledge, to the needs, and response of customers.
2. Innovation *'Followership'* - where firms aim at being late to the market, based on imitating. This requires a strong commitment to competitor analysis and intelligence. The analysis and intelligence should cover the preliminary investigation including how they work, how they are made, to cost cutting and learning.

From the above description, John Bessant emphasizes the key of value creation from innovation which is Technology. In the case of PT Pesona Edukasi, the value creation of product innovation was technology. The technology enables the firm to make differentiation with others, but the technology itself was able to imitate. The others value of creation should develop in this case such as learning and experiences. The learning and experience come from the process of dynamic competition which involve considerable amount of trial and error from both procedures and users. Therefore the technological leadership does not necessarily translate itself into economic benefits. But the capacity of the firm to appropriate the

benefits of its investment in technology depends on the ability of the firm to translate the technology advantages into commercially sustainable product or process.

All the value creation has been discussed above should be managed by the firms through knowledge management. In essence managing knowledge involves five critical tasks:

1. Generating and acquiring new knowledge

   It is require defining the basic knowledge for organizational context.

2. Identifying and Organizing existing knowledge

   To be able for manager identifies the knowledge, it should begin with what is knowledge all about. Knowledge is the information that has been contextualized, given meaning, and easier to operationalize. (Joe Tidd and John Bessant, 2009). But much of the research and innovation management and organization change has failed to address the issue of organization learning or knowledge learning. The key of this was organization learning. Mean the organization should learn through the individuals / employees within organization. In fact, in the most organization changes was focus on the individual learning within organization, not organization learning.

3. Storing and retrieving knowledge

   In the term of technology, storing and retrieving the knowledge was minor issue/problems. The two common approaches use to help organization storing and retrieve the knowledge. A first approach was on investment in IT, the knowledge management systems. Introducing the knowledge management into an organization consist of much more than technology and training. It does require fundamental changes of firm structure, processes, and culture.

4. Sharing and distributing knowledge across the organization

   It is about the process of information from different source share. Therefore, leads to new knowledge or understanding. Joe Tidd and John Bessant explain the greater organizational learning happen once or more of an organization element gain fresh knowledge and recognize it as being of potential use. There are certain knowledge was not easily to imitate by competitor. This is because the knowledge was not fully encoded. Example of this knowledge was tacit knowledge. Further study, because of tacit knowledge was not fully encoded, and it may not be fully visible to all members of organization too. So, the manager should process the knowledge by converting and connecting the knowledge from different part of organization. Otherwise, the knowledge just was not visible to every employee within organization.

5. Exploring and embedding knowledge in processes, product and services. David Tranfield and his collagenous describe the important element of exploring knowledge through process. The managers should bring the innovation phases into organization. First, discovery the knowledge – search from both internal and external knowledge resources. Seconds, Realization – implement the innovation process through various stage of development to final launch as a new product or service. The last was nurturing knowledge – after discovery and realization the potential knowledge through innovation process, it's required for the manager to evaluate, support and re-innovate by exploring each knowledge within organization. The purpose of this was keep the organization to learn and reviewing their experiences of success / failure in order to learn about how to manage the process, capture relevant knowledge.

2.4 Core Capabilities

According to **Dorothy Leonard**, core capability is the ability to transform technology rapidly into new product and process. In addition, the development of core capabilities is inextricably linked to learning; knowledge is both raw material and finished goods in today's corporations. Core capabilities create a competitive advantage for a firm. They have been built up over time and cannot be easily imitated.

Core capabilities are distinct from both supplemental and enabling capabilities, neither of which is sufficiently superior to those of competitors to offer a sustainable advantage. Supplemental capabilities are those that add value to core capabilities but that could be imitated, for example, having particular distribution channels but not unique packaging designs skills. While enabling capabilities are essential but not sufficient in themselves to competitively distinguish a company.

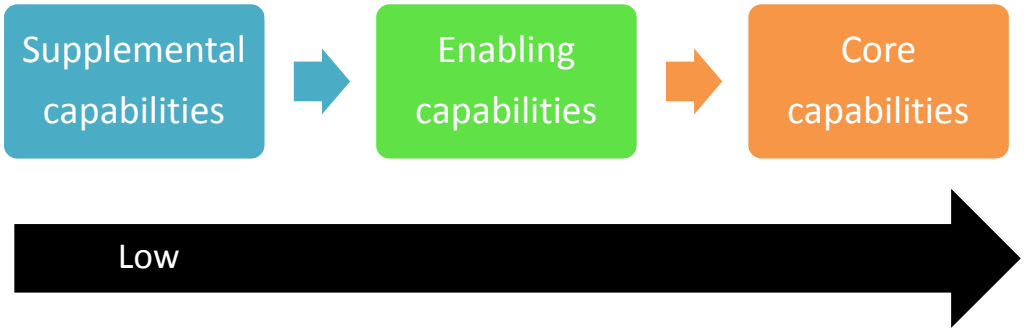

Figure 2.5 Strategic importances of Technological Capabilities (Dorothy, 1995)

There is a continuous interaction between the activities that leaders encourage and the core capabilities of the firms. The core capabilities are created through knowledge–creating activities, but those activities are also dependent on, and enabled by core capabilities. To create and maintain core technological **capabilities**, at least two abilities must be developed, which are the know-how to manage knowledge-creation activities and the ability to understand exactly what creates a core capability - what are it aspect.

2.4.1 The Essence of Core Capabilities

The idea of a few core capabilities bring a competitive advantage on company is not new. A number of authors have called them distinctive, firm-specific, organizational competencies; resource developments; or invisible asset. Researchers for several decades have noted that a strategy of building on such distinctive capabilities appears to lead to superior performance. However, the proponents of this view do not suggest a static view of competence. Rather, they recognize that although organizations, like the people who populate them, have invested in knowledge building over the years and have developed particular skills, they still must continue to build and change those skills in response to changing environments. In recent study, ***Gary Hamel*** has pointed point a core competence or capabilities provide a gateway to new opportunities.

2.4.2 The Locus of Core Capabilities

There is much debate whether core capabilities should be define at corporate level only or whether a core capability should located in a division or function within the organization. If a core capability is one that provides competitive advantages, it would seem logical located at any line of business level, said ***Dorothy Leonard***.

However, the useful knowledge bases are to guide identified, nurtured, and exploited. Dorothy emphasized the design of activities that create and channel knowledge rather than the process of agreeing upon a statement that identify a company technological identity.

2.4.3 The Nature of Core Technological Capabilities

Dorothy Leonard explain the term of technological capability is used to cover the system activities, physical systems, skills & knowledge bases, and managerial of education create a special advantages company or line of business. In earlier discussion, she describe such system may be considered supplemental, enabling, or core.

Table 2.3 type nature of core technological capabilities

Supplemental Capability	Nice to have – BUT unessential
Enabling Capability	Important to company as minimum basis for competition in industry BUT no particular competitive advantage.
Core Capability	Apart from the rest of the pack and AT LEAST have potentially provided a competitive advantage.

According to ***Dorothy Leonard***, there are four primary activates which help company to create and control the knowledge necessary for current and future operations. Three of these activities are internally focused:

1. Share – creative problem solving
2. Implementing and Integrating new methodologies and tools
3. Formal and informal experimentation
4. Pulling in expertise from outside

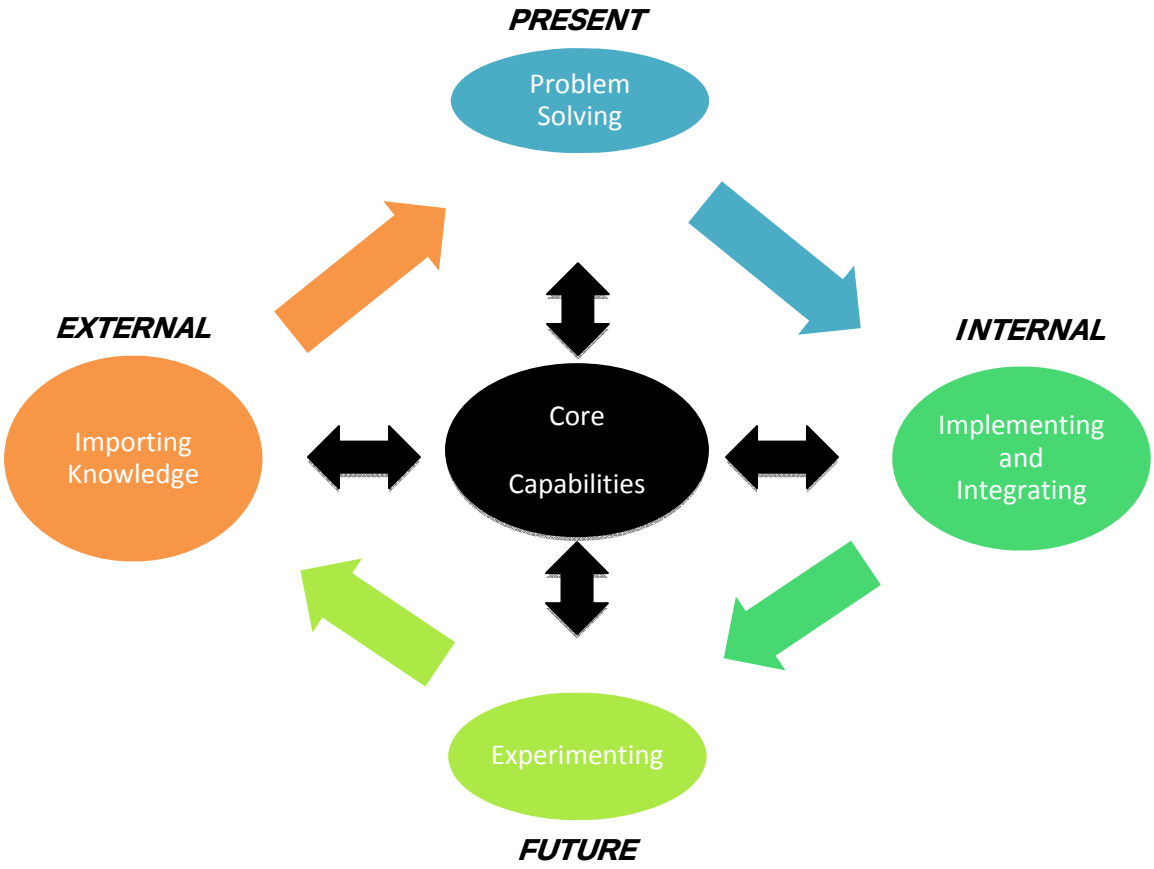

Figure 2.6 Knowledge Creating and Diffusing Activities (Dorothy, 1998)

However, by looking even nature at a particular set of such activities in real factory, we starts with our feet on the managerial ground. Let's look one-by-one each activity that impact core capability in organization:

- **Shared Problem Solving**

  In learning environments, progress must be everyone business is not just province of a few specialists. **Dorothy Leonard** say probably 90 percent of the problems never even make it to the morning meetings. Mean, the problem only share and discuss to group of people or everyone on the shift. ***Dorothy*** gives a good example of often case happen in our internal organization if the problem have not share. Have you often listened to this word in your organization: "You go see what the problem is", "You don't say that not my area", or "I don't know that much about it". All that word come to certain staff or event manager in organization if they never involve into discuss group.

  The critical point above is problems should be shared. Five or six heads are better than one. Everyone in the organization get new knowledge when each the problems solve. This knowledge should manage carefully. The tools of knowledge management demands the ability to move knowledge in all directions (up, down, across).

  In recent study, ***Dorothy*** clarifies the knowledge flow readily not only because of the company size but considerable effort has been made to

minimize both vertical and horizontal barriers in organization structure. For example: if employees have tact/opinion, he/she can tell anyone (from top management to lower level) in organization exactly what is on his/her mind. This first step emphasize on share problem and how problems are solve.

One of the greatest advantages of this attitude is that the *ideas come from just about everybody*. Others point, if it had been just one manager / staff, probably it would have taken him ten times longer to find the solution.

- **Integrating New Technologies and Methodologies**

  In this step, the top management is willing to integrate new technologies into several operational activity that necessary improvement. ***Dorothy*** assumes this step like "Do-it-yourself Company", with no acknowledged staff positions and only a few positions that seem staff like. Mean, similar like "FLAT" organization structure whereby every employee should try to be initiative, improve their knowledge, and have good problem solving skill. One of this advantages was process improvement are immediately enacted. Work is structured with the objective of disseminating knowledge.

- **Constant Formal and Informal Experimenting**

  Dorothy Leonard illustrate most of the company has formal experimenting such as R&D facility only use by researcher. In recent study, she believes

every employee should share their idea and share in the pride of doing. She has share the evidence of her concept in Chaparral steel. Every employee in the chaparral company has shared the experimental though they are not part of Research and Development (R&D) group. No separate R&D facility exists at Chaparral.

Share the experimental equal to creating knowledge. Creating knowledge requires continuous pushing beyond the familiar, and Chaparral employees are skilled experimenters. The nature of the experimentation is shaped by both skill of employee and the risk of the endeavor.

In additional, top management of chaparral share his opinion. “It is hard to say who fathers an idea. It does not make any difference. Everyone share in the pride of doing.” The disadvantage was if the experiment fails, everyone shares in the failure. In others place, a few people do a lot of innovating. Here a lot of people do little bits that add up. In the managing innovation book was known as incremental innovation.

The point of focus was continuously share experimental from many employees not only in formal experimental but also informal. ***Dorothy Leonard*** suggestions prove on excellence result at Chaparral Steel. Share experiment from each employee spread the knowledge to everyone in the company. So, employees have equal/similar knowledge/skill.

- **Expertise from Outside**

  An important source of knowledge found in others organizations. The example from chaparral steel shown the manager constantly benchmark and scan the world of technical expertise. Chaparral steel employees were very actively scan external sources of expertise though more than the usual publication channels. This mean, they want to be the first industry knowledge to learn, if by the time you hear about technology in a paper at a conference, it is too late said *Vice President Chaparral Steel, Dave Fournie*.

  The company also works with the best suppliers it can identify in the world and then pushed those suppliers to innovate, often far beyond current designs and products. Means, top management push the supplier to have latest technology to adopt. The company is very aggressive in pursuing the latest industry knowledge.