INFLUENCES OF THE STRUCTURE OF ORGANIZATION ON THE TECHNOLOGY COMMERCIALIZATION AT A START UP COMPANY VS. AN ESTABLISHED COMPANY

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INTRODUCTION

A technology based company has different characteristics than a service based company, particularly in their R&D which has relatively high cost and high risk. Accordingly, the commercialisation of a new product, which is the result of its research and development department (technology push), should be done carefully. Among other things, the company should educate the market about the new product. Another company starts the development of a new product by doing market research and then asks the R&D department to make the required product (market pull).

Some companies succeed in commercialising their technology; while some others fail. The success of technology commercialisation, either for the technology push or the market pull strategies, depends on many aspects among others are financing, research & development, production, marketing, and human resource. In human resource aspect itself, the success of technology commercialisation can be seen either at the organisational level or at the individual level.

This paper focuses on the organisational level. At the organisational level, the structure of the organisation plays an important role. Some companies prefer to put product development under the R&D department while others create a cross-functional team for product development. This team may consist of staff from the R&D department, production department, and marketing department. Another variation may be related to the age of the company. A start up company and an established company may have different structure of organisation related to their technology commercialisation. Another factor in addition to the age of the company is the size of the company. A company with small number of employees and a small budget behaves differently from a big company.

Research Aims

An organisation should adapt with the evolution of the company. The organisation structure of a new venture should be different from an established company. It is the aim of this research to determine the appropriate organisation structure for the commercialisation of technology, both for a start up company and an established company. The outcome of this research will be useful to differentiate the appropriate organisation structure between a start up company and an established company.

Research Methods
In general, this study is done based on literature review on organisational aspects of a company. The literature review is performed to find the theoretical bases of technology commercialisation, organisation behavior, and company life cycle. The organisational structure of companies is analysed. Next the start-up company organisational structure and the established company organisational structure is compared. Furthermore the organisational behaviour as consequences of the organisational structure is analysed.

Technology Evolution and Company Evolution

This chapter will explain the technology life cycle and technology evolution. It will also explain how the company’s organisation evolves to follow the technology evolution.

The technology life cycle follows an S-curve, which consists of 4 phases: introduction, growth, mature and decline. At the introduction phase, the product is really new and only few customers buy it. At the growth phase, the number of customers who buy the products grows. At the maturity phase, many customers buy the product, the market is saturated and there are only few additional customers who will buy the product. At the decline phase, customers start to buy another product and leave the current product. The relation between phases of technology life cycle with the number of customers of the product is explained in Figure 1.

![Figure 1 Technology Life Cycle](image)

Following the decline of a technology usually another, new technology emerges. The new technology could be an incremental technology or a breakthrough technology. It could be either a disruptive technology or a discontinuous technology. The new technology itself could be developed by the company itself or by competitors. If the competitor’s product can win customer’s heart, then the competitor will rises and take over the company’s position.

Tushman (1997) explains another perspective about technology cycle. The technology cycle is composed of the era of technological ferment, which is ended by the domination of a single design (dominant design). That stage leads to an era of incremental innovation, which is, in turn, broken by the next technological discontinuity. This subsequent product or process technological discontinuity then initiates the next wave of technological cycle (variation, selection and incremental change).
A disruptive technology is usually developed by a start-up company, whereas an established company tends to make an incremental technology. An established company may see that the market is too small, therefore decide to not develop a disruptive technology. Furthermore, it too focuses on the development of the existing product and neglects the possibility to develop the disruptive technology.

A start-up company usually starts the company with single or dual products. The future of the start-up company really depends on these first products. Then it expands, in term of the products, employees and market. The new product may serve either the current market or new market. Some start up companies succeeds to become bigger while some other dies. For the company which becomes bigger and established, the revenue it gets allows the company to generate more income which further allows the company to develop other new products and enhance the existing products. This will create new market or extend the current market.

There are some changes which are happened at a start-up company in becoming a bigger-established company:
- Organic growth, the start up company becomes bigger in term of the number of products, number of employees and number of customers. For this to happen, the company needs to be successful with the product and sales and able to generate revenue and profit.
- The founder is replaced by a manager. Usually this case happens when the company is big enough and the founder would like to become a member of the board of commissioner, or when the company is sold to other people.
- IPO (Initial Public Offering), some start up companies sell their share at the stock exchange either for wealth creation or for company expansion.
- The share is bought by another company, and the founder will set up another business.
- Turn around, the possibility that the founder or CEO changes the company’s blue print. The company’s strategies are usually changed after the company becomes bigger. It also happens if the founder is not the CEO anymore. The new CEO tends to have vision or strategy which is different from the founder. It will cause labor turn-over and followingly people should learn the new thing.

Baron (2002) explains that there are three dimensions of employment blue print, those are the basis of employee attachment and retention; the criterion for employee selection; and the means for controlling and coordinating work. Based on these three dimensions, he creates five basic model typologies of employment relations blue print, which are “star”, “engineering”, “commitment”, “bureaucracy”, and “autocracy”. He also finds that after a couple of years some companies (10.9%) change their blue print from the founder’s blue print to the current CEO’s blue print. This tendency is higher for the companies whose current CEO is not the founder.
Characteristic of Start-up and Established Company

This chapter will emphasize the similarities and the differences between a start-up company and an established company.

There is no exact difference between a start-up and an established company. However, usually a start-up company is characterized by their age, which is usually less than 2 years; the number of products, which is only a few; the number of employees, which is only a few; and the type of market it serves, niche market.

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<th>Start – Up</th>
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<td>Age</td>
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<td>Line of product</td>
<td>Vary (usually 1 or 2 products)</td>
<td>Vary (usually many products)</td>
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<tr>
<td>Number of employee</td>
<td>Vary (usually few employee)</td>
<td>Vary (usually many employee)</td>
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<td>Market / Number of customer</td>
<td>Usually niche market</td>
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An established company has certain and routine budget which can be used for R&D. On the other hand, a start-up company doesn’t have routine income which can used for R&D, even sometimes it is still necessary to find financier. As consequence, it is more difficult for a start up company to give big additional compensation (e.g. bonus, incentive) compared to an established company.

Organisation Structure of R&D and Marketing Department

This chapter will explain about how company organises their R&D department and marketing department, especially at technology based company.

An established company has a clear division on who should be responsible for certain product’s R&D. There are at least two perspectives for organizing their R&D department: by line of business/product (it means that there is a fix organisation structure at the R&D department) and by project (there is an ad-hoc team; which depends on the product which will be developed). While at a start-up company, employees in the R&D department, sometime, are responsible for more than one product. The other alternative is that they outsource their R&D to university or government laboratory.

A similar situation applies for organizing sales and marketing department. A start up company will ask its employees for doing multi-tasking jobs. It means that the employee should understand and have product knowledge for more than one product, as well as should be able to sell and market all of them. In an established company, there is clearer job division, which marketer/sales are responsible for a particular product or a particular brand.

Organisation Structure of Start-up and Established Companies

This chapter will discuss the appropriate organisation structure for start-up and established companies based on their characteristics.

A start-up company tends to have adaptable/organic organisation structure, which means that the organisation structure changes quite often if there is change either in the product specification, customer need or market demand. As a consequence, the job description always changes as well. Organisation structure at the start up company is simple; it only has the main function which really supports the core business. Furthermore it is also flexible. Often one people is responsible for more than one positions. Therefore the employee often has multi-tasking job description; they are able to do more than one job. Company which has few employees make the employee does “total football”. All team members should be comfortable playing any positions. It is quite normal that several positions are done by one people. They will recruit new employee based on the project available. When they have few first customers, their success in serving these customers really influences the future
customer decision. Through word of mouth effect, it will influence other customers to come or to choose another company.

An established company tends to have more options for organizing its organisation structure. It can make the organisation structure based on function (the R&D department, separate from the production and the marketing/sales departments). Here it tends to have a clear job description and position. Furthermore it can create a project team of product development as a cross-functional team and give autonomy for the team. Its stable income allows it to allocate some of the budget for product development. Nonaka (1990) shows examples of functional background of major new product development team members at several established companies (Fuji Xerox, Honda, NEC, Epson, Canon, Mazda and Matsushita Electric). At those companies, the team members have various functional backgrounds (R&D, production, sales/marketing, planning, service and quality control). Furthermore Nonaka (1990) also shows an example on the various educations, majors and career paths of the core members of the FX 3500 development team at Fuji Xerox.

Employee requirement. A start up company tends to find experience employee whose skills match with the current running project or the developed product. The company needs employee who is ready to work as soon as possible and is able to immediately achieve his/her top performance. The company tends to need employee who is flexible, willing and able to do another job at the same time. Moreover, the company hires employee who can fit and can work together with the existing employees at the company. While an established company tends to hire young-potential employees who may fit with organization culture and value. The company will educate them to familiarize themselves with the organization activities and values. After the new employee accustom to the organization culture and value, they will be placed at a certain department.

Bureaucracy. Adler (1999) classifies organisational design within company into 4 categories (Figure 3). Based on technical structure dimension, he categorises a typology of organization design into low level and high level bureaucracy. While based on social structure, he categorises an organization design into enabling and coercive. A start-up company tends to have less bureaucracy than an established company. A start-up company only has few employees, manages few products and serves few customers. Thus, it only needs low level of bureaucracy. This situation also makes “enabling” function is more possible to be implemented. Therefore, at start-up company, the “organic” organizational design is preferable.

The company that evolves from a start up to an establish company tends to more bureaucratic. At an established company, the bureaucracy is needed to manage the employees and businesses, especially at the department who has repetitive job description. However at an established company’s department who requires innovation at its job description, less bureaucracy is preferable. In the end an established company needs a combination between “organic” and “enabling bureaucracy” organisational designs.
In addition to organization structure, how New Product Development (NPD) project teams are organized, should be well managed for determining the success of technology commercialisation project. At his first article, Copper (2004) identifies four factors that should be considered in relation to the way in which teams are organised. The four factors are: both the project team and the project leader remain on the project from beginning to end of project, a clearly assigned team of players and a clearly identified team leader. Both a start up company and an established company should consider above factors to ensure the success of their project. Those factors really influence the success of technology commercialization project. However it may be difficult for a start up company to retain the project team and team leader at the same company, especially if there is change in CEO and change in company’s blue print. The situation is not stable, the founder is replaced by another CEO. Therefore it influences the labor turnover.

Besides taking into account of how they are organized, the NPD project team should focus and has dedicated resources. At his second article, Cooper (2004) describes five factors affecting technology commercialization performance, in relation to project team focus and dedicated resources. These factors are: resources allocated based on project merit, adequate time and other resources assigned to NPD projects, project team focus (not spread over too many projects), team focused on NPD (not doing too much other work), and an innovation or NPD group exists (dedicated to NPD work). It is true that there should be dedicated time, resource, budget and people for certain project. But at a start up company, it is a bit difficult to just focus on the project team. There are not many employees, and they should do multi-tasking works. Furthermore a start up company tends to have a limited budget. There is difficult to dedicate one people only for one project due to the dynamics of the market. There will be a trade off between focusing on one product or chance for expansion. There is simply not enough resource too handle many projects at once.

**Organisation Behavior of Start-up and Established Company**
This chapter will discuss the differences between organisation behavior of a start-up and an established company as a result of the organisation structure.

There are many differences of organisation behavior between a start-up and an established company:

1. Product Portfolio. Usually a start-up company only has single or two products and really depends on the success of these products. Therefore it is difficult to build many alternatives of product portfolio. The situation is a little bit different from the situation at an established company, where it can create many options of product portfolio. It can have one product at mature phase, while one product at growth phase and the other product at introduction phase. It also can determine the appropriate timing for launching the new product.

2. Product innovation. Although a start-up company doesn’t have big budget to make various products, a start-up company tends to develop more innovative product. There is more flexibility to change the product based on employee creativity. Limited budget force the company to focus on its product and always enhance its product. An established company tends to develop less innovative product. It has bureaucracy and regulation which discourage the employee to develop a product which doesn’t align with company’s blue print.

3. Challenging work. The start up company tends to have more challenging and interesting work. The company usually focuses at niche market and their product is really customized for this market. Therefore the product usually is really new and at the frontier of the technology cutting edge. This condition creates really challenging working environment for the employee. While at the established company, most of jobs are routine work. The innovation is focused on development of the existing product. Therefore the working environment at established company is less challenging than the working environment at start up company.

4. Market Respond. A start-up company tends to react faster to the customer need and give faster response to the market demand than an established company. This fast action is related to its less bureaucracy. While at an established company, the bureaucracy makes it reacts slowly to market changes.

5. Employee relationship. A start-up company tends to have closer relationship among employees, between the boss and the sub-ordinates. They are only few employees; therefore the frequency of the meeting among employee is more frequent. They only have relatively small office which allows them to meet every time. Many jobs should be done together which allows interactions and makes closer relationship between employees. At an established company, the number of employees is very large. Thus it is difficult for every employee to have contact with the all employees at the company.

6. Autonomous activity. Employees at start-up company tend to have autonomous and independence for setting up activities. There is no strict role on it. Therefore, the employee can make an improvisation. An established company has more rigid role and job description which make the employees more focus on their own job.

7. Employee performance. At the start up company, the performance of the employee is measured based more on professional basis. The CEO assesses the performance based on the final output which is relevant with the ongoing project. The performance control is more cultural and more informal since the nature of the job always change. It means that there is no rigid control for measuring the employee performance. While at the established company, the employee performance tends to be measured more formal using certain performance indicator. Furthermore every employee has supervisor which assess employee’s performance.

8. Employee competition. At a start-up company, competition on technology commercialisation is for convincing the fundamental idea of the new product, which can influence company direction. While at an established company, competition on technology commercialisation is for getting funding a certain project from holding company and for producing high quality product for satisfying target which is set by the holding company.

**Concluding Remark**

This last chapter will summarise the important points from this paper.
A start up company tends to have more autonomous, flexible, and organic organisation structure. This structure influences the organisation behaviour, which is fast (it can fast react to the market), creative (innovative) and less bureaucracy. An established company has some options in term of their structure, and has many functions and clear job description. As consequence of this structure, it has much bureaucracy and makes the company reacts slowly to market changes.

NOTES

1 In soccer, the phrase "total football" means all 11 outfield players in a team are comfortable in any position, depend on whether they attack or attacked by other team.

REFERENCES

Christensen, Clayton M. (2005), Innovator's dilemma: the revolutionary book that will change the way you do business / Clayton M. Christensen.