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INNOVATION CUBE: TRIGGERS, DRIVERS AND ENABLERS FOR SUCCESSFUL INNOVATIONS¹

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Research on innovation has explained the relationships between institutions of higher learning, companies and the markets from both market driven and resource driven perspectives. However, innovation still remains more of an art than a science. Key researchers have lamented that it is difficult for most companies to scan the market place to identify new innovation opportunities. This paper describes a framework called Innovation Cube that is the building block for helping companies identify new innovation opportunities. This cube is constructed using three attribute-pairs called drivers, triggers and enablers of innovation. The paper discusses examples of the types of innovations represented in each of the four quadrants of the three planes that result from the drivers, triggers and enablers of innovation.

1. INTRODUCTION

All of the innovation related research beginning (Schumpeter, 1934) can be broadly divided into two major camps – market driven perspective and resource driven perspective. (Porter, 1985) and (Slater and Narver, 1994) argue that it is the market conditions that drive innovation in firms. (Cohen and Levinthal, 1990) suggest that few companies have the ability to scan the market place to recognize such market driven innovation opportunities. The resource driven camp made up of (Penrose, 1959), (Prahalad and Hamel, 1990), (Wernerfelt, 1995), (Grant, 1996), (Conner and Prahalad, 1996) and (Eisenhart and Martin, 2000) show how it is a firm's rare and not easily copied resources, capabilities and skills result in sustainable competitive advantage in the form a continued string of new products.

Several examples from the history of innovations show that serendipity has played an important role as well. It is not that the discoveries happen without effort. Louis Pasteur's quote '*chance favors the prepared mind*' reminds us that one has to actively pursue the innovation path in order to taste success.

¹ This paper has been accepted for presentation at the Annual Conference of the International Society of Professional Innovation Management to be held in Porto, Portugal from the 19th to the 22nd of June. This paper is the first in the series of three defining a framework for innovation. The other two papers will focus on the Innovation Engine and Innovation Stack.

There have been several models of innovation, the earliest being Linear models of innovation. The first linear model of innovation was based on technology push. Research in institutions of higher learning resulted in science that was transformed into technology by industry players and offered as products in a market place. The second linear model of innovation was the result of a study by von Hippel that proposed a market pull based innovation. The market was said to drive the research and development directions which in turn passed on the results to the manufacturing who later delivered the products sought by the markets. (Galbraith, 1982) in his article suggested that a simultaneous coupling between research and development, manufacturing and marketing fostered innovations. (Rothwell and Zegveld, 1985) showed that innovation is a result of the market pull and technology push through the interaction between the marketplace, science base and an organization's competencies / resources. The interactive and simultaneous coupling models did not assume any explicit starting point for innovations.

(Kelly and Kranzberg, 1978) describe innovation as a management process that involves one or more of the following three:

- a context dependent response to a need
- a successful creative effort that introduces a novelty
- the need for changes in the current offerings.

None of these models explain how innovations are triggered. It is as if some how the bridges were built across the technologies and markets using a firm's resources. There has been suggestion on how one decides where to build a bridge and when.

The work on the innovation cube is motivated from the observation by (Cohen and Levinthal, 1990) that few companies have the ability to scan the market place to recognize such innovation opportunities. The resources required to scan all of the market shifts and technology discontinuities and determine which of them were relevant to a firm would be enormous. Very few companies can afford to carry out such scans on a continued basis. Further, companies would only be interested in expanding into markets without abandoning their roots as explained by (Zook, 2003). It would be nice to have a framework that can call a firm's attention to selected market shifts and technology developments of interest to it. The innovation cube provides such a framework. This paper describes the innovation cube. The use of innovation cube to identify new innovation opportunities will be discussed in a future publication.

2. INNOVATION CUBE

The Innovation Cube uses three pairs of attributes that define successful innovations. "Pain-Pleasure" is the first pair of attributes. "Market shifts-Technology discontinuities" is the second attribute pair. "Price-Speed" is the third pair of attributes.

Each attribute pair plays a different role. "Pain-Pleasure" attribute pair is the most fundamental of the three since it defines why people would want innovations. An innovation that identifies a solution for a pain experienced by a community or that addresses the needs for their pleasure would certainly be attractive to the markets. The automobile is an example of a solution to a pain experienced by human societies. It helped people commute from an origin to a destination fast, in

comfort and with protection from sun and rain. The roller coaster is an example of an innovation that addresses the needs of human society on the pleasure dimension. Given that these Pain and Pleasure are the basic drivers of innovation, this pair is labeled the Drivers of innovation.

The second attribute pair is Market shifts-Technology discontinuities. Whenever markets change or when a new technology becomes available then there is an opportunity for innovation. Even if the pains experienced by the society or their needs for pleasure have been identified, the markets may not be ready for them or the required technology might not be available. It is the opening of the markets and / or availability of a new technology (arising due to a technology discontinuity) that would trigger the timing of the innovation. Hence we call this attribute pair the Triggers for innovation. It is important to note that a technology discontinuity will lose value over time when that technology gets commoditized. Once a technology discontinuity is commoditized, it is the market shifts that come into play. Information technology is an example. Companies treated information technology as a strategic investment in its early days. When information technology became a commodity, companies had to focus more on effective use of technology to create new products rather than on the technology itself.

The third attribute pair defines the pragmatics of an innovation. Any innovation has to be affordable for wide spread acceptance by the markets. Speed of delivery is as important as relevance. A company that has identified an innovation but is slow to deliver it to the market will surely not be successful. Price and Speed of delivery enable an innovation succeed in a market that is ready for exploitation. (Moore, 1995) is very clear that only one firm ends up as a gorilla when the tornado for market share of a new product has settled down. The speed of capturing the market share of a product is certainly influenced by the speed of delivery to the market. Hence the Price-Speed pair is called Enablers of innovation.

The innovation cube (See Figure 1) captures the three key dimensions required for a successful innovation. The X axis represents the Drivers of innovation, them Y axis represents the Triggers for innovation and the Z axis represents the Enablers of innovation.

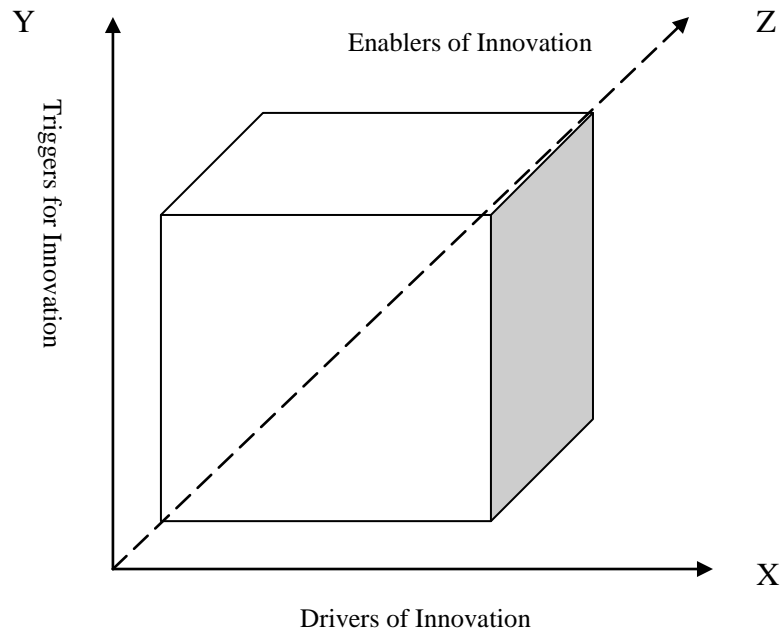


Figure 1. The Innovation Cube

A discussion on the innovation cube can be decomposed into a discussion of the three planes of the cube, viz., XY, YZ and XZ planes. The three following sections provide examples of the type of innovations that is addressed by each of the three planes of the innovation cube. The term product is used in the following discussions to refer to both products and services based that are innovation based.

2.1. Innovations along the X-Y Plane of the innovation cube.

The XY plane is defined by the drivers of innovation and the triggers for innovation (See Figure 2). Some examples of pains are inconvenience, bottlenecks and immobility. Some examples of technology discontinuities are miniaturization, high speed computing elements, broadband communications, increased capacity and higher resolutions. Examples of market shifts are new regulations / deregulations, user maturity with respect to new skills, willingness to pay, and familiarity with new technologies, new residential and commercial geographies, and new user preferences. Examples of pleasure are ego trips, thrills and personalized products and services.

The quadrant that is the intersection of Technology discontinuity and Pain represents innovations that can be collectively termed transformational products. Examples of transformational innovation are automobile and E-Commerce. Internal combustion engine was the technology discontinuity that was used to address the need for reliable, fast, comfortable long distance travel, resulting in a product that we now call automobile. Internet was the technology discontinuity that was used to create desk top shopping resulting in E-commerce related products. These two have transformed the way human society operates and hence this quadrant deserves to be called transformational innovations.

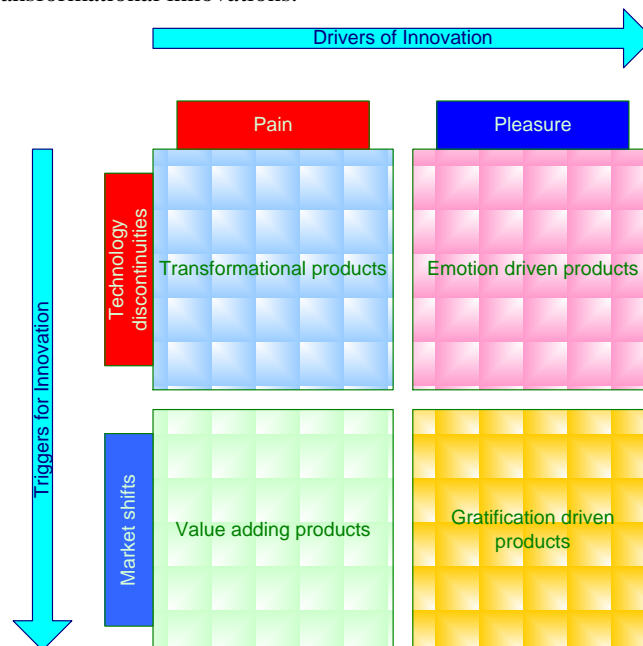


Figure 2. X-Y Plane of the Innovation Cube

The quadrant that is the intersection of Technology discontinuity and Pleasure represents innovations that are labeled emotion driven products. Examples of such innovations are science based vanity products and leading edge joy rides in Disneyland.

The innovations at the intersection of pain and market shifts are value adding products. Examples are Pork Floss buns created by BreadTalk in Singapore and Almond filled croissants created by Au Bon Pain in the east coast cities of US (See end notes).

The innovations at the intersection of market shifts and pleasure are gratification driven products. Examples of such products are downloadable ring tones and Swatch watches.

2.2. Innovations along the Y-Z Plane of the innovation cube

The Y-Z plane of the Innovation cube is defined by the Triggers of Innovation and Enablers of Innovation (See Figure 3). This plane is used to understand the impact price and speed to market has on innovations that are created based on market shifts and technology discontinuities.

The innovations that arise from technology discontinuities will be high priced given that it takes some time for technology discontinuities to be commoditized. Hence the innovations that are represented in the quadrant intersected by Price and Technology discontinuities are likely to be Niche and Special purpose products. Two examples are Space and Defense related products.

The innovations that are at the intersection of Price and Market shifts represent Cost Down mass market products. Market shifts happen when technology is mature and hence commoditized. The technology price would have fallen to be low enough for addressing mass market products. Some examples are video game products and personal computers.

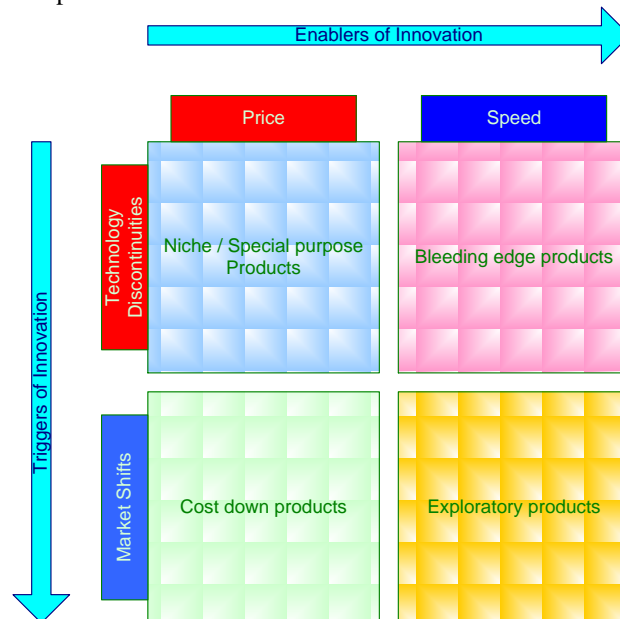


Figure 3. The Y-Z Plane of the Innovation Cube.

Innovations that arise out of new technology discontinuities are often rushed to the market to capture the largest possible market share. These often end up as bleeding edge products that are of interest to a select few early adopters. Some current examples are fuel cells and hybrid cars.

Innovations that are released quickly after new market shifts often end up being exploratory products. These often are experimental and are released to understand market reaction. Some examples are 3G telecom products that were rushed out immediately after deregulation of the telecom industry.

2.3. Innovations along the X-Z Plane of the innovation cube.

The X-Z plane is defined by the Pain-Pleasure and Price-Speed attribute pairs. This plane can be used to identify the impact of price and speed to market on the products that are created in response to the pains and pleasures of human societies.

Innovations that are at the intersection of Pain and Price tend to be utility products that are for the mass markets. There are many examples and two of them are shoes and blenders. The competition in this dimension is often driven by price sensitivity.

Innovations that are at the intersection of Price and Pleasure are mass market entertainment products. Examples include video games and movies.

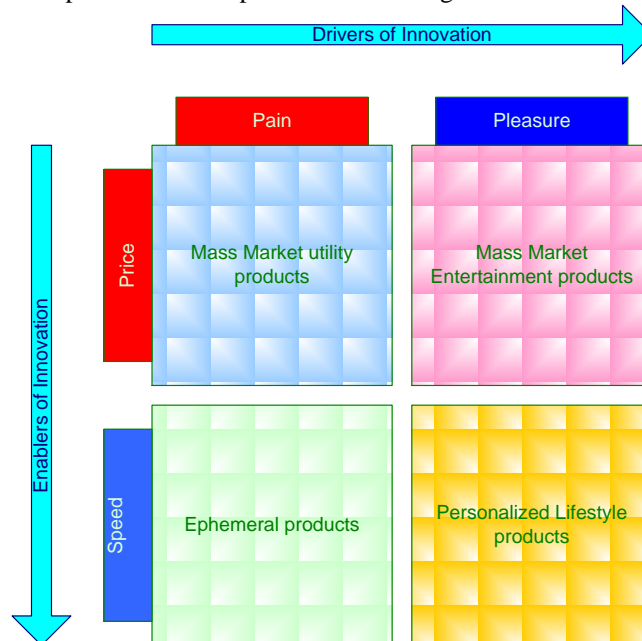


Figure 4. The X-Z Plane of the Innovation Cube

Innovations that are at the intersection of Pain and Speed are Interim or Ephemeral products. Firms rush to offer interim solutions with no concern for price or market size. Such products are often replaced by more cost effective mass market oriented products over time. Examples of such products include Apple computer and Haut Couture products.

Innovations that are at the intersection of Pleasure and Speed are most likely to be Personalized Lifestyle products. Lifestyle products are driven by consumer tastes and they change very often and very frequently. Hence it is important for firms to rush products to the market within the narrow window of opportunity.

3. USE OF INNOVATION CUBE FOR IDENTIFYING NEXT INNOVATION OPPORTUNITY.

This framework was developed as a taxonomy that can form the building block for developing a strategy (or an algorithm) for identifying when to initiate new innovation drives. Suffice it to say that such a strategy is beyond the scope of this paper due to space constraints. For the sake of curious readers, the general approach to using this taxonomy to identify the timing for the innovation is explained below in brief.

A strategy for identifying innovation opportunities for a company will be determined by the mission of the company. The mission in turn will define the markets addressed by the company and the resources assembled in the company. The company can use the adjacency principles discussed in (Zook, 2003) to identify the pains and / or pleasures that it would like to address next. The type of product would define the plane that the company needs to consider. This in turn will bring into play the attribute pairs that should be of interest to the company. The company should identify the attributes required to become active for the launch of the identified innovations.

We call the strategy and the algorithm for determining when and how to launch an innovation an “Innovation Engine”. This work will be reported in detail in a future publication.

4. SUMMARY

This paper defines a taxonomy for innovation that is called “Innovation Cube”. The planes bounded by pairs of the three attribute pairs define different type of products. A company can ascertain which of the planes or even quadrants in any of the three planes are of interest to it. This can then lead to setting up a innovation watch to identify when to launch an innovation.

Notes

BreadTalk founders observed that consumers used to buy a bun and then struggle to lay pork floss on top of the bun before consuming the bun and the floss. This observation helped them decide to create a hugely successful product wherein the pork floss was laid on the bun before the bun was baked.

Au Bon Pain in a chain of bakery / coffee shop with presence on the east coast cities of the USA. They product delightful croissants whose center is filled with almond paste – another very popular and successful innovation.

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