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Formalizing Innovation: A Taxonomy Organizing the Madness of Creativity Through the Dimensions of Invention

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ABSTRACT

Innovation is often seen as a mysterious black box, but some companies manage to consistently innovate through different product cycles. This implies that innovation is a process that can be learned by ambitious firms. This paper explains how to understand the needs and wants that drive innovation. It then details the structure of the innovation process and lays out the dimensions of innovation. The dimensions include product and service examples of innovation by successful firms. Finally, there is an explanation of how to use this information in business to be a more innovative company. This is a concisely accessible and easily understood summary of the facets of innovation along with a practical guide on how to apply the process. While still difficult, firms wishing to be more innovative will have a map to guide them through the challenges and excitement of innovation.

Keywords: Innovation; Competitive Advantage; Creativity; Needs; Wants.

1. INTRODUCTION

Innovation. This is an unconscious process that drives society in brilliant new directions, but the process has not been fully examined in the literature. This paper will try to organize the experiences of innovation in such a way that it can be useful for companies to add structure to their research and development processes so that innovation can be maximized within organizations. Innovation encompasses big and small changes to products and services that improve the lives of users. It might seem to be a random inspiration of genius, but there are ways to think about innovation which, if correctly implemented, might help firms do more

of it. Trying to move the thinking about innovation towards a process will help to demystify it and make it more accessible to improve societal well-being. That is our goal with this paper.

2. THEORETICAL ANALYSIS

Innovation is a frequent topic for study. Some scholars have found the specific attributes encourage innovation. For example, Laursen found that openness was a key differentiating factor among the most innovative UK industrial firms.[1] Howells posited that having the correct intermediaries encourages the innovative process[2]. Barras looked to a reverse product cycle to drive innovation forward[3]. Cheng found that the different types of innovation, whether it be random, orderly, or chaotic, was related to the stage of product development[4].

Our model is different. We take psychological theory, and extract delineate needs and wants. From these, we construct a number of dimensions of innovation, with examples from Europe, China, South Korea, and the US.

1. Needs and Wants

In our model, the starting point for innovation begins with needs and wants.

First, what are needs? Needs are what is necessary for survival. These are innate, unchanged across time, space, and culture. Needs can be conceptualized in several ways. Maslow gives us one way to understand and classify needs. In his hierarchy[5], he describes the different stages of growth in human psychology, with lower needs on the bottom. In Maslow's conception of these needs, at the base of the pyramid exists physiological needs, which include the basic biological needs, including hunger and thirst. One up but near the bottom are safety needs, the necessity to protect the integrity of one's person. This type of security can be personal, financial, or related to health and physical safety. Nearing the middle section of the pyramid lies social needs. These include love and belonging from family, friends, and lovers. Above social needs come esteem needs, which include self-esteem, recognition and status. At the very top of the pyramid are self-actualization needs. These are the needs to become the most complete person one can be, including self-development and realization needs. Most importantly, and maybe controversially, Maslow believes that one cannot move to the next level until lower needs are satisfied. While some scholars argue, based on empirical evidence, there is no hierarchy of needs at all[6], Maslow's conception of needs provides a very useful starting point for us to understand the needs of people and what drives innovation. Even if there were no hierarchy, however, this framework still helps company discover needs

How do needs compare with wants? Whereas needs are universal and fixed, wants are specifically-shaped solutions that vary depending on culture, time and space. Wants change with technological developments and changes in consumer tastes. Unlike needs, demand for wants can be created, often by companies and marketing departments.

For example, people naturally and biologically get hungry. Hunger is a need. But how can this need be satisfied? There are hugely varied wants to solve this need. Many people choose spicy soups, rice, and fish in Korea, while American consumers often choose hamburgers and pizza and Russians prefer borsch. The need of hunger can be solved in many ways, and many factors can change what people do to satiate that need.

This is true for all needs. People need written communication. Their wants create demands for postal mail, stationary, faxes, FedEx, DHL, EMS, e-mail, WhatsApp, KakaoTalk, and LINE. People have a need for verbal communication. They want landline telephones, mobile phones, smartphones, and cafes. People have a need to listen to musical performances. This need creates wants for concerts, gramophones, records, cassette tapes, CDs, MP3s, iTunes, and Spotify.

The over-focus on selling while ignoring customer needs has been noticed by commentators for over 50 years. Theodore Levitt first identified the phenomenon of marketing myopia that he postulated would eventually cause businesses to fail when they stop focusing on meeting customers' needs and instead looked inward to their own product lifecycles and internal sales goals[7]. Many companies have succumbed to this internal focus while ignoring the wants of customers. Research in Motion (now Blackberry Ltd.) and Nokia were early leaders in smartphones, but they failed to heed the wants of consumers for more user-friendly interfaces, and both are shells of their former selves because of it.

For managers, why is this important? It is essential to define the business in terms of customer needs, and not your perspective. Amazon.com focuses relentlessly on price, convenience, selection, and service of its offerings, with the knowledge that a competitor's site is only microseconds away from the consumer's mouse or smartphone. Also, managers must be aware that wants are constantly changing and shifting. Today's essential gear is tomorrow's junk. Managers must be constantly innovating, even if it cannibalizes their current star products. Ten years ago, the iPod was the essence of chic, three years ago, Apple killed it off[8] as a redundant relic made obsolete by its iPhone empire. If your firm doesn't innovate, thinking consumers will wait for your next development cycle, be aware the corporate graveyard is full of companies who believed consumer wants were secondary to internal development cycles. Companies must also be constantly trying to better understand customer needs and create products that meet their wants.

There are two categories of consumer needs, recognized and unrecognized needs. Recognized needs are those things that can be learned from market research. These types of needs could be referred to as known unknowns. Companies know that there are things that they do understand about consumer needs, and with enough market research, they can find them. This seems promising for companies, and it is, somewhat, in that these can be discovered through conversations with consumers. The problematic flip side is that competitors can also discover these needs, making it hard for a company to generate sustained competitive advantage.

However, customers often don't know they want something until they are presented with a new and innovative product. Unrecognized needs are the needs even consumers do not know what they want, even if asked directly. These unknown unknowns exist, but consumers lack the ability to communicate these needs to market researchers. This is the Steve Jobs' approach, where he believed he knew what consumers wanted more than even they did. Big innovations, such as radio, television, and smartphones came from meeting consumers' real but unrecognized needs. These are needs that are unrecognized until consumers see a product that fills a void that they did not believe possible to overcome.

So how should companies attempt to discover consumer needs and recognize their wants? There are two different approaches, the market-driven strategy and the market-driving strategy.

The market-driven strategy is an approach taken by followers, and it is a customer-oriented strategy. Its primary focus is on satisfying consumers' recognized needs. It is a reactive strategy which substantially

relies on market research to find these needs. Because of this, it is impossible for a company to be a market leader using only this approach.

On the other hand, a market-driving strategy is the approach required to be a market leader. With this approach, companies struggle to meet unrecognized needs by creating better solutions through aggressive inventions. The guiding principle here is intuition. Obviously, the most innovative solutions cannot be found by targeting the median consumer. This proactive strategy was the one taken by Apple during its long run of market-driving innovation including the iPod, the iPhone, and iPad. Apple has dazzled the media and investor with its prowess at creating entire new markets. But, even interspersed with these successes have come failures, including the G4 Cube (an expensive desktop computer in a clear square shape) and more recently, the Apple Watch. Being the market leader will virtually guarantee big mistakes sometimes; intuition is not GPS. But, with this approach, there are also chances for huge successes.

2. Dimensions of Innovation

Once a company understands the needs and wants of its consumers and has chosen its innovation approach, the company must decide what ways it wishes to innovate. There are several ways that producers and service providers can innovate.

When we talk about innovation, the innovation dimension includes two components, promotion and prevention. Promotion is something that makes things better while prevention makes unpleasant tasks less miserable.

One promising way companies can innovate is to ***remove time and space constraints***. People strive for more freedom, and this is a ubiquitous need throughout the world. Many companies have or are working to remove these limitations on human behavior. Sony's Walkman and Apple's iPod allowed people to listen to music wherever and whenever they wanted it. It also allowed them to travel with large amounts of music in the form of multiple cassette tapes (Walkman) and computer memory (iPod). Other excellent examples of these types of innovations include the smartphone and the battery. The power to bring the functionality of a very small computer and a power source with you allows for a huge range of mobile applications. Food is a common area where companies have removed time and space constraints. Instant ramen (Japanese instant noodles), the refrigerator, and the Thermos changed when people could eat specific foods, broadening the time between preparation and consumption. Cloud computing, the e-book, and the Internet of Things allow people to manage information and applications without regard to geographical limitations.

Another type of innovation improves ***efficiency***. This has been done ever since there were *homo sapiens* with creations such as the wheel, lever, and ax, advancing to more complex machines, like the bow and arrow and crossbow. This type of innovation is a free lunch; people can do more with the same amount of effort. With similar inputs of money, time, and work, consumers can get more output. There are many variations to innovation that increase efficiency.

Some innovators make products ***cheaper***. Wal-Mart squeezes suppliers and provides big volume sales potential to suppliers, allowing it to charge lower prices to competitors. Deep discounters like Germany's Aldi and Lidl drastically limit their product offerings to be more efficient and have lower costs, passing some of the savings to consumers. Amazon offers ultra-fast delivery options (within an hour in some

places) and also offers other cheap and free shipping options. Ryan Air and EasyJet provides very no-frills service but also extremely low prices for European travelers.

Other innovations provide consumers with more ***speed***. Transportation is a good example, first with the train, then the automobile and airplane. Market research could not have divined the rapacious consumer demands for these because consumers did not know about them until companies educated them. FedEx created a rapid document and package delivery service many thought unnecessary, but it has been extremely successful. Even small innovations can be lucrative. The mechanical pencil saves much time standing over an unreliable sharpener. Others involve food. The Philips boiling pot allowed consumers to make tea more quickly and in smaller volumes, while ready-to-eat food saved time for families in an era where both parents more frequently work outside the home.

Somewhat related but distinct is the improvement of the shopping experience through the creation of ***all-in-one convergence***, which reduces the efforts customers must expend in the buying process. This happens in shopping with the super/hypermarkets of Wal-Mart and Carrefour and online with Amazon, AliBaba and Gmarket. Early department stores brought together fashion for the entire family along with a huge number of products for the home, including, but not limited to, actual homes. Shampoos added conditioners, and coffee mixes alleviated the need for people to mix and grind their own beans. The risk for all-in-one innovations is that companies do many things but none of them well. To succeed in business, specialized expertise and knowledge is required, but too much dilution is the enemy of this.

Another way companies innovate is to ***increase convenience***. Humans sometimes prefer sloth. Convenience allows people to make fewer efforts for the same result; it appeals to our sense of laziness. Whereas efficiency might include some of this, it also includes better ways of conducting business operations to get more outputs with similar inputs. Convenience focuses on the consumer side exclusively. A more convenient product or service allows the consumer to do less work to achieve the same result. The movement toward twist-off beer bottles obviates the need for an opener, making a more convenient product offering for consumers. Another example is the mechanical pencil. It is much more convenient to use than a traditional wooden pencil. Going to a sharpener is a hassle. It also takes effort. Thus, mechanical pencils increase convenience while also reducing effort required. Escalators and elevators save people from the sweat and exhaustion of climbing stairs. The Roomba and other robotic vacuum cleaners can take over the messy job of cleaning floors. The Post-It note allows for bosses to leave terrifying messages for underlings without having to get tape. There is some overlap, some correlations, between these factors, but, each of the concepts is distinct.

Simplicity is another way companies can innovate. There is an over-segmentation of products, with companies targeting ever smaller niches. However, more choices are not always better. Having a simpler buying process can be less burdensome for consumers than being required to choose from hundreds of different toothpastes. Simplicity is exemplified by Costco and Aldi, which only offer a few products in each category, each held up as having excellent quality. Costco is a good example of a retailer whose success is related with fewer SKUs. Unilever reduced SKUs by 75% to reduce branding clutter and improve efficiency. The iPhone is a relatively undifferentiated product with only a few model choices consumers can make, and it is the best selling and most profitable smartphone in the world. Innovation-promoting simplicity plays a large part in that. The growth of high-quality private label brands is another example of the growing innovation of simplicity.

Realism is another avenue for innovation. People want products and services that touch all five of their senses. Brands that can "pop" to consumers will be more successful, all else being equal. There has been a tremendous movement for fresh foods recently. People want foods they perceive from a more natural environment. The growth of cooking shows has helped to create this want, which is increasingly filled by local grocers. Television technology has progressed enormously over the past ten years, with high definition programming and ultra high resolution video providing a dynamism of reality to homes worldwide. Innovation in LED, OLED, and IPS technologies have made this possible. Auditory senses are stimulated by impressive sound systems for watching television and video at home. In-store samples allow customers to smell and taste the aroma of foods, often as they are being cooked and prepared.

While innovations discussed above improve the user experience, other innovations can make bad things less unpleasant. This is called ***prevention***. Some common examples include medicine, toothbrushes, and preservatives. Medicine can reduce or eliminate symptoms of existing disease. With a toothbrush, we can keep our pearly whites far longer than our ancestors ever imagined. Electric toothbrushes and toothpaste allow us to clean our teeth even more thoroughly and easily. Medicines can cure or reduce the negative effects of disease. Medical equipment, such as heart stents, reduces the need for more invasive surgical procedures. Preservatives allow our food to last much longer. Prevention can also be applied to other areas. Condoms and birth control pills allow couples much more flexibility in choosing the right time to have children. It takes the choice from the Gods and delivers it to men and women.

Great innovations can simultaneously occupy several dimensions of innovation.

3. THE DIMENSIONS OF INNOVATIONS, APPLIED

Apple's creation of the smartphone removed time and space constraints; users could always have computers in their pockets. But, its innovation was greater than this. It was fast, with speedy processors and high-speed connectivity. Additionally, it brought together many different functions in an all-in-one experience, eliminating the need for pens, schedulers, standalone GPS units, compasses, personal video players, and even made Apple's own iPod obsolete. Companies that succeed at innovation should not hesitate to cannibalize their own products, because if they don't, a competitor will. Apple's innovation went further, however. It was convenient, and with a simple interface, but still provided intense realism with 3D graphics.

Amazon also innovates in multiple dimensions. The firm obviously removes time and space constraints. You can get anything, anywhere, and their superb logistics system gets shipments to the customers quickly, and not just fast enough. Amazon's services such as its cloud computing and eBooks, bring electronic media and storage everywhere, and anywhere. Thus, innovating based on speed is another example of Amazon's innovation. As an example of an all-in-one innovation, you can buy almost anything on Amazon; they are the internet's virtual bazaar. And because of their efficient systems, they can charge low prices and still make a profit while being inexpensive. Finally, they are convenient, with a very efficient matching engine that often knows what you want before you do.

AlphaGo is another example of multiple strands of innovation. It was the computer system that first beat a human champion in the game of Go. Unlike chess, computers are not able to completely model the game mathematically. So, the creators embraced a form of predictive learning that used math in intelligent and probabilistic ways. One innovation was to use computing to learn, and not just win by brute force. Thus,

it showed that computers can solve problems more quickly. Additionally, it also removed time and space constraints of the game. Champion players can now compete with very skilled virtual machines instead of other elite humans. Finally, human champions learned new strategies from the machines, as an example of strategies they never before considered, in an intriguing example of promoting efficiency in innovation.

Both prevention and promotion are vital dimensions of innovation. Great innovation has many facets.

4. HOW TO CREATE NEW BUSINESS MODELS AND NEW PRODUCTS

What are the ways businesses can be organized to maximize innovation? There are analog businesses and digital businesses.

Brick and mortar businesses are the classic analog firms. They have stores, factories, and warehouses, and all business is done there. ***Click businesses*** are modern virtual companies with few assets, little inventory, and are de-localized and global. The most innovative businesses, however, will be ***click and mortar businesses***, hybrids of the best of the old and new economies. However, with ICT (information and communications technology), the click, can often be used to make an analog business more effective. For instance, a computerized inventory control system can make an old fashioned warehouse much more effective at tracking inventory.

Amazon has an unparalleled ICT infrastructure with thoroughly linked databases of consumer preferences and inventories. It also utilizes much virtual inventory and just-in-time ordering from suppliers. However, it has also created a vast network of physical warehouses to get products to consumers quickly. Groupon is a merger of the analog flyer with the internet age. The smartphone is a combination of an old-fashioned phone with a very small mobile computer. Golfzon (Korea's golf practice room equipped with a picture screen) merges tedious in-door golf practice with imaging and IT systems that allow the full experience of a golf course in a small room that can be located anywhere. Smart farming allows the more efficient use of inputs in the creation of foodstuffs through well placed sensors, agricultural knowledge, and delivery systems. Even exercise is receiving innovation. Virtual assistants can increase or decrease workout intensity in an adaptive way to maximize effort while avoiding injury.

To be successful in hybridization, the best businesses will have a strong brick and mortar presence. They will also be early adopters of new and innovative IT technology. Facebook is a good example of this, and in Korea, KakaoTalk capture the mobile instant messaging market even though its competitor, LINE, produced a superior technology, but later. Also, be aware that successful hybridizing is rare. Groupon's business model is under strain from a lack of barriers to entry and the tension between businesses using Groupon for marketing to customers to build long-term brand awareness, while value-seeking shoppers often use it for a cheap place to eat, once, and then move on.

5. CONCLUSION

Innovation is the process of creation, where ideas are transformed into products that dazzle the mind and enchant the senses. While it has been thought of at as an *ad hoc*, one-off black box, there is actually much that is similar among companies that innovate. The best innovators start with a very deep understanding of needs and wants. There is substantial research, but still, research alone is not enough; customers often do

not know what they want until they see it. Innovative companies must also try to determine unrecognized needs, or at the very least, attempt to meet recognized needs more effectively. Then, the firm must decide on the dimension or dimensions in which it wishes to innovate. Innovative products can remove space and time constraints, improve efficiency, be cheaper, faster, bring all-in-one convergence, or have greater simplicity or realism. Finally, firms can be understood to be digital firms, analog businesses, or a combination of the two, with somewhat different strategies for each. There are numerous brick-and-mortar businesses and click technologies. If we make a full combination of click-and-mortar, theoretically we can create an infinite number of new businesses. The ultimate key to success is imagination.

References

Laursen, K., & Salter, A. (2006). Open for innovation: The role of openness in explaining innovation performance among U.K. manufacturing firms. Strategic Management Journal, 27(2), 131-150.

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. Research Policy, 35(5), 715-728

Barras, R. (1986). Towards a theory of innovation in services. Research Policy, 15(4), 161-173.

Cheng, Y. & Van De Ven, A. H. (1996). Learning the innovation journey: Order out of chaos? Organization Science, 7(6), 593-614.

Maslow, A.H. (1943) A Theory of Human Motivation. Psychological Review, 50, 370-396

Wahba, M. A.; Bridwell, L. G. (1976). "Maslow reconsidered: A review of research on the need hierarchy theory". Organizational Behavior and Human Performance 15 (2): 212–240.

Levitt, T. (1960). "Marketing Myopia" Harvard Business Review, 82(7-8).

Kastrenakes, Jacob (September 9, 2014). "iPod classic comes to an end: a look back at Apple's iconic music player". The Verge.