“Substitution Causing Disruption in the market of Wearable health care and fitness devices”

EEE 452- TERM PAPER

Md Sharif Hossain
ID: 1712336642 | DATE: 5 APRIL 2020

Table of Contents

Introduction:

According to preselection, I am meant to develop a write-up on the interpretation of a given principle of innovation within the context of a chosen area of innovation.

The given principle of mine was principal-8 which says that "With the maturity of existing technology core and emergence of new ones, every innovative product in course of time will start losing the market to substitution resulting in an eventual departure from the market—creating the discontinuity and posing the challenge of making the transition. Often incumbent firms fail to make the transition and new ones show up with better, less costly alternatives--disrupting incumbent products, and firms and industry in producing and delivering them." [1]

Again, the chosen area of innovation was: "Wearable health care and fitness devices".

In this term paper, I'll interpret this principle of innovation within the context of this topic.

Acknowledgments:

I would like to express my special thanks of gratitude to the course instructor of the course 'EEE452: Engineering Economics' *M. Rokonuzzaman, PhD* who gave me proper instruction to do this term paper on this topic.

Keywords:

Maturity of existence technology core, the emergence of new technology, losing the market, substitution product, making transition, less costly alternatives, Wearable, Health care and fitness devices.

[1] M. Rokonuzzaman, Ph.D., "10 basic principles of innovation: An attempt to theorize innovation-led wealth creation dynamics in a competitive market", Principle-8.

"Substitution Causing Disruption in the market of Wearable health care and fitness devices"

What is Wearable health care and fitness device?

Definition: Wearable health care and fitness technology include electronic devices that can be worn by users. These devices are mostly designed to monitor the data of the user's daily movement, physical exercise and personal health. The wearable technology is growing advanced with time and its willingness to pay from the customers is growing rapidly. Devices like Smart Watches, Fitbit and wearable monitors like blood pressure monitor, sleeping monitor or diet monitor fall under the category of wearable health care and fitness devices.

Wearable Fitness Trackers: These are the simplest and basic forms of wearable technology combined with fitness trackers and wristbands equipped with sensors to keep track of the user's physical activity, oxygen saturation and heart rate. It might be connected with smartphones wirelessly and can also be controlled remotely.

Smart Health Watches: Smart Watches are a more advanced form of wearable fitness trackers. It allows users to perform basic tasks they normally do in the phone like checking a notification, sending and reading messages, making and receiving calls, tracking footsteps, health monitoring, etc.

Nowadays, smartphone companies like iPhone, Samsung, mi, etc. are also investing to make better wearable fitness trackers and smart health watches.

Wearable ECG Monitors: Wearable ECG monitors are on the cutting edge of consumer electronics, and what sets these monitors apart from some smartwatches, is their ability to measure electrocardiograms, or ECGs. Business Insider recently reported on winning the best wearable at the 2019 Consumer Electronics Show with its Move ECG product.[2]
The greatest feature of the device is that it is truly multifaceted. It functions as a wearable health tracker, it records electrocardiogram and can send the data to preselected monitors.

Wearable Blood Pressure Monitors: Omron Healthcare introduced the first wearable blood pressure monitor in 2019. It looks like a typical smartwatch. Mainly it is an oscillometric blood pressure monitor that can measure blood pressure and daily activities like steps measuring and calories burned.

Wearable Activities Monitors: This device is like a chest belt that can monitor heartbeats, step counts, activeness, stress measurement and oxygen saturation.

[2] Alicia Phaneuf, (Feb 1, 2020), "Latest trends in medical monitoring devices and wearable health technology"

Wearable Hearing Aids: This is one of the most using wearable aids in new technology. This device can adjust sounds for partially deaf people, can automatically translate foreign languages and can track both of the user's physical and mental health.

Wearable Sleeping Monitors: These devices track light and deep sleep, record if the user snores, if s/he talk in his/her sleep or have sleep abnormalities, and wake the user up at the best possible time with its smart alarm.

Wearable Stress Managing Aids: Stress problem is one of the biggest health risks in this century. These devices control the level of focus, lead to bad sleep and decrease emotional well-being. Luckily, there are already plenty of technological solutions for mental health out there to offer efficient stress management.[3]

Wearable Meditate Helping Kits: As mentioned before, managing stress is vital to health. There are many effective ways to reduce stress levels, depression and anxiety. Meditation plays an effective role in this reduction process. These devices help users to reach a calm and relaxing state of mind more easily.

Wearable Physical Exercising Kits: These devices are fitness trackers that are not about counting steps. Rather, these want to become the user's personal fitness coach or professional performance diagnostician. This is a health wearable that is built for the gym, specifically for people that head straight for the weights. Worn on arm or leg, it helps to build muscle accurately and makes sure that the users are completing those reps properly. The trackers give the users visual and verbal, real-time feedback also.[4]

Some more potential Wearable Health Care technologies: There are some potentialities in many wearable technologies that can be improved. road safety practice, mask-wearing habit, leisure time activity, weight control, physical activity, eating habits, food handling practice, oral health practice, drinking pattern, smoking pattern etc. monitoring devices can be introduced and factorized.

Basic concept on Substitution Causing Disruption:

According to Investopedia, the substitution effect is the decrease in sales for a product that can be attributed to consumers switching to cheaper alternatives when its price rises.[5] There might be many reasons behind the loss of market shares of a product. The substitution effect is purely a reflection of frugality. If a brand raises its price or any other better substitution product is offered at the same or lower price, people lose the willingness to pay for that specific brand product. This is called the substitution effect.

On the other hand, the theory of Disruptive Innovation supports a technology whose

[3] The Medical Futurist, "The Top Health Wearables for A Healthy Lifestyle", 5 October 2019.

[4] Anita L. Allen, "Dredging up the Past: Lifelogging, Memory, and Surveillance" Archived 2013-12-13 at the Wayback Machine, *The University of Chicago Law Review* 75 (2008) 47–74 (pdf)

[5] Jim Chapellow, "https://www.investopedia.com/terms/s/substitution-effect.asp" Jul 14, 2019

application significantly affects the way an existing market or industry functions. More or less all innovative products face disruptive effects due to substitution. As example, ambulatory blood pressure monitor was first blood pressure monitor invented in 1881 faced substitution effect sphygmomanometer in 1896 and sphygmomanometer faced substitution effect from Digital blood pressure monitor in 1991. (Figure 01)

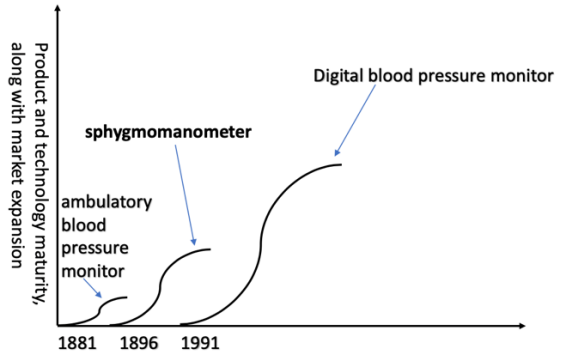

Figure 01: Blood Pressure Monitor industry, successive disruptive waves offering better as well as cheaper substitutes.

For the substitution to succeed, there should be a strong non- consumption of the existing product, to be substituted.[6] In other sense, there should be a new potential market which is not a part of the existing market yet.

Firstly, let me explain the thing using BCG Matrix Displaying Dog Star Question and Cow. Where Star has high market share and high market growth, Question has low market share but high market growth, Cash Cow has high market share but low market growth and finally Dog has low market share and low market growth. (Figure 02)

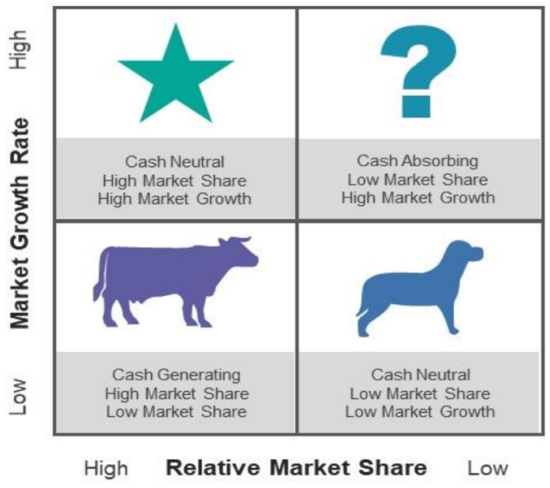

Figure 02: BCG matrix[7]

For a successful substitution, the existing market of a new innovative product needs to be Star or Question mark in the BCG matrix. No matter how much market share is covered by existing technologies, if the market growth is low, or there is no potentiality for the new market segment, the substitution effect faces a high challenge there.

Secondly, according to an academic research report by Dr. Rokonuzzaman, "Non-consumption is about a potential customer segment of the incumbent product, who could not consume the existing product. There could be several factors starting from cost, technology complexity, environmental effect, portability, or needed infrastructure affecting the non-consumption. Ideally, the society should be decomposable in three concentric circles concerning the product which is targeted to be disrupted, as shown in Figure 03."

[6] *M. Rokonuzzaman, Ph.D., "Succeeding with innovation in a globally connected competitive market economy"*

[7] https://www.slideteam.net/cash-cow-in-bcg-matrix-displaying-dog-star-question-and-cow.html

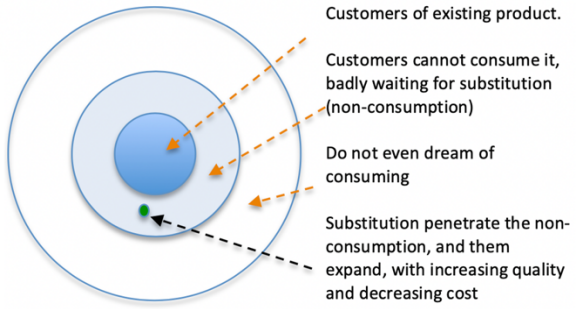

Figure 03: Decomposition of a potential market of substitution product, likely to grow as a disruptive force to existing products and industry.[8]

According to the researcher, the segment in the second inner circle is perfect to target for substitutional products or technology because customers cannot consume the existing product and badly waiting for substitution. The journey of creating disruptive effect by pursuing substitution is often risky as well as long. Moreover, opportunities for offering substitutions, causing disruption, often take a long time to emerge. The good news is that the market of wearable health care and fitness devices has a very strong chance to cause disruption.

Wearable health care and fitness technologies that can be substitutions of the existing market: The market for wearable sensors was valued at USD 10.82 billion in 2019, and it is expected to reach a value of USD 31.96 billion by 2025, at a CAGR of 19.15% during the forecast period (2020 - 2025)[9] (Figure 4).

Figure 4: Estimated market share of WHD from 2015 to 2026[10]

Primarily, owing to digitalization, the electronic industry has prospered significantly. Thereby, driving the market for wearable technology devices, which are widely used for self-health monitoring applications. [11] As example, let's consider the market of Fitbit. **Fitbit** is an American company headquartered in San Francisco, California. Its products are activity trackers, smartwatches, wireless-enabled wearable technology devices that measure data such as the number of steps walked, heart rate, quality of sleep, steps climbed, and other personal metrics involved in fitness. [12] Currently, there are about 28 million active Fitbit users and it is growing rapidly. (Figure: 5)

[8] *M. Rokonuzzaman, Ph.D., "Succeeding with innovation in a globally connected competitive market economy"*

[9] Statista, B.I. Smart Clothing Unit Shipments Worldwide from 2016 to 2022 (in Millions); Statista Inc.: New York, NY, USA, 2017.

[10] Hayward, J.; Chansin, G.; Zervos, H. Wearable Technology 2017–2027: Markets, Players, Forecasts; IDTechEx: Cambridge, UK, 2017

[11] WEARABLE SENSORS MARKET - GROWTH, TRENDS, AND FORECAST (2020 - 2025)

[12] *"Fitbit, Inc. – IR Overview – Investor FAQ". Fitbit. Retrieved July 25, 2018.*

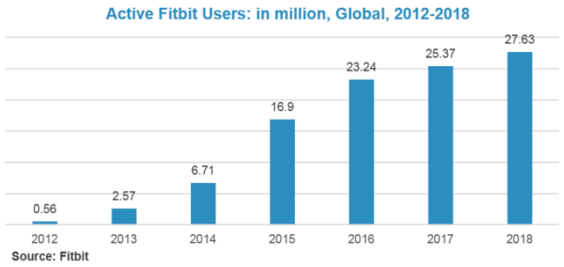

Figure 5: Globally Active Fitbit users

These innovative technologies are creating substitutional effect to the existing products as they are more comfortable to use, cheaper and better.

Discussion:

Wearable Health Devices (WHDs) are increasingly helping people to better monitor their health status both at an activity/fitness level for self-health tracking and at a medical level providing more data to clinicians with a potential for earlier diagnostic and guidance of treatment. These devices can be substitutions of existing markets.