

Succeeding with innovation in a globally connected competitive market economy

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Basic Concept: Human beings are driven by incentives. Consumers are looking for better products to buy at a lower price to keep increasing consumer surplus. On the other hand, producers are driven by the profit incentives; to increase it, producers are in a race to offer better quality products at a lower cost. As a matter of fact, the competitive market economy is basically a race of increasing both consumer and producer surpluses. Through some means, if we can succeed in offering better quality products at a lower cost, both production and consumption increases. Though the finding of natural resource deposits or harnessing of lower cost labor help us to address these conflicting variables. But they are not sustainable. Technology appears to be a very powerful option for increasing both consumer and producer surpluses simultaneously, opening apparently endless frontier of wealth creation.

The consumer surplus is measured by the difference of willingness to pay, which is related to perceived value and utility, for a product and the actual price paid for. And the producer surplus depends on the difference between the cost of production and the price at which the producer succeeds to sell the product as shown in Figure 1. If producer succeeds to increase the willingness to pay for the product by increasing the quality, preferably without incurring an additional cost, and offering the product at the same price like before, more consumer will likely buy the product. As a result, both the consumer and producer surpluses will increase simultaneously as shown in Figure 2. To have a workable definition, wealth creation out the production of consumer and producer surpluses through innovation is defined as the summation of CS and PS. Due to ideas, if

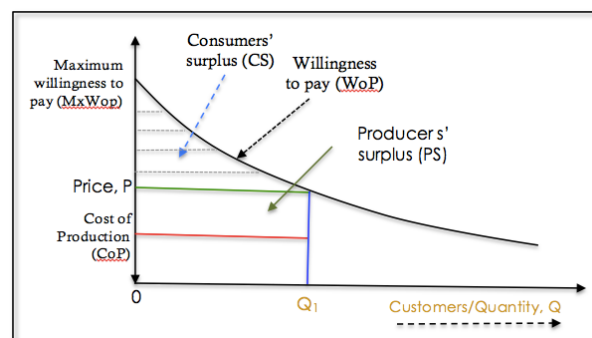


Figure 1: Concept of consumer and producer surpluses

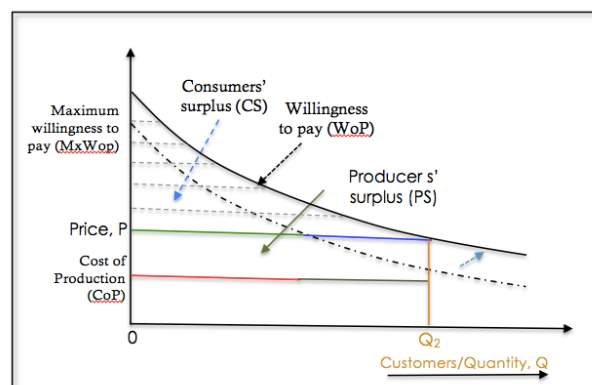


Figure 2: Consumer and producer surpluses increase simultaneously

quality increases at no additional cost, additional wealth is created. Similarly, wealth is created if ideas to cost reduction without reducing the quality.

The increase both consumer and producer surpluses simultaneously, the challenge is to increase the quality (Q) and reduce the cost (C) simultaneously. There could be four different combinations of these important variables as shown in Figure 3.

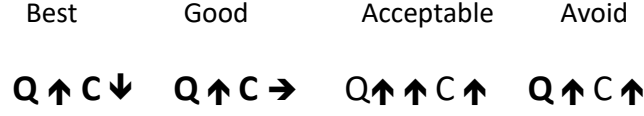


Figure 3: Four different plausible scenarios

Basically, there are four plausible scenarios. The Best one is that producer succeeds in improving the quality and reducing the cost simultaneously. The next one is the situation when quality goes up but the cost does not, could be termed as Good achievement. While the quality goes up far more than the cost increase could be termed as an Acceptable option. All other options must be avoided in the journey of crafting sustainable means of improving both consumer and producer surpluses simultaneously.

Progression in science and technology opens the opportunity of adding intellectual assets in products and processes to produce so that quality goes up and the cost keeps falling. A product is basically a collection of features as shown in Eq. (1). The perceived utility affecting the willingness (*WtoP*) to pay for a product is basically the summation of utility created by each of the features as shown in Eq. (4). Of course, the utility of a feature, $U(f_i)$, thereby the total utility of a product Tu is subjective, which depends on individuals, purposes to be served and also the time. In improving the product, often the practiced option is to keep adding new features and improving existing features. There is no doubt that the addition of new features, increasing the value of N , increases the quality and also the cost. But the enhancement of existing features, as shown in Eq. (2), has the potential to improve the quality and reduce the cost simultaneously.

$$f_1, f_2, \dots, f_N \quad (1)$$

$$f'_i = f_i + \Delta f_i \quad (2)$$

$$Tu = \sum_{i=1}^{i=N} U(f_i) \quad (3)$$

$$WtoP = f(Tu) \quad (4)$$

With the progression of science and technology, producers or innovators take the following advantages, as shown in Figure. Due to the reduction of material and labor need, not only cost decrease, but also the quality improves. Moreover, feature improvement also leads to greater utility. The exploitation of this opportunity out of science and technology progression is the key to attain the goal of increasing both consumer and producer surpluses, through having a favorable change in Q and C, as shown in Fig. 3.

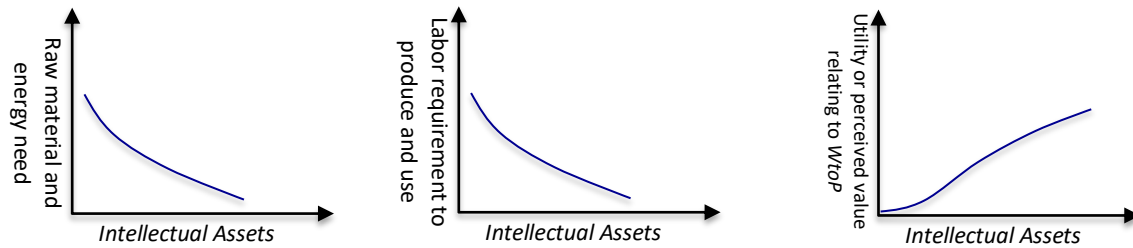


Figure 4: Effect of increasing role of intellectual assets in improving existing features, as well as adding new features.

Through process innovation, product quality is also improved and the cost is reduced. Increasingly, the role of science of technology (IA) is increased in the production process so that effectiveness and precision are improved, and defects, material as well as energy need, and labor requirements are reduced. As a result, process innovation plays a vital role in increasing quality and reducing cost, consequentially increasing both consumer and producer surpluses simultaneously.

Innovators keep enhancing underlying technology core and taking advantage of it in improving the product quality and reducing the cost, as a result, products keep penetrating deeper into the society through different customer segments as shown in Fig. 5.

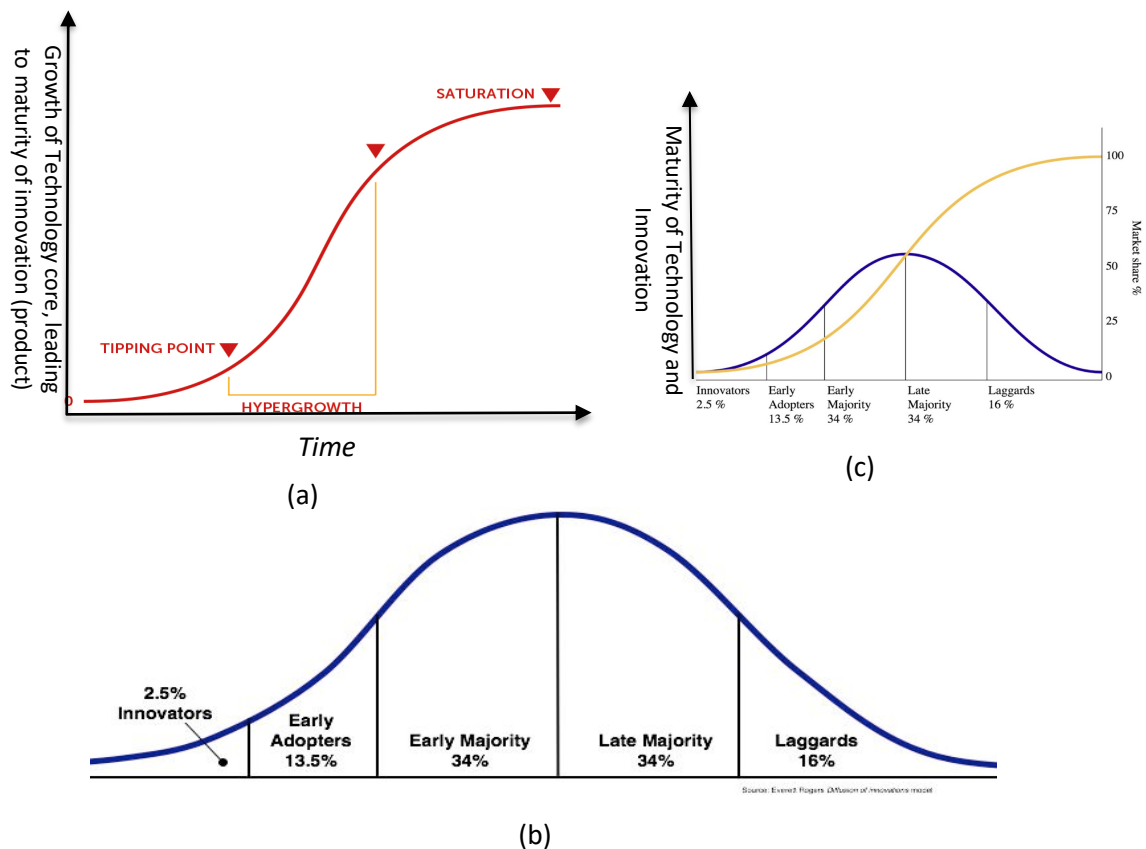


Figure 5: (a) typical S-Shaped life cycle of innovation and its underlying technology core, (b) different segments of the customers likely to be buying the product, and (c) different segments of the customers keep responding to the product adoption along with the progression of the product, driven by the progression of the underlying technology core, as quality keeps increasing and cost keeps falling.

Sustaining Innovation in a Competitive Market: Once an innovative product starts showing the possibility of profitability and growth, it starts experiencing two major forces: 1. Competition, and 2. Externality effect. The competition force shows up in the form of (i) Replication, (ii) Imitation, (iii) Innovation, and (iv) Substitution at a later stage. The externality effect comprises of (i) Complementary offering products from 3rd parties, (ii) Network effect, and (iii) Information and experience effect. The competition force affects the willingness to pay (WtoP) of the product negatively, drifting it downward. On the other hand, the externality effect plays a positive role. For example, due to the offering of complementary products from 3rd parties, the perceived value of the innovation keeps going up, affecting *WtoP* positively. Similarly, the network effect keeps increasing the value of the product with the growth of the customer base of the product. On the other hand, once the information gap about the utility of the product is reduced and potential customers get a chance to experience the product, the *WtoP* increases.

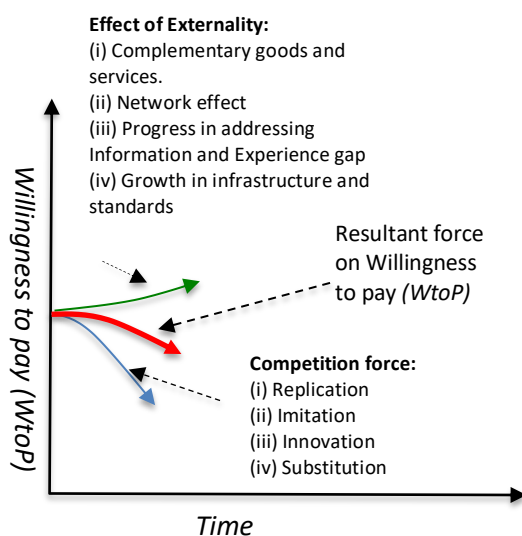


Figure 6: In a competitive market, *WtoP* of an innovative product keeps drifting downward.

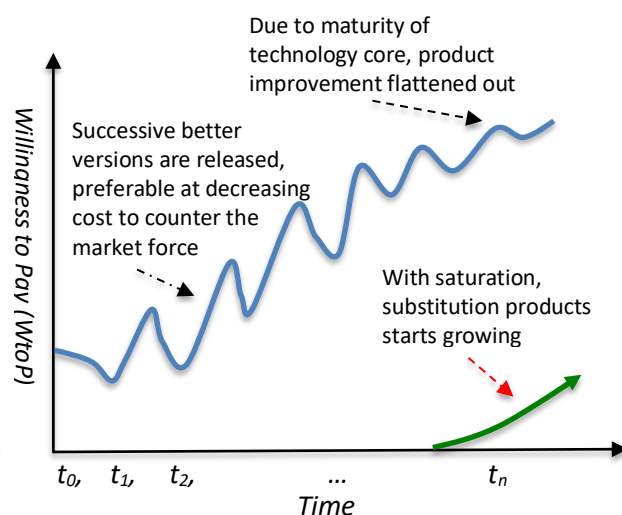


Figure 7: To counter the drifting *WtoP*, the innovator keeps releasing successive better version

In general, it has been found that the resultant effect of competition and externality on the *WtoP* of an innovative product keeps drifting downward as time progresses as shown in Fig.6.

As successive releases are better, often priced less powered by decreasing cost, the customer base of the product keeps increasing. This is basically a key success factor to profit from innovation in a competitive market economy. As a matter of fact, irrespective of the greatness of the idea of substitution and the strength of the underlying technology core, every

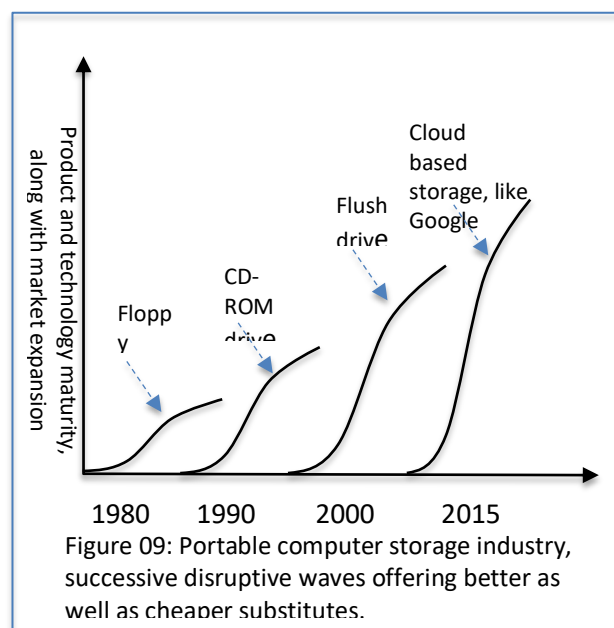


Figure 8: Sales pattern of successive versions of iPhone, shaped by market forces

innovation shows up in the market in a rather primitive form, resulting in producing loss-making revenue from a small customer base. For example, the LCD television in the early 1980s was in a primitive form. The success of flat screen display TV as a substitute to CRT (cathode ray tube) based TV has been due to the continued offering of better quality TV at a lower cost. Even Steve Jobs' magical iPhone could not escape this reality. Within just one year of the release of the first version, the sale came down to zero. During this time, replication of the iPhone based on the crack version of iOS started to show up, at a far less price. Similarly, Samsung and others started offering to imitate iPhone features such as multi-touch user interface by adopting Android OS. 3rd party apps and the rapid expansion of mobile Internet played a complementary role to iPhone's growth as well. To counter the resultant market force and create appeal among a growing number of customers, Apple kept releasing successive better versions, often at the same price, or slight price increase.

Substitution Causing Disruption:

Although, iPhone is yet to experience the emergence of strong substitution product, but more or less all innovations eventually face disruptive effect due to substitution. For example, the floppy disk drive faced the substitution effect from CD-Rom. Later on, CD-Rom faced a similar effect from the flash drive as shown in Fig. 09. But not all substitution ideas grow as a strong force causing disruption to target products and associated industries. For these reasons, more than 90 percent start-ups even in Silicon Valley fold up within the first three years.



For the substitution to succeed, there should be a strong non-consumption of the existing product, to be substituted. 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

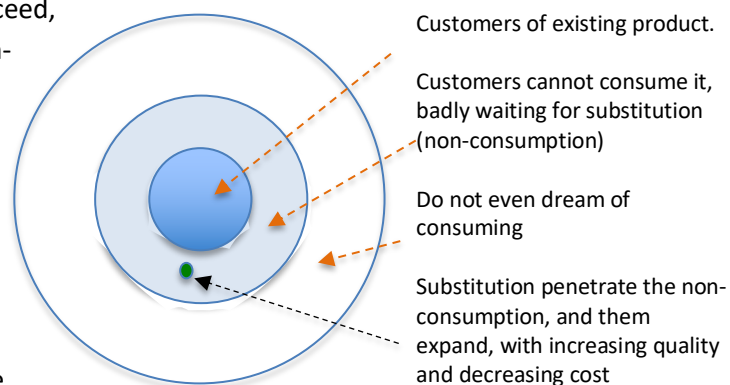


Figure 10: Decomposition of potential market of substitution product, likely to grow as a disruptive force to existing product and industry.

should be decomposable in three concentric circles with respect to the product which is targeted to be disrupted, as shown in Fig. 10. Here are a number of characteristics associated with the growth of substitution as a disruptive force:

- (i) The potential market should be decomposable into 3 concentric circles, with a strong presence of non-consumption, as shown in Fig. 10.
- (ii) The substitution product should be around an emerging new technology core, which is at the growth stage in its life cycle.
- (iii) Irrespective of the greatness of the idea and strength of the technology core, initial emergence of substitution would be in primitive form causing a very faint substitution effect on the targeted exiting product.
- (iv) Primitive versions should create a willingness to pay among non-consuming customers to start generating revenue and offering feedbacks supporting subsequent development; such primitive product will create very little wiliness to pay among a small group of customers generating loss-making revenue.
- (v) The underlying technology core should be amenable to rapid growth (as well as expansion by integrating with complementary technologies) through R&D leading to sharp improvement of quality (Q) and reduction of cost (C)—consequentially increasing sale and turning loss-making revenue into profit.
- (vi) Quality improvement and cost reduction will capture the non-consumption segments and will also penetrate the core market of the existing product, causing disruption, and will also expand to the periphery creating a larger market than before.

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. Such time duration varies. For example, it took more than 100 years for Electric Vehicle to grow as a substitution posing disruption threat to gasoline engine-based cars. On the other hand, within just 15 years, portable video camera faced the substitution effect from smartphones. Similarly, the portable computer storage industry has experienced disruptions four times within a span of 40 years, caused by successive waves.

Effect of Technology and Innovation: It's true that technology and innovation create wealth and expands trade by offering better products at a lower cost, consequentially creating both consumer and producer surpluses. But, it also kills jobs and negative affect trade by enabling better performing producers to acquire monopolistic market power through the accumulation of technology and innovation capability in offering better products at a lower cost, than what competitors can offer. Innovation also transforms the value and market of human competence, and raw materials, as shown in Fig. 11, which is likely to accelerate in the age of the fourth industrial revolution (4IR). Particularly software and network-centric innovations (*as cost of replicating software is zero, and perceived value keeps increasing with the growth of customers due to network effect*) are powering such transformation with far greater scale, speed and scope than seen ever before. To succeed in creating an innovation economy, the production and commercialization of Intellectual assets (or intellectual properties), as product and process features, is vital.

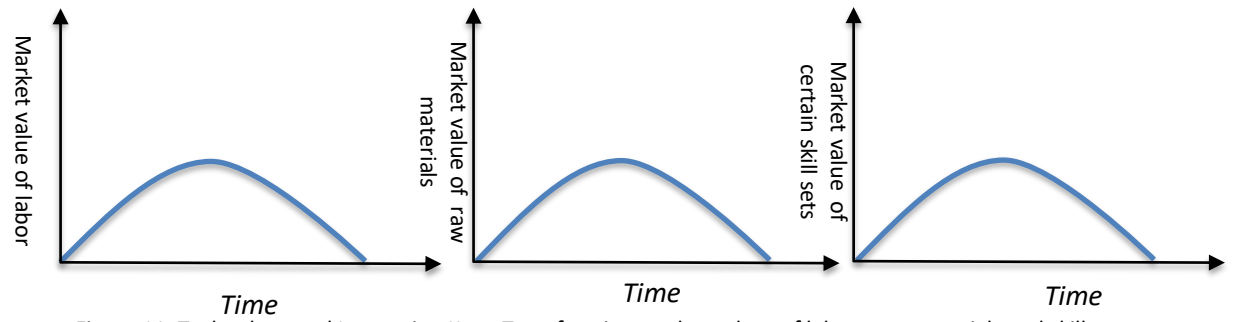


Figure 11: Technology and Innovation Keep Transforming market values of labor, raw materials and skills.