

Chapter 2

Emotion and Innovation

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Abstract The word “innovation” is attracting wide attention these days. It is pointed out in this chapter that quality becomes increasingly difficult to be recognized with its improvement. Quality in its original meaning means segments. Therefore innovation and pursuit of quality concurs on the point unless new sectors are explored, customers do not feel their expectations are met and they will not be satisfied. In the old days, product lifecycle were much longer so people could make decisions whether to buy or not based upon their use experience or upon observations of foregoing customers. But today product lifecycles are getting shorter and shorter so people have to make decisions as soon as new products come up on the market. But such new products are not only experienced before, but also developed with new technologies they do not know. So people feel very much uneasy when they buy innovative products. How we can reduce their anxieties is very much important for our innovative products to be accepted by them. Therefore, true innovation is more emotional than technical. How we can make our innovation more emotional and acceptable is discussed with illustrative cases.

2.1 Why Innovation is Important

Everybody talks about innovation these days. Why is innovation so important? Today changes are so frequent and extensive and the boundaries of our world are quick disappearing so our world becomes an Open World. In the days of a Closed World where situations did not change appreciably and its boundaries were fixed, we could apply set theory and induction and deduction logics (Fig. 2.1).

And as the world is small, there was only one peak so that we did not have to make decisions which peak to climb. Our efforts were fully rewarded in these days. We did not have to think about innovation because Christensen’s sustaining innovation [1] was the only option we could take. But as our world expands, many other peaks appear and we have to make decisions which peak to climb (Fig. 2.2).

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Fig. 2.1 Closed world and open world

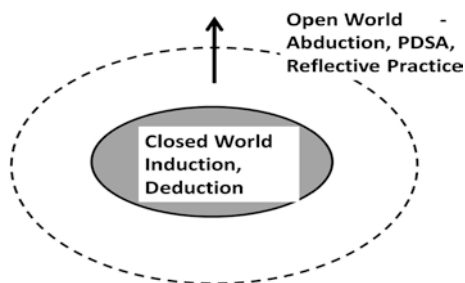
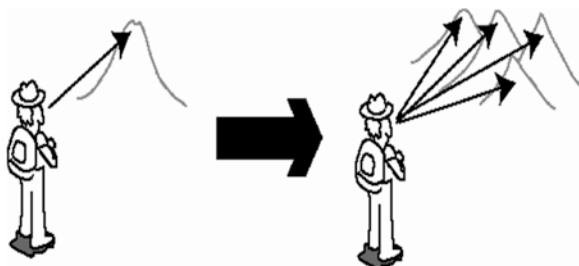


Fig. 2.2 Single peak, yesterday and multiple peaks, today



Thus setting a goal or defining a problem becomes more important than problem solving. We have to change our way of thinking from tactics to strategy. And in an Open World, what we have to do is to explore. So trials and errors are prerequisites and we have used such reflective approaches as Abduction, PDSA and Reflective Practice [2–4] (Fig. 2.3).

Christensen pointed out [1] that there are two innovations. Our traditional innovation is sustaining innovation where people make efforts to move forward on the same track. He pointed out, taking hard disk drives as an example that while such efforts are being made; new markets are being created off the track. Such new market emerges from customers' expectations. When situations change very extensively, the producer tends to overlook such emerging markets and they fail to respond to such expectations. Thus, he called such an innovation “disruptive”.

Yesterday changes were small. Mathematically speaking, the change curves were smooth and continuous. Thus, they are differentiable. So we could make predictions. Today, changes are frequent and extensive. What makes predictions very difficult is because the change curves are not smooth. They are angular so they are not differentiable. Therefore, it becomes almost impossible for the producer to predict the future (Fig. 2.4).

“Disruptive” is the name which comes from the viewpoint of market. It would be better to call such an innovation “evolving innovation” from the viewpoint of industry or the producer, because such situations necessitates the producer to adapt to changes of customers' expectations.

Innovation becomes important from another reason. We should remember that the higher the quality of a product becomes, the more it is difficult for a customer

Fig. 2.3 Reflective cycle
(Shewhart cycle)

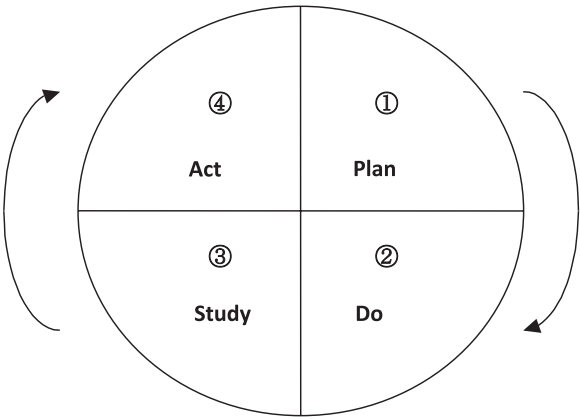
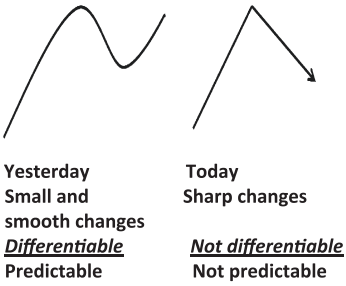


Fig. 2.4 Changes of
yesterday and today



to realize its improvement. Weber-Fechner pointed out that we need an increment proportional to its level of stimulus to perceive the difference of a level.

$$\Delta S/S = \text{Constant}$$

ΔS = increment of the stimulus, S = level of Stimulus

If a man with a small voice raises his voice a little, people will immediately understand he raised his voice. But if a man with a big voice raises his voice a little, people would not understand. Thus, although industry is making tremendous efforts today to improve quality, customers cannot recognize the improvements. To let them recognize, just noticeable difference (JND) [5] is enough. But it is very difficult to know how much JND is.

If we explore the new market, people understand immediately the difference. This is what Kim and Mauborgne [6] pointed out in their book “Blue Ocean Strategy”. It is much more effective and rewarding to look for a blue ocean than fighting blood over blood on the red ocean.

2.2 Innovation and Quality

The word “Quality” comes from the Latin word *Qualitas*, meaning quality or property. As its original meaning indicates, quality is “qualitative” and not “quantitative”. And if interpreted as property, then segmentation is much closer to its original meaning.

Efforts to improve product quality quantitatively will not be rewarded in this sense as well. Such quantitative pursuit is red ocean strategy. Battles are fought blood over blood. But if we look into another direction, there is a Blue Ocean.

If we come back to its original meaning, we should discuss quality in the sense of Blue Ocean. Or to put it another way, industry should pursue another business segment instead of fighting in the same traditional segments. Red Ocean is nothing other than sustaining innovation and Blue Ocean is evolving innovation. Thus, pursuit of quality is very closely associated with innovation in the sense that both are activities to explore new segments.

2.3 How are Emotions Related to Innovation and Quality?

Then, how are emotions related to innovation and quality? Innovation and quality are needed to meet customers’ expectations. Expectation is emotion as can be easily understood if we recall that the word motivation or motive comes from the same Latin word “*movere*” as emotion does.

One of the definitions of a human, “*Homo Faber*”, best describes what a human is. Human can dream or can think about the future. Animals cannot. Animals can use tools available in nature, but humans are not satisfied with such naturally available tools. They make tools to realize their dreams. This is emotion. Engineering is an activity of creating artifacts that are not available in nature. It is an activity to realize our dreams. So it may not be too much to say that engineering itself is an emotional activity. Innovation and pursuit of quality comes from our basic human nature and it is very much related to our emotions.

Thus, innovation becomes true innovation when it meets the expectations of customers and when they feel they have new innovative products. Unless they do not feel that way, that is not an innovation, no matter how they are innovated technically.

Thus innovation lies in the hearts of customers. The same argument holds for quality. What is important in quality management is not quality improvement, but quality satisfaction or meeting quality expectations. If customers feel the quality meets their expectations, then that is true quality.

Thus, although quality also lies in the hearts of customers, current discussions about innovation and quality are too much technical focused. We should give more thoughts and attentions to emotional aspects. If a customer feels a product is innovative or good enough, then our job is perfect, no matter whether it is not too much innovative or is very sophisticated in technical quality. True quality is very much subjective and emotional.

2.4 Reverse Innovation

Today, another innovation, i.e., reverse innovation is attracting wide attention. But it is another form of evolving or disruptive innovation. Take GE Healthcare for example. They had to adapt their cardiograph to Indian market because space, etc. are limited there. They had to develop smaller and simpler ones. They did not realize that there were great demands for such small and simple equipments back in their home country. Until then, they were fighting along the line of Red Ocean. But their business in India opened their eyes to the new “Blue Ocean” market in the States. Although it is called “reverse”, this is nothing other than another Blue Ocean. It so happened that a developing country business made them aware of such a business opportunity.

Much simpler case can be found in Japan. Such a trailer as shown in Fig. 2.5 is called “rear car”.

Although there were many “rear car” makers after the war, most of them shut down their business and only several manufactures survived. One small company, Muramatsu Sharyo was asked by an African Embassy to produce them in order to reduce the burden of women carrying waters to their homes from the well. This story reminded Yamato Unyu, Japanese delivery company, of their usefulness. They do not have parking problems. They can negotiate narrow roads. Now rear-cars as shown in Fig. 2.6 are seen every day, everywhere in Japan. Muramatsu realized that rear cars could be used in a different manner. This success led Muramatsu to develop mobile wagons for flower shops. Most of flower shops in Japanese hotels have to vacate their space after business hours. Rear cars met their expectations.

2.5 Simplicity is the Soul of Innovation

So a lesson we learned is we do not have to make our products complex or sophisticated. Rather, simplicity is the soul of innovation. This is demonstrated by iPhone.

Fig. 2.5 “Rear Car” in Japan



Fig. 2.6 “Rear Car” for delivery



Until the emergence of iPhone, most cell phone makers paid every effort to attach more functions. They believed more functions would satisfy customers better. But it did not work that way. I asked many young students who are studying IT whether they are satisfied with cell phones. To my surprise, most of them told me the way cell phones are being developed at that time made them irritating and led to dissatisfaction. This is very much the opposite from what cell phone developers expected.

Students told me that they would like to master new functions as soon as they are added. But too much complexity made it very difficult to do it in a short time, and more often than not it called for extensive knowledge to really put them into use. So cell phones irritated young students because their expectations are not met. Cell phone makers have been making efforts to discourage users.

iPhone, on the other side, is very much different. The basic mechanism is simple and a user adds apps as he or she wishes or as he or she needs. So it works exactly the way a customer expects. So iPhone was accepted by market very quickly and widely.

How important it is to meet the customers' expectations is already pointed out by Norman [7]. He pointed out yesterday people put more trust in machines because they were simple and operated as people expected. But today they become too much complicated and they do not work as people expect. So people are quickly losing trust. iPhone demonstrates how simplicity is important.

2.6 Multiple Systems for One Human Need

The current framework of industry drags the histories of inventions. They are not organized to correspond to human needs. Let us take transportation for example. Cars, rails, ships and airplanes were invented to solve a very specific technical issue and developed independently.

Airplane was invented to satisfy our desire to fly. At the time of invention, the challenging issue was to fly in the air. That was the immediate objective. But we forgot why we hoped to fly like a bird. Our final goal was to travel safely and comfortable, no matter what situations come up.

In fact, if we look at birds, they fly because they have to travel a long distance. Indeed they fly, but they also walk and swim. If we come back to our basic desire, all transportation industries should be integrated and united into one.

Our industry development has been too much technically driven and we forgot to get down to our basic human desire. If we look industries from this perspective, we would know there are many such cases where integration of industries are called for.

It should be pointed out that such integration leads to a great amount of reduction of cost and energy consumption and it also increases productivity to a great deal. Again “simplicity is the soul of innovation” must be remembered.

Such reorganization of industries may be called “Emotional Reorganization”, because industries are reorganized for emotional satisfaction of customers, and not for technical interests. And it should also be added that such integrated transportation system is really called for in such a big country as Brazil. You could fly to a distant place, but if a car is not available there, you cannot go any further.

2.7 Social Innovation

Integrated innovation is needed not just for meeting customer’s expectations, but for sustainable development as well. To save energy, we have to integrate our products and industries. Many different products which have been developed independently up to now will be integrated. Such integrations calls for emotional innovation in addition to technical one. We have to decide what kind of a society we want in the future.

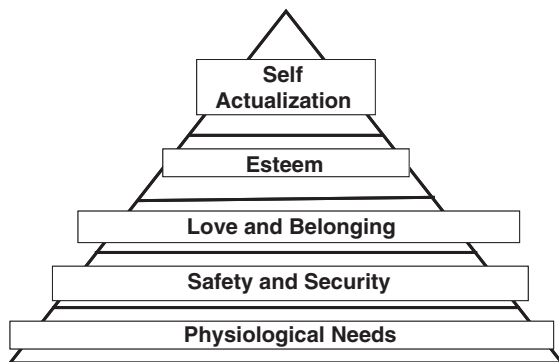
New energy management system, for example, is now changing designs of housing, transportation, etc. to much integrated design. Product based designs are now changing into a holistic system design or the design of society. Thus, we will be designing our lifestyle in the future.

2.8 Process Innovation

Maslow pointed out that the highest human need is self actualization (Fig. 2.7).

The main spring and the core of all human activities are challenges. We would like to challenge to new situations. It is deeply associated with evolutionary innovation. The highest human need is our desire to innovate ourselves. This is emotional innovation.

Fig. 2.7 Maslow's hierarchy of human needs



If we could develop such a system where our customers can enjoy producing and repairing their products, then their desire for self actualization will be satisfied. To get our customers involved in design, manufacturing and repair, our design and production system needs an extensive change. Such new DIY system is very much of a challenging issue and certainly calls for technical innovations, but it also brings about emotional innovation.

If we are successful in developing such a new framework of DIY, our customers would feel more attached to such self produced products because their time and efforts have been spent upon them. This is the endowment effect.

When people talk about innovation, they focus on new developments. But if people come to use our products longer, repair will come up as another target for innovation. Current product developments focus on one time value. Values are discussed and evaluated at the point of delivery. But there is lifetime value. Extension of a product lifecycle will increase lifetime value.

Repair is not the same as maintenance. Maintenance is to bring the degrading functions back to its original design level. Repair is to keep products in the best working conditions. The functions or materials degrade, but if they work well in the operating conditions, our customers are happy.

This holds true with humans. What doctors define as good health and our feeling of being healthy are different. Doctor's health is an idealized health or health as a mass. But our health is very much personal. If we can live our life happily and comfortably, we feel we are healthy.

Repair and remedy are basically the same. They require great amount of knowledge and experience. But if customers can perform such repair jobs, they would be happier, because not only they can enjoy the best working products but also their desire for challenge will be satisfied.

2.9 Emotional Innovation

Since innovation is more emotional than technical, it is important to consider innovation from emotional viewpoint. To illustrate the points, two cases are taken up.

2.9.1 The Product Space: Permeating Innovation

The success of Korea in global market is well known. Korea used to be poorer than Chili because she is small and does not have any appreciable resources. But while Korea succeeded in global market today, Chili still remains the same. This is because Chili is rich with natural resources so Chili did nothing more than just to export them. That way, Chili could easily survive. But Korea, being poor in natural resources, no Korean thinks Korea as a market. Most of them look for the global market from the first.

Hidalgo clarified why Korea succeeded [8]. What Korea took as their strategy is to explore the market very close to the current one using the current available technologies. They studied what products are close to the ones they are producing today. Then they produced such neighboring products.

I would like to call such an innovation “Permeating Innovation”. This is one type of evolving innovations. Such permeating innovations not only reduce product development time, cost and resources, but what is more important is it takes away the anxiety of customers.

Today many new products are being developed in much shorter time. Most of these products use new technologies customers never experienced. Yesterday, it took more years to develop a product and their lifecycles were long. About 30 % of foregoing customers tried these new products. So the rest 70 % customers could observe how the product would work and they could decide whether to buy or not based upon the observations. They could buy these new products with confidence.

But today the product lifecycles are getting shorter and shorter. So every customer must make a decision whether to buy or not once a new product comes up on the market. He or she has never used such a product before and what makes them anxious is most of these new products are developed with new technologies he or she has never experienced or never heard of. So their anxiety is increasing. The Korean strategy of “Permeating Innovation” greatly reduces such concerns.

2.9.2 Segway and P.U.M.A

Dean Kamen developed Segway or personal transport (Fig. 2.8).

It was originally developed as a wheelchair but the disapproval of the idea of a new wheelchair by a governmental institution led him to develop this innovative vehicle. What is innovative is not the technology. The idea of an inverted pendulum is nothing new. What is important about Segway is Dean created a new lifestyle. What he developed is not a new product, but a new lifestyle.

Dean’s another innovation, P.U.M.A, Personal Urban Mobility and Accessibility, developed it with GM better demonstrates that he is developing a lifestyle. If we compare a wheel chair and P.U.M.A., we would immediately know that there is no difference between a wheelchair and personal urban transport. In fact, he developed P.U.M.A. based on his idea of a wheelchair (Fig. 2.9).



Fig. 2.8 Segway, personal urban transport



Fig. 2.9 Wheelchair and P.U.M.A

If we could develop such a transport with the same platform but with different optional systems on top of it, then there will be no distinction between a wheelchair and personal urban transport. The current distinction will lose its meaning.

Then, disabled can say that the only difference is their lifestyle. Some may have more mobility and accessibility. But it so happens they do not. Thus not only such a transport would provide pride and joy to everybody, but also would increase productivity to a great extent and reduce cost and energy. What is most important is people can enjoy innovation.

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<http://www.springer.com/978-1-4471-4983-5>

Emotional Engineering vol. 2

Fukuda, S. (Ed.)

2013, VIII, 242 p., Hardcover

ISBN: 978-1-4471-4983-5