

REDESIGN AND UNITE INDUSTRIES TO MEET THE BASIC HUMAN NEEDS

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Abstract: The current framework of industries are too much separated, although not a small number of them share the goal of satisfying the same human needs. This is because current industries are too much technology driven. Industries were developed on the basis of technology inventions and they grew on the same track. They do not look back and examine what human needs led to such an invention. If these industries are redesigned and united, customers will be more satisfied because their expectations will be met more perfectly and consumption of energy will be reduced considerably. Thus it will bring about a great increase in productivity. Such expectation-driven reorganization of industries will bring forth seamless society where people can enjoy their life more comfortably because it will respond to their own needs and to their own tastes.

Keywords: *basic human needs, reorganization of industries, expectation-driven*

1. Introduction

It is pointed out that the current framework of industries is technology-driven and industries are not necessarily developed by the basic human needs. To really answer to the users' needs, we have to come back to the basics and develop a more sweeping industry across technology sectors. Machines were developed to assist us in expanding our abilities beyond our body capabilities. In this sense, mechanical engineering is nothing other than assistive technology. It has to meet the very personal needs of a user but its price has to be market competitive. Assistive industry provides us with some useful hints. If we come to consider the basic human needs, products that will encompass many different industries and link them together to meet these needs could be developed. Then, such an industry would realize a great reduction of energy and a great increase of productivity, in addition to more satisfaction from the user.

2. The same human need – separate industries

Most of the current industries are pursuing sustaining innovation, if we borrow words from Christensen (2003). They would like to produce better products in their own fields. They often say they have to listen to the voice of customers. But these voices are those of the customers who buy their products.

Let us take transportation for example. Cars, rails, ships and airplanes were invented separately. Their years of invention were different and they followed different histories of development. But what is common to all of them is the fact that they were invented to solve a very specific technical issue and developed on their own grounds. Airplane was invented to satisfy our needs to fly. At the time of this invention, the challenging issue was to fly in the air. That was the objective of the attempt. But once it succeeded, then the objective changed to how it could be a better means of transportation. Our

expectations shifted from making our dream come true to using it as a daily means. We do not fly to get excitement anymore. We use them as a means of traveling easily over a long distance. Airplanes are now just one of such traveling means. They are no different from other means of transportation. But airplane industries are paying most of their attention to how much they can improve their airplanes and flights. They do not care too much how they can link it with other means of transportation such as cars or ships. Situations are the same with other transportation industries. They are doing their best, but only in their own field and they do not care how they can partner with others to provide a seamless and easy transportation. This is because they are technology-driven. They do not come back to the basic needs of their customers and consider what they are really looking for.

If you are going to travel from place A to B, do you want to change the means of transportation? No. You wish to stay on the same transport, no matter what may come up on your way. What you want is an easy and seamless transportation. We invented cars, ships, etc separately because it is much easier for us to tackle the problem separately. If we narrow down the conditions and boundaries, problem solving becomes so much easier. If we consider land alone, for example, it is by far easier than to invent all-in-one transportation. This separation benefits the inventor and consequently the producer but certainly not the user. If you are a traveler, your basic requirements should not be to design a car with certain specifications. Yours is to move from A to B easily without any trouble. Changing transportation is undoubtedly troublesome, but to answer such basic needs, transportation industries must team up together to establish a seamless and cross-modal transportation system. Their redesign and reorganization are called for.

Such seamless transportation is not only to provide a comfortable and easy transportation, but sometimes it is a must. Suppose you are traveling in a big country such as US or Brazil, then even if you can fly from A to B, you cannot go anywhere beyond from B, unless a car is available at B. In such a case, an airplane and a car must be integrated into one. The Transition was developed by Terrafugia, MIT group ("The Transition-Terrafugia", 2006)(Figure 1), and amphibious (land-water) vehicle was developed ("DUKW", 1942) (Figure 2) for example, to cater to such needs.



Figure 1. The Transition by Terrafugia



Figure 2. Amphibious truck DUKW

But these are still an integration of two industries. We still have to go ahead to realize a seamless and cross-modal transportation or to realize all-in-one transportation (Figure 3).

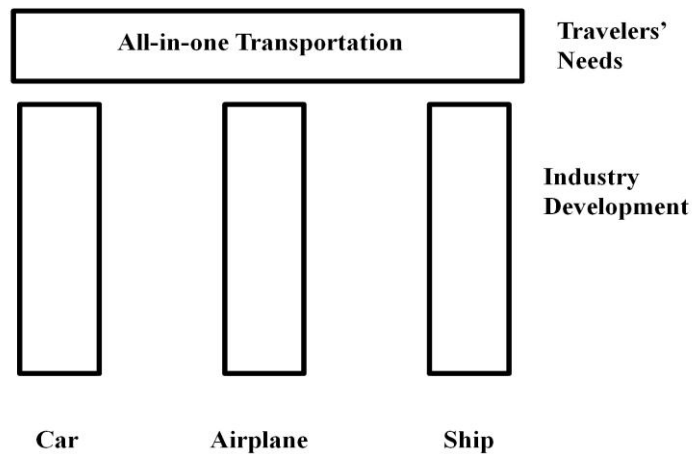


Figure 3. All-in-one Transportation

3. Mechanical engineering: an enabler of our poorly-able bodies

Let us take another example. Segway and GM developed P.U.M.A. (“GM, Segway P.U.M.A”. 2009) (Figure 4).



Figure 4. P.U.M.A. - Segway and GM

P.U.M.A. stands for Personal Urban Mobility and Accessibility. But if we drop “Urban”, then it comes to Personal Mobility and Accessibility and it is nothing other than the words used in assistive technology to assist the body movement of the disabled or physically handicapped person. In fact, Dean Kamen developed Segway (“Segway PT”, 2001) because his first idea of developing a sophisticated wheel chair was not approved by Department of Health and Human Services (HHS) so he changed it to Segway. P.U.M.A. is a revival of his original idea of a wheel chair. But this time he developed it not only for the disabled, but for all of us by introducing the idea of “urban” mobility.

Indeed, why we need transportation is because we are disabled or physically handicapped to reach to the destination using our body alone. In this sense, able-bodied or disabled does not make any difference. It is just a matter of degree. We are all disabled in this sense.

If we think this way, then why do we have to distinguish a wheel chair from a car? In fact, P.U.M.A. is nothing other than a wheel chair. And a car is in fact covered chairs on wheels.

What are their differences? We regard them as separate objects because it is easier to design and produce them separately. Knowledge, skills and equipments are simpler if we separate them.

But if we come back to our basic desire that we would like to get around freely, this desire is exactly the same as the one the disabled person desires as personal mobility and accessibility. So transportation can be regarded in a broad sense as one area of assistive technology.

Further, if we think that way, we would then realize that we don’t have to park our car in the garage and bring heavy things into the house. Disabled persons enter a house on wheels. Why can’t we do the same? Technology is disabling us. Our perspectives stick too much to the current technology framework.

If we can develop a really personalized mobility such as Figure 5 (“Honda US-X”, 2009), then there will be no discrimination or difference between the disabled and the able-bodied. We can enter a house on wheels without any trouble. And if airplanes are re-designed to accommodate such a personal mobility, then we can reduce the trouble of changing the means of transport. Indeed, we may still need a plane and a house, but no matter how such outside environments may change, we can get around without any difficulty and trouble.



Figure 5. Honda US-X

4. Greater increase of personalization and reduction of energy

It should be stressed that this is not only comfortable and good for our own individual standpoints, but it also contributes immensely to the reduction of energy. We discuss very often how we can reduce energy but most of these discussions is based upon the current framework of industries. If we can

integrate them into much smaller number of industries, such as all-in-one transportation or personal mobility, then we could reduce energy consumption to a far greater extent because there are no overlaps. Besides, such personalization of industry will itself reduce energy consumption. We would not have a bus with only several passengers onboard anymore. We can move around as we wish with the minimum energy. We will be moving from the centralized to much smarter distributed system. Introduction of such a personal mobility will bring about a new house design which allows easier accessibility. Thus, it will lead to the development of a new industry which will encompass much broader industrial sectors than the current ones.

This discussion may sound too much unreasonable and daring. But if we recall Weber-Fechner's law which tells us that the greater the level of stimulus is, the more increment we need to recognize its difference. If a person speaks in a small voice, then we would know if his voice becomes louder even though the voice he raised is small. But if a person speaks in a very loud voice, then we would not know if he raised his voice or not, when he raised his voice a little louder.

The quality of products is being improved or sophisticated too much now so our customers would not recognize its difference easily. To let them recognize it and to convince them, we need a far greater time and efforts than we needed in the past. Time and cost needed are so enormous we would lose competitiveness. Most of our customers would not pay for such high prices. As a business, such a decision may be possible to cater to only rich people who can afford it. And this argument does not apply to such individual productions as civil structure, etc. But most engineering products have to be produced more or less in mass. If we develop such personalized products as described above, then people would feel their desire is satisfied, although the product is produced in mass. They would recognize the difference of quality not through physical products, but through their usages or experiences.

5. Greater increase of productivity

Another benefit such an integration of industries would bring about is the remarkable increase of productivity. As there are no overlaps between the industries, productivity in the sense of social productivity increases tremendously. Current productivity is defined as amount of output/amount of input (money or workforce). Money will be far less because we remove overlaps. As to workforce, the more integrated industries will be, the smaller number of workforce will be needed.

6. Summary

We should look at technology from a very different perspective to make a great step forward if we would like to reduce energy consumption and to increase productivity by a large margin. In a nutshell, united we stand, divided we fall. We should unite our engineering to cater to the very basic human needs, not from the standpoint of easy technology development.

This could be expressed in another way. It is to regard technology as assistive technology and regard us all as a disabled person. Assistive technology is to assist us to do what we want. It starts from our basic desires or expectations. Most of the current industries were developed along the line of technology inventions and innovations. Now is the time to get back to our basic idea what we want. And we should redesign and reorganize our industries in order to respond to such basic desires or expectations.

Now is the time to create Homo engineering. Let us start from what Homo wants, not from what technology can offer.

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