PETER HESSELDAHL

GROUND RULES FOR THE 21ST CENTURY
Chapter 6

FROM PRODUCT TO PROCESS

Standardization allowed industry to produce cars, sewing machines, radios, refrigerators and telephones cheap enough to make them accessible to the masses. There was only a limited selection of models to choose from back then, but that was no major issue, because so far these products had not been available at all to the general population.
The key words then were *mass production* and *economies of scale*. Industrial production required predictability and fixed plans. There was a basic assumption underlying mass production, that companies were able to determine in advance what consumers wanted - and that was fairly easy to guess, at a stage where most people had very little in terms of possessions and comfort.
So industrialism was based on what's called a "push" strategy: Companies developed products, produced a stock of them, and then started convincing the consumers to buy them.

Societal culture was characterized by the same mindset that characterized the production at the factory: Standardization of functions and skills, clear separation between work and leisure, hierarchical structures, mass movements like trade unions and political parties, the nuclear family as the norm, and strong nation states.
By the end of the 1960s this rigid structure, and the clearly defined categories and roles, started to dissolve, however. The new generation was born into a much more wealthy world and their needs and desires were no longer as simple and predictable. The new generation was ready to leave the uniform masses and start realizing themselves. The emerging ME-centric culture was supported by the industry whose products and services branched out into a multitude of options. Simultaneously, production facilities become more flexible and better able to handle variations without losing economies of scale.

Today, the challenge in industry is to stand out. But meanwhile, many products have developed to become so mature that it's hard to come up with new features that really make much difference. Furthermore, production is so automated that there is often not any significant quality difference between different brands - they are all pretty good, actually. Whether they are expensive or cheap, cars can run reliably and with sufficient speed, watches are accurate, drugs are efficient, the image quality of video is great and the food is fresh. This is the situation known as *commoditization*, where a producer can basically only compete on price - which in general is not a particularly attractive way of doing business.

One way manufacturers can try to avoid commoditization is by adding more knowledge and to make the product part of a larger, more complex package of services
Another strategy to distinguish itself from competitors - which may well be combined with the first strategy - is to deliver services that are adapted as accurately as possible to the individual consumer.

Both strategies imply that companies go from supplying finished products, to in stead maintaining *a process* that makes it possible to continuously support the consumers' changing wants and needs.

The post-industrial, ultra-individualistic consumer

Sure, it's old fashioned, but on those special occasions, it can still happen that you will send a real letter in the mail - written on paper and sent in an envelope. It could be an invitation to a baptism. The proud parents might chose to make the letter extra special by having stamps made just for the occasion. They can send - via the Internet, of course - a .jpg file with a photo of their adorable baby to the postal company and have them issue stamps with the photo printed on them - official and fully valid for postage. This service is offered by the postal services in over 15 countries, including Canada, Finland, Australia and USA.

At the party after the baptism, the goodies and snacks should be something special too, for example a bowl of personalized M&M chocolates. The parents have uploaded the child's picture to M&M's website, and ordered chocolates imprinted with the images and name. Later, as the toddler grows up, he can create his own build-a-bear, or he can have running shoes fitted to his particular foot shape, and with the colors and patterns, he has specified. The parents, of course, will pay with a credit card that also features a picture of junior on the front.

Altogether he's off to a good start as a post-industrial, super-individualistic consumer. He will be accustomed to getting exactly what he wants. Cars, furniture, clothing, travel, education – it will all be tailored to his needs, and unless the manufacturer can deliver exactly what he needs, he'll move on to someone else who can.

From commoditization to customization

Normally one would expect a tailor-made product to be much more expensive than standard products, because you lose economies of scale by customizing. However, technology is making it possible for companies to differentiate a product or service and still maintain economies of efficiency. It's called *mass customization* and the concept obtained buzzword status when the American economist Joseph Pines published the book *Mass Customization: The New Frontier in Business Competition* in 1992.

There are countless examples of mass customization. Paints are typically tinted individually to the customer in the store. Sofas, bookshelves, cabinets and other furniture are often configured from the client's specifications for upholstery, colors, legs, doors, etc. Many car manufacturers have attractive and easy websites, where you can assemble just the vehicle you want.

Mass customization goes hand in glove with the pervasiveness of digitization. If what a producer supplies is digital rather than physical, it is far easier to customize it. Google is the ultimate example. Every search is unique; it is delivered to a single person who specifies exactly what he or she wants. The results are delivered within seconds - and Google provides nearly 3 billion search results daily, each of them equipped with commercials, chosen for the particular customer.

Internet radio stations as LastFM and Pandora have programs that, with the listener's consent, analyses the music he has already stored on his hard drive. In addition, the listener can continuously click "love it" or "ban it" to show whether he likes the tunes played. In this way the station can build a very accurate profile of the listener's

personal taste, and its programming service can select an individualized mix of music that is streamed to each user. It is no longer broadcasting, but *narrowcasting*. Each listener has his own channel - just like every one of Facebook's half-billion users see their own personal version of the service.
There is no reason to believe that this trend would reverse. Rather, the step beyond "individualization" might be called "contextualization", for it is not just about targeting and configuring for a specific person, but about continuously adapting to match the user's needs exactly, right now and right here.

From finished products to tools that involve the user

For the supplier, the key to providing individual and contextual service knowing as much as possible about the customers. But this has its problems. Businesses cannot build a massive, super detailed and current database of the customers by spying outright on them. Customers will not accept to be under massive surveillance by any company that might want to build a closer commercial relationship with them. Instead it takes a completely different relationship between producer and consumer - a voluntary and deliberate relationship where customers themselves help to shape the service they want.

The user himself has to see an interest in providing access to personal data - and perhaps even actively contributing input. Such participation requires commitment and confidence and therefore a closer, perhaps more emotional relationship between consumer and producer. This implies that it will be a more important competitive factor in the future that companies understand how to create long term relationships, which can be gradually deepened (Think of Amazon.com). But the prerequisite for this is that the company understands that there must be benefits to the relationship for both parties. It should be very clear that it is also to the user's advantage to open up. It’s not just a question of listening a little better to your customers before you manufacture a product. For a traditional company to make an attempt at mass customization and to involve users in configuring products, it requires both a different business model and a changed self-understanding of how it contributes value to its customers.

The focus of companies needs to shift: From designing finished products to designing tools that make it easy for users to be co-creators of what they need, here and now.
Companies will be competing on their ability to organize *processes* rather than merely delivering *products*.

The customer experience is crucial, functionality is taken for granted

In a traditional consumer-producer relationship the customer chooses a product, pays for it, and if the product works as expected, the parties have no reason for further contact. But when a business involves customers in co-creating the product, then the quality of the interaction – the experience – becomes extremely important.

Ease of use and relevant choices become decisive competitive factors, and the company must prioritize its efforts accordingly. Some call it ”experience design”: In order to attract and engage users, they should have a good and rewarding experience

all the way from the advertising, to advice, sales, service and the after sales contact. Whether a company succeeds in creating a good experience is largely a matter of design. It doesn't happen automatically. If you want a good interaction, it requires a deliberate effort to get the preconditions for a good relation in place. Unfortunately, far from all companies seem aware of this dimension.

The American marketing consultant Bill Carney says that it is no longer sufficient to deliver "ISO quality", in the sense that companies simply meet technical specifications that can be measured and weighed. There are many other, softer and less rational values that come into play when a customer chooses one product over another.
Ultimately, it may be about getting the right motorcycle, the nice skateboard or a good book to read. But there can be other elements of value to the customer on the path to the result. For an enthusiastic user, it is interesting to delve into the details of the product, learn about it and carefully select the right solution. Maybe there is a community of other users and experts, where you can discuss and be inspired. And afterwards, when the goods have been delivered, there may be service, small improvements, new equipment or additional tips for new ways to use it.
These types of experiences and services are becoming a more important part of the total value for the customer – which is why companies should start focusing more on creating processes rather than static products.

The raw functionality of a product must obviously still be delivered, but increasingly companies will compete and differentiate themselves on values that are intangible and emotional.

For the motorist who configures his customized Mini Cooper or Fiat 500, having a car isn't just about being able to transport themselves from A to B. Likewise, for those who buy a Toyota Prius hybrid car, the standard issue vehicle for a politically correct commute. To the buyer, the car is very much a symbol, a way to express his or her personality. For a buyer to enter a closer relationship with a company and its products he or she obviously has to like its style and feel in line with the ethic that the company professes.

In slogan form we are going *from transaction to interaction*. The relationships between producer and consumer are becoming longer and deeper. The parties know more about each other and the more they know, the better the outcome of their interaction can become.

As David Weinberger wrote in his book The Clue train Manifesto: "Markets are conversations". Trade is a dialogue, an ongoing conversation in which the parties jointly develop and adjust the product.

Degrees of participation
Many companies try to involve their customers and partners in new ways, and if you are working in innovation or product development, you can hardly avoid concepts like *open innovation*, *crowd sourcing*, *user-centered design* or *user driven design*.
The key word here is "participation" - but participation is a word with many nuances. In its minimal form users 'participation' consists only in choosing one product over another. At the opposite end of the scale, users take far more initiative and make

independent contributions to the development. The more active users are, the more it changes the producer's role and influence. If a business really wants to involve customers, it also sees itself as a "participant" and "co-creator" in the sense that it loses some of its control over the final result. To a certain extent the company becomes just one of several parties, which create the experience together.

The degrees of participation can be ordered along these lines:

- **Observation**
- **Rating**
- **Configuration**
- **Co-creation**
- **User-driven innovation**

- Observation and selection

You can argue that a customer is participating to some extent simply by allowing a supermarket to gather information about his or her purchases using a membership card, or by allowing a website to make recommendations and customize content based the record of the customers previous behaviors online.
The customer's choices are taken into account in subsequent communication and service that the producer delivers – so to some degree the customer is a co-creator of the result.
One can also argue that the more options are available for consumers to choose between, the more involved they become as participants simply by virtue of choosing among countless other similar offers exactly the breakfast cereal or shampoo, which they personally prefer.
But obviously it is a relatively limited and passive form of participation.

- Rating

It gets slightly more active if the client engages in giving an assessment of the product. Many companies try to get customers to speak their minds, either by rating the product with a number of stars or by writing comments. Of course this is a bit cumbersome for the user, but it may yield some influence on how the product evolves and it's useful for other customers to determine which product to buy.

- Configuration

Many companies offer customers to configure the solution they want, from a series of modules. On NikeID.com customers can configure shoes with the soles, width and colors they prefer. If you want to buy a kitchen from IKEA, you can download their "kitchen configuration" software and use it to assemble the elements and order the items. In exactly the same manner other companies invite consumers to participate in finalizing their next house, bike, t-shirt, glasses and so on. It's an important point in these cases that the particular product doesn't get manufactured, unless the customer has actively participated in designing it.

- Co-creation

Next step in participation marks the transition from simply configuring a product from the modules, which the producer offers to in stead contributing with elements you have created yourself. When customers work directly with the manufacturer to develop the product, it's called *co-creation*.
The vast 3D online worlds and games, like Second Life or World of Warcraft, are

examples. A significant part of these services is literally built by the users, who often use unimaginable amounts of time to create the virtual cities, costumes, monsters and castles the game unfolds around.
In the physical world, the website ponoko.com is an indication of an entirely new form of interaction between designers, manufacturers and consumers. Ponoko delivers two features: They have a factory with laser cutters, which can carve wood, steel, acrylic and other materials with very high precision. And they run a website that allows anyone to send in a design, have it cut out at Ponoko's factory and shipped back as a finished product. Customers may choose to exhibit their designs in Ponoko's catalog, and they can set a price that other customers must pay to use the design. Users can look through the catalog's rich selection of jewelry, furniture, lamps and sculptures - designed by other users. If what you see is not exactly what you want, you have the opportunity to adjust an existing design, so it becomes just right for you.
LEGO's *Design by me* website has similar elements – and, mind you, it is made so simple that children can figure out how to use it: When you have downloaded the special design program, you can build a model with virtual bricks, which you can then order and have delivered with just the blocks you've used in the virtual construction. You can even design the box that the bricks come in, so your design is shown on the lid. Users can share their models in the LEGO Design by me gallery so others can buy the same set - and if your model is *really* cool, you may be lucky to have it selected to be produced as a real, official LEGO set in the " Exclusives" series.

- User-driven innovation
The most active level of participation is when the consumers themselves first develop a product, and only then involve manufacturers. Eric Von Hippel, a professor at MIT Sloan Business School, described how both mountain biking and kite-surfing were originally developed by passionate amateurs, who designed the first models and tested them by using them and discussing with other bike and surf enthusiasts. Only later, when the established industry realized the potential, were they put into commercial production. This sort of participation is called user-driven innovation.

<u>It makes no sense to finish the product</u>
When the user interaction around the design of a product works well, the result is a strong win-win situation. The manufacturers, who can engage the customers in helping, become more competitive. And the customer gets exactly the item he or she wants, but also enjoys a more interesting experience. Customers, who have taken the trouble to configure their own product, are likely to be more loyal and committed to a brand. Often they become a sort of missionaries for the company - and they're probably less concerned about the price.
Overall, both sides of the exchange are potentially best served by taking part in an ongoing interaction, and that’s why companies would often be wise to put greater focus on making the process work.

Especially when it comes to products made of bits and bytes, it doesn’t make sense to think of them as "finished" because both the product and the context they are meant to be used in are constantly changing. The value of the product is largely dependent on whether it is in sync with the circumstances of the user.
It’s common for software to change every few weeks or few months – the programs are said to be in ”eternal beta”, the stage of development just before the software is officially released to the general market. In beta, there may still be imperfections and

bugs, but the users don't have the time to wait for development to be "finished".

Wikipedia turned an encyclopedia into a process

Wikipedia is an excellent illustration of how a product might evolve from a product to a process. A traditional encyclopedia was static. Knowledge bound in leather binding. Expensive volumes that could be passed on to the next generation. The only way you could ensure that the information was relatively up to date was to buy the update volumes that some encyclopedias published annually.

In contrast, Wikipedia is purely digital, and it is constantly evolving. Articles on new topics are added all the time, and you can be pretty sure that if there are substantial changes within some topic or other, they will soon be recorded in the articles on Wikipedia. In many cases, the corrections are made promptly, almost as if the dictionary was also a news medium.

Wikipedia is a *process* because it is constantly evolving. But Wikipedia is also a process in the sense that it is created by a mechanism that allows the ongoing assembly and quality assurance of large and small contributions from thousands of users. The process of change is an inseparable part of the Wikipedia power.

One could argue that indeed a dictionary *should* be a process; otherwise it cannot provide accurate information about a world that is in constant flux. Exactly the same could be said about many other products which until now have been static, but which could be made much more useful if they were able to adapt to changes around them. Transportation is an example. Public transportation is carefully scheduled and coordinated. There is no doubt that the schedulers do their utmost to accommodate all sorts of considerations. Yet waiting times and poor connections are the main reasons why so many choose to take the car instead.

But what if instead of fixed timetables the busses drove in response to the passengers needs here and now? Many of us already have a phone with built-in GPS in our pocket, so it should be possible to offer a range of transport solutions with different prices depending on whether one wants to be picked up and moved from door to door, if you are willing to change bus along the way or walk to the nearest bus stop, or if you travel the same route daily.

The system could encompass both large buses, minibuses, taxis - and even a pool of shared cars, which could be booked, for example if a family wants to go for a weekend trip. The main point is that the driving could be based on a much better insight into the actual, current transportation needs.

It would be an immensely useful example of contextualization, if bus operators were able to create a customized service in real time. Taxis do it already.

It requires that the supplier - in this case the bus company – starts thinking in terms of process rather than product.

Generally, this would imply operating less in rigid, predetermined ways, and instead organizing to operate in a more fluid and flexible fashion. There would be no final solution ("Here is the summer timetable, follow it slavishly until Nov. 1"); instead one would respond to continuously changing customer needs and requirements as they arise.

A layer of processes on top of the physical platform

In many cases you can think of processes as a new layer of activities running on top

of the old, traditional business of selling physical products. The physical product - be it a car, a refrigerator or a toy - acts as a platform. The physical product is necessary for the user to run the processes, but increasingly the features that make a company stand out against the competitors reside in the processes – and so do profits. It is in the process layer that the new economy is emerging.

The next step is to stop selling products entirely. Instead of ownership, you sell access to the utility or experience that the product provides.
Staying in the transport sector, today each of us is buying "our own car." However, there might be some benefits of instead buying "access to transportation." Sometimes we need a van, other times we need a car for the whole family - and sometimes we would prefer not to have a car, because it is impossible to find a parking space. Maybe we do not need to have a car available constantly, because we only use it occasionally. That is why car-sharing schemes are sprouting in many cities. Users do not purchase the product - their own car - but instead pays for the process: access to adequate transportation.

There are examples of this type of thinking in many different industries: Xerox sells access to a number of photocopies instead of selling the machine. Chemical giant DuPont sells the use of certain chemicals, rather than the chemicals themselves. When the chemicals have been used, DuPont takes them back, and cleans them up so they can be re-used.

Selling access to a utility rather than selling the product has an interesting environmental impact as well. A producer who sells a freezer to a customer will naturally focus on lowering production costs in order to make the sales price low. But if, instead of selling the product (e.g. a freezer) you are selling a service (such as a guaranteed number of hours at low temperature) it becomes in the supplier's interest to ensure that the cabinets are durable and have very low operating costs - because it is the supplier who must pay to keep them running for the customer.
When the manufacturer of the device only leases it to the user, it also implies that the producer will have access to re-using the raw materials once the product is obsolete and turned in, and therefore there is a greater incentive to design the product so it is easy to disassemble. Thus, process thinking can lead to a longer-term perspective on costs and use of materials.

Ultimate personalization with 3D Printers
If the development of so-called "3D printers" lives up to the expectations, the boundaries between producers and consumers could become even more blurred. In principle, a 3D printer works in the same ways as an ordinary inkjet printer. The inkjet printer’s nozzle places small drops of ink on paper, but in a 3D printer the nozzle deposits a small drop of a plastic resin. By adding layer after layer on top of each other the 3D printer can gradually build up three-dimensional shapes. This enables them to "print" an object that has been designed on a computer. A sophisticated 3D printer can work with different colors and materials, and can build models with moving parts, for instance a gearbox with cogwheels.
Currently 3D printers are mainly used in development departments, when designers need a quick prototype to get a better idea of what an object they have drawn in a computer system looks like in real life. 3D printers are quite expensive to buy and use, but like any digital technology, prices are dropping rapidly. In time, one could

imagine 3D printers becoming quite common in homes, or that there will be shops, which offer to print out objects – just like having a copy of key made. We all know the situation where you accidentally break a tiny component of a device, and because you can't find a replacement part, you have to throw out the whole shebang. The solution could be to go to the manufacturer's website, download the blueprint for the broken part and have it printed around the corner at the local 7-Eleven.

As 3D printers develop and become more widespread we will probably see many more companies who no longer bother manufacturing the final, physical product, but instead only sell the basic designs, which the user can customize to fit her particular needs and taste before printing it out. Initially it could be knickknacks like handles for cupboards, cutlery, jewelry, bowls and dishes, or spare parts for DIY'ers.

The nature of a product changes when it is digitized. The final, physical version is only one possible manifestation of the knowledge, ideas and developments that are embedded in the product.
A significant part of its value lies in the code. The digital blueprint is what makes it possible to manufacture the product - and perhaps more importantly - makes it possible to remix and re-design elements of the product in new ways.

Remix your couch or your bike
Until just a few years ago the value of music, pictures and texts was tied to a physical product. The media industry earned its money by selling books, newspapers and CDs with music. But the actual value of media is not the physical manifestations, but the information they contain and present. Previously the information was locked and static, precisely because it was tied to a physical medium. But now, information has been liberated. Users have the gear to download, cut and paste, remix and post information in new ways.
Ironically, this makes information much more useful to users, but even though the utility of the media has increased, the industry has not yet understood how to translate that into higher earnings. It has been difficult to find other business models than to sell old-fashioned physical media.

The developments in the media industry offer a clue to how things might develop in other manufacturing industries. Today industrial companies typically make their money from selling the physical version of their products - whether it's a car, furniture or a bicycle.
Although the vast majority of new products are designed on computers and therefore exist in digital form, as a consumer, one wouldn't normally have access to the design data. So far, this hasn't been an issue, because most ordinary consumers haven't had anything to use the CAD drawings for, because they don't have the equipment or skills to manufacture the product.
But that may change. The price of "printing" from a CAD drawing will fall, and at the same time consumers will become increasingly accustomed to having the option of participating in adapting the objects they buy to their own fancy. The design code is valuable to the participating customer, and in the future we will no doubt see the design specifications be sold as an additional offering – a new layer of service on top of the traditional physical product.
If that is the way things are moving, you will probably see consumers starting to remix, edit, share and hack the design of lamps, chairs, bags, shoes and other

everyday physical objects. It could be fun to print a handlebar on a bike with a Roll-Royce hood ornaments, or what about Arne Jacobsen's classical Ant chair, made in plastic, 20 percent larger and with cutouts in the back, based on an image that was downloaded from an online collection of Islamic art?
Once consumers acquire a taste for remixing physical objects, it will throw many new kinds of design and physical production into exactly the same difficult issues about copyright, which currently dogs the media and music industry.

For many traditional manufacturing companies, physical production could become a commodity - something anyone can do, if necessary, at home on ones desktop. Instead, the majority of the value will lie in the "recipe" - the digitized design.

Gene-chips - the ultimate personalization
Looking another few years ahead, one could imagine similar developments occurring in biotechnology. In principle, genes can be remixed and edited like digital information. You can transfer gene sequences between species and splice genes from plants into animals. You can even change an organism by inserting artificial genes that are synthesized from chemistry by combining, step by step, the four bases that all gene sequences are built from. The research field is known as *synthetic genomics*. One of the objectives is to create microorganisms with very specific functions, for instance being able to produce biofuels or a particular protein for medicine. Scientists are trying to streamline the process of designing new organisms by developing a standardized "toolkit" of genes whose properties are known very accurately. These can then be combined depending on the function you wish to equip a new organism with. In principle, one should be able construct an organism for a specific task, in much the same way as an engineer builds a machine, by assembling a number of well-known components.
The perspective in having databases of DNA sequences that can function as standard components or building blocks is that when the recipe for a specific substance or a particular property in an organism has been decoded and can be expressed digitally, then others can begin to work on it by remixing, editing and combining it in new ways.

So, we should expect our products and services to become far more fluid in the future - they become processes of continuous change. Products and services will not be finished by the manufacturer; rather they will continue to evolve to suit the consumer’s needs, here and now. Both producers and consumers become more participants who work together to create solutions.
This requires that companies are willing to open up to a dialogue and to involve more parties in the design. In many ways this implies working directly against the way in which companies usually develop products - but as we shall see in the next chapter, it may be that companies have no other choice.