DENWA
Consulting & Configuring

Drive Your Organization Towards a More Environmentally Sustainable Future with CPQ

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1 What is Mass Customization?

If you can recognize a picture of your customers generally becoming more and more demanding in terms of wanting **unique solutions** tailored to their specific needs, while simultaneously insisting on **low lead times**, **high uniform quality** and a **competitive price-tag**, chances are that **mass customization** will be the savior you have been waiting for!

Mass customization aims to combine the advantages of standard processes, high uniform quality and economy of scale, known from traditional *mass production* with customer specific customization and flexibility as of *customized production*.

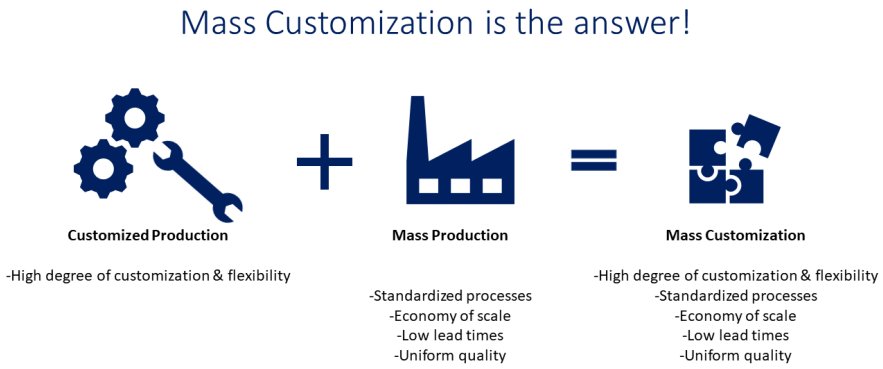

Figure 1: Combined benefits of mass production and customized production within mass customization.

Some of the key benefits that can be achieved through mass customization efforts are listed below:

Sales

- Significantly faster quoting, offering and fabrication of sales documents
- Better product overview
- Securing better and more uniform quality in quotes to customers
- Better prioritization of customers and orders
- Less orders lost due to high lead times or faulty cost prices
- Improved customer loyalty and preferences
- More customers can be handled and thus revenue will increase

Manufacturing

- Reduced storage costs
- Improved and more uniform quality of goods
- Reduced purchasing costs
- Reduced cycle times
- Less scrap, overproduction, & rework lowering costs & environmental footprint

2 Mass Customization and Sustainability

Traditionally in the business world, and particularly in manufacturing within most industries, sustainability has been associated with economic well-being, which has led to the era of mass-production, heavy standardization, and an immense focus on cost cutting. This has in many ways contributed to propelling the world forward throughout the 20'th century and has increased the living standards for many people acting as private individuals or within organizations as products and technology have become increasingly more affordable.
But the world has changed since, and with the increasing living standards, buying power, level of education and globalization of the world customers, whether businesses or private consumers are starting to demand more! As mentioned in the introduction, they want solutions that are optimal and tailored to their specific needs. With the rapidly increasing pace of technology development and the evermore challenging competition, traditional mass-production will no longer be sufficient to keep up. We have to be extremely customer focused, and use a pull technique best known from the lean philosophy developed by Toyota, where the flexibility, elimination of waste, one-piece flow and other well known techniques are applied to put the customer in focus at all time. If the customer is not happy with the product or service provided it will not be long before there is no business to save. If there is one thing traditional mass-production is not, then it is the concern about what the customer wants! As Henry Ford, who by many is seen as the revolutionizing founding father of mass production said when introducing the new model T in 1908:

Any customer can have a car painted any color that he wants so long as it's black.

Although this quote, famous as it is, it can not be directly linked to the actual reality of history, since the model T was later introduced in several colors, it gives a clear and precise understanding on some of the shortcomings found within traditional mass production philosophy, which seem to be out of sync with the modern world we live in today.

This is also the case in terms of our very understanding of the word "sustainable", as the general understanding and widely accepted view has been altered so that it now also includes social and environmental sustainability. The three elements are acting as a trinity, and a company is thus not considered to be sustainable by the modern standards and ideology if they are turning huge profits but neglecting or even harming the society and or the climate and environment. One of the most popular frameworks for this new understanding and vision for a sustainable future is captured in the 17 development goals of the 2015 Paris agreement. It is also a framework that we wish to introduce and discuss in relation to mass customization, pointing at some concrete points of action that can be taken towards obtaining the goals.

Finally, we will return to the economic sustainability where a huge hidden treasure can be found by not just focusing on costs as we think of them in a traditional manner, but also focusing our attention on the cost of "lost potential". With lost potential one can think about questions such as:

How much more revenue can we generate by providing the exact thing our customers demand when and how they demand it?

How will improved customer satisfaction affect the public perception of the brand?

If we spend our energy serving only the customers that are actually a good match with the provided product or service what will that mean for the financial balance, and how much time will it free from our employees?

Those are just some of the questions, that we will go into depth with in this paper. We will also come up with answers that are directly linked to the tremendous powers of mass customization.

2.1 Bringing in the Social and Environmental Dimension

As the world leans into a sustainable path, industries must not fall behind and re-think their whole production chain. With the help of the United Nations (UN), Europe has been intensively investing in spreading the word on sustainability programs and tools. A widely known step towards global environmental awareness was developed by the UN Department of Economic and Social Affairs, called the 2030 Agenda for Sustainable Development. In this agenda, the UN was able to come up with 17 Sustainable Development Goals (SDGs), which are a combination of guidelines and relevant topics to be followed by the society for a sustainable and fair world to be build. Below, Figure 2 shows the 17 SDGs developed by UN.

Figure 2: The 17 Sustainable Development Goals.

Keeping in mind the SDGs, the new development of tools should try to address different goals in order to help the society, reduce or even eliminate the negative impacts on the environment while simultaneously operating in a economically feasible manner. The transformation from mass production into mass customization, can as previously mentioned, help shape a new industry model that is concerned with the SDGs. As mass customization is already the next step within customer business, it is natural to touch upon different goals in the context of mass customization, such as SDGs 7 (Affordable and Clean Energy), 8 (Decent Work and Economic

Growth), 9 (Industry, Innovation and Infrastructure, 11 (Sustainable Cities and Communities), 12 (Responsible consumption and production), 13 (Climate Action) and 17 (Partnership for the Goals). However, mass customization can be directly linked to ensure sustainable consumption and production patterns which is SDG 12. Utilizing the benefits of mass customization efforts, can directly improve status quo with relation to the following targets of the overall goal:

12.1: Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

12.2: By 2030, achieve the sustainable management and efficient use of natural resources.

12.3: By 2030, half per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

12.8: By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

Of course being lean helps companies reduce unnecessary wastes. However, when it comes to social and environmental impacts, a more impactful approach needs to be put into game. And this is where DENWA believes mass customization can add to the whole SDGs. If the entire process is mapped, from the supply chain to the ordering process and production processes, then it is possible to choose the desired combination of items, products, processes, raw material and so on. Imagine being able to select the most "green" product of your shelf! To allow your customers to decide the amount of green materials they want to incorporate in their decision of purchasing a new product. Those topics are just a few contributions to the evolution of product configuration that DENWA believes in.

2.2 Shift the Decoupling Point and Create Structured Value for All

To realize the benefits posed by mass customization efforts in a sustainable way that also brings in the social and environmental standards that we just learned about, we have gathered some of the most well-known proven benefits to be achieved and grouped them into the three pillars of sustainability.

2.2.1 Economical Sustainability, Driven by Quality, Speed and Lower Costs

A good place to start when taking on the many changes required of the organization, processes, and products for mass customization to be fully implemented, and yield the maximum desired benefits, is with a Configuring, Pricing and Quoting solution (CPQ). A CPQ solution, "starts with the beginning" and will if successfully implemented, radically change the business process within sales.

For B2B enterprises, this would mean the business process taking place from the moment of receiving a customer request to being able to send a quote, where the costs on which prices are based are reliable, and all technical information about the particular customized product

is fully specified. The renewed business process is strongly related to the decoupling point of the product, and is with CPQ shifted from *Engineer To Order* (ETO), towards *Configure To Order* (CTO) as illustrated in Figure 3. Having a CTO decoupling point instead of ETO, essentially means, that the vast majority of customer requested products can be combined from standardized modules using a configurator, instead of redesigning the product all over for each specific customer request.

Actually, the famous Pareto Principle can be applied so that for 80 % of the current customer base it is possible to fulfill their needs, simply by combining modules according to a set of rules, connectivity to other modules and constraints. Then, there will typically be 20% of customer request that deviates too much from what can be handled by the configurator, and it must be decided if the old business process for handling deviating requests should be optimized and made more lean, so that all customers can continue to be served, or whether it is actually most beneficial in the long run to refuse such clients. This is highly dependent on the situation the company operates in, and there can be several reasons for doing both. An argument to keep on serving a customer who deviates greatly from standard configurations could be that this is a big customer who will buy a lot of other products that fits the frame of standard configuration. On the other hand, the opposite could be the case, and the serving of that particular customer would end up in potentially lost profits, as the resources could have handled several more customers in the same time they would spent preparing the quote for the deviating customer.

For a B2C enterprise, there is also the possibility of having customers use an online configuration tool, to put together the exact product they demand themselves, and have a fully automated quote sent or presented to them immediately. This technique is well known from various car manufactures, where the customer can decide the color of the car, the amount of equipment, look of interior, type of rims etc. This way, the car manufacturer can keep the assembly generic until the very last moment, in terms of the decoupling point. This will give the customer a sense of flexibility and participation in the process, while simultaneously reducing costs as safety stocks can be significantly reduced since there is no longer a need to keep every single possible combination on stock "just in case", but a generic car is produced in great volumes, while modifications are made using pull-techniques, so it is only *Just in Time* (JIT) that the modifications requested by the customer are added.

For B2C enterprises the decoupling point is often categorized as either *Make To Order* (MTO), or *Assemble To Order* (ATO). Similar to B2B enterprises discussed above, it is highly desirable if the decoupling point can instead be shifted towards the CTO, as illustrated in Figure 3, and thus, keep the level of standardization when it comes to manufacturing and assembly processes, while providing a customer freedom similar to that of the ETO.

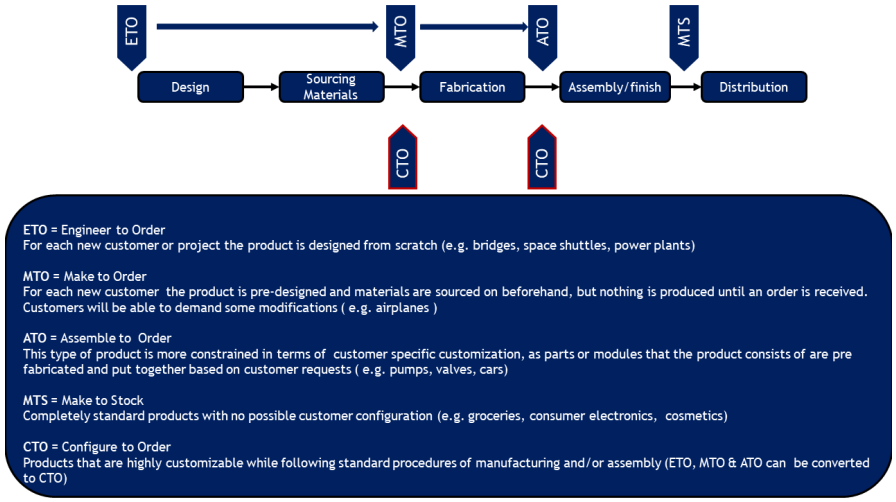

Figure 3: Decoupling Point

Significantly faster quoting:

To obtain significantly faster, better structured, robust quoting, is the main motivation for implementing a CPQ solution, as we remember that the "Q" stands for Quoting. CPQ will thus enable the user to configure products fast and efficiently, combining only valid modules and components to make up the exact product that the customer has demanded. The configurators are typically governed by rules or constraints meaning that if I as a customer state that I'm going to use my configurable bicycle for "competition purposes", it constrains the rest of the product configuration to only allow for me to chose external gearing, and a carbon frame. When I have the product that fits my exact needs, I as the customer will in B2C situations have an instant overview of how different selections and de-selections are priced and what the total sum of my configured product will be. Likewise, the salesman of a B2B setting can instantly see the costs of the configured product(s) and can make sales offer adjustments and pricing accordingly. When the pricing is done, the customer can see the quote on the web page for B2C, and a quote can be generated automatically for more technical products that are typically associated with B2B settings, where the quote might contain technical drawings, flow-curves, and other technical computations.

Literature states that the quoting time can be reduced as much as several thousand percent!

And yes, it is not a mistake, since CPQ solutions have proven themselves to reduce highly complex and technical quotations that previously took several days, to a matter of minutes, whereas a concrete example of the CPQ software provider Tacton, reduced custom quotation time of Siemens from 8 weeks to somewhere around 10 minutes, smashing all sanity with a wobbling time reduction of:

$$100\% - \left(\frac{10\ min}{60\ min \cdot 7.5\ hours \cdot 5\ days\ \cdot 8\ weeks} \cdot 100\right)\ = 100\,\% - 0.056\,\% = \mathbf{99.94}\%$$

Better product overview:

CPQ solutions will enable it's users to get a much better overview of the products, in terms of what can be combined and what can't, product architecture (what does the product consist of), associated costs of modules, parts and components, interconnection between product modules, physical appearance visualized with drawings, technical information, and many other things that all contribute to a good thorough understanding of the product.

When understanding the product at a very deep level, it will become much easier to suggest new solutions for product improvements and upgrades, which might lead to the creation of ever better products.

Better prioritization of customers and orders:

Another element from the even wider subject of complexity management, that will help you and your business improve is the prioritization of customers and orders. If you are sitting right now thinking, "I don't discriminate between my clients. An order is an order, and I'm striving to get every customer the same amount of attention and time!" - Well... sorry to break it to you but however noble that thought may be, you are being foolish!

Why is that? Well for starters, it is a well known fact that for the majority of businesses the famous Pareto principle applies to an array of elements within the business, meaning for instance that it is more than likely that 20% of your customers will generate 80% of your total revenue! Apart from a designated Customer Relations Management (CRM) system, a CPQ system will also help you prioritize, as ABC-analysis is often used as the basis for the products handled, whereas product types/families that are frequently sold while bringing in a solid margin are marked as AA products, and vice versa poor performing products in terms of sales frequency and margin are marked CC. By focusing on the customers who places large orders of your AA, AB, or BA products, you can win their loyalty, and satisfaction meaning that they keep on coming back, for you to generate a truckload of profit with minimal effort!

And yes, revenue might decrease slightly, if you are saying no to some customers, but what does it matter when you are only serving customers you earn good money on? Many companies have many project sales that actually generates negative margins, meaning that you are loosing money by serving that C customer supplying them with CC products! This phenomenon is seen all across different sectors of business and it typically looks as illustrated below in Figure 4:

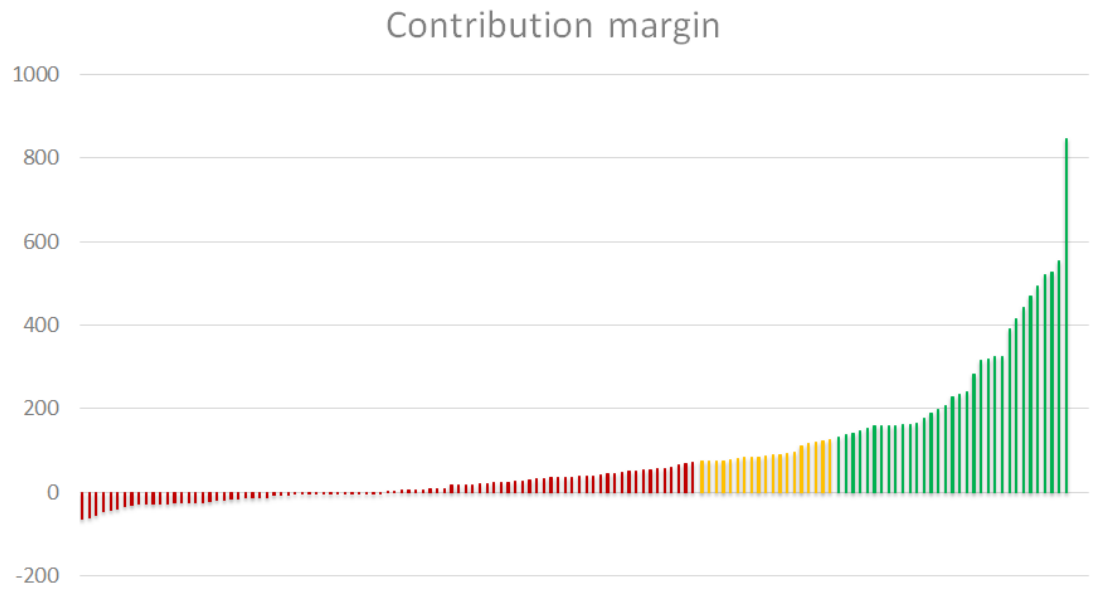

Figure 4: Profit margins of typical product portfolio

And yes, there are several valid reasons for keeping some C products within the portfolio, such

as good customers buying AA-products only if they can also get one of the C-products. That is a fair reason, HOWEVER the majority of products specified as C products can be removed over night and no one would miss them!

An additional argument, relates itself to you asking yourself the question: why not take some of the time from a C customer buying CC products, out to try and be service-minded towards an A customer buying A products? If you can nurture those customer relations carefully, then you will get a much higher return of investment (ROI) for your time. Time is money, don't waste yours!

Less orders lost due to faulty cost prices:

In a world that spins faster and faster where customers expect more and more of you, it is of the greatest essence to be able to perform accurate costing and thus also pricing. As previously mentioned the "P" in CPQ, stands for exactly pricing. This is not a coincidence. If you have technically challenging products with a great number of product variants and possible customer specific modifications, inaccurate pricing can lead to you losing the clients to a competitor if they are too steep, or you can end up offering your products at a price where you are just barely over your cost prices, and in some cases selling the products at cost price or in severe cases cheaper than the costs. Obviously, the latter is pretty much an own goal and will not exactly drive the business towards prosperity and solid profits on the bottom line.

Improved and more uniform quality of goods:

The software-based product configurators being the main driver of CPQ solutions, can also be used to improve documentation, specification and processes *after* quoting a customer.

There are various examples on configurators that connects a broader range of the overall business process, typically in relation to both the sales, engineering and production departments.

Can we do even more, and obtain more benefits? Yes we can! For instance the software typically associated with CPQ can depending on the software platform applied, help automate or semi automate technical drawings, Bill of Materials, production schedules and or instructions and other technical documents.

The fact that these key documents of high importance to the further process, are generated and controlled by the configuration software, notably reduces chances of faulty specification and documentation. Having control over your processes that are highly standardized, however simultaneously supporting customer specific modification, will lead to good and trustworthy outputs.

When the production receives such documents, they serve as a handover from sales or engineering, and are now used as inputs. As the inputs are of high quality, it will positively affect and increase quality for the following processes of manufacturing and assembly, thus ending up with a better and more uniform quality for the end product!

2.2.2 Environmental Sustainability Driven by Elimination of Waste

Now that we have gotten a feeling of some of the widely and common benefits to be achieved through successful mass customization efforts, we would now like to show you an inter linkage to the environmental aspect, where mass customization can help drive a more sustainable sourcing and use of resources and materials as well as help lowering emissions of harmful carbon gasses.

Less scrap, Overproduction, Rework and Environmental Footprint:

A massive benefit that we are now going to cover is something that will benefit your time schedule, reduce your costs and at the same time help you minimize the damage done to our lovely planet that we call home.

Since there is better and more accurate documentation and flow of information, the number of errors will be reduced. Furthermore, you are likely to spot the mistakes that you actually do make, way sooner in the process where it costs less to fix it. When you are making fewer mistakes in handovers, drawings, bill of materials, production schedules etc. obviously the number of times where something wrong is put in motion, decreases as a direct result, from procurement, to processing to assembling, and you will have to make fewer corrections and there will be less scrap and rework! The structure imposed can also help you source and forecast more accurately, as demand is driven as a "pull setting" where the customer drives the process, but more on that later. It can also help you manage logistics better and thus reduce the emissions caused by shipping operations, as planning is simplified creating less hasty shipments that should have been there yesterday, which will improve our capability of choosing slower but also less environmentally harmful routes and means of transport.

2.2.3 Social Sustainability Driven by Innovation in Technology, and Products

Finally, we will now take a closer look at the linked benefits of mass customization towards society and fairness, as we come up with relevant links to social sustainability.

Job Creation in Poorly Educated Regions

One of the often overlooked benefits that can come from the structure and standardization imposed by mass customization efforts, is the possibility for creation of jobs that require less training and education, thus holding the potential to bring people out of unemployment. This can be the case both in a local community, but since complexity can be heavily reduced if the right initiatives are carried out successfully, it can lead to simplified global management of facilities, and therefore potentially creating jobs in developing countries or communities. But what about the very nature of the jobs created? Is it not very under stimulating to carry out standard operations and processes for several hours a day? Well we get the point, because

it is a valid one and it can potentially be the backside of the coin. However, if combined with traditional lean philosophy, not talking about the techniques and tools, but the actual underlying philosophy of "owning" the process, we are convinced that people will grow in their role and carry out meaningful work as they are met with openness and willingness to listen to their bright inputs visions and ideas for further improving the processes. Furthermore, frequent job rotation for factory workers can also further help stimulate enthusiasm and spirit.

Technology Driven Innovation Benefiting Society

When looking into the social aspect of sustainability, one of the key aims is to improve the quality of life so that past generations do not use all available resources from future generations. Therefore, organizations must be responsible for providing society with products and services consistent with social and environmental guidelines. That is only achievable by having full control and knowledge of the whole supply chain. Mass customization is a great opportunity to gain control of all the chain, be aware of all the parameters and resources involved from end to end, and possibly improve both the processes and make better products benefiting society. But how to achieve this state of full awareness? The answer is "simple": innovation in technology! By increasing the intelligent use of new technologies, it is possible to innovate within organizations and provide solutions of the future to our present modern day problems and needs. The implementation barriers of "mass customization" can be overcome with the use of new technologies, like better "configurators" and even more, innovative "configurators", structuring and standardization of the three P's (people, processes and products), combine with lean philosophy and practical methodology, as well as complexity management all driven through the vast technological improvements that we see today.

2.3 The Hidden Treasure

As mentioned earlier, mass customization can be a treasure map that can reveal where x marks the spot! It may lead the organization to a treasure of glittering gold, and the best thing is that this treasure can be unlocked without sacrificing any of the two other pillars in our modern day quest to build sustainable and responsible organizations. As a matter of fact this treasure is likely to lead to ripple effects that will end up further enhancing both the social and environmental aspects. So let us dive in!

Time is Money

The popular saying "time is money" has in many cases turned out to be true, and maybe that is the reason why the catchy phrase has remained popular. Mass customization is no exception as it in combination with a classical "pull" approach from lean can ensure significantly lower storing costs, while bringing lead times down to a bear minimum without compromising the control and reliability of the supply chain nor the flexibility.

First of all CPQ tools can as earlier mentioned help configure, price and quote in a rapid pace, while some of the more advanced systems also helps generate relevant documents such as technical specifications and calculations, drawings, bill of materials, production schedules and so forth. This will smoothen and minimize the unnecessary time spent on handovers between sales, planning and procurement, engineering, production and shipping, which seems to be very aligned with the well known teachings of the Toyota lean philosophy of eliminating waste since it adds no real value to the customer.

If we take it on step further out this have a huge potential in our production and warehousing facilities as well, as it will allow us to move the decoupling point and keep less stock and simplify and standardize production processes. Why is that? With basis in a good ABC analysis we can rank our products so that the most frequently sold products making us the most money, the "high-runners" are identified. In combination with our re-engineering of business processes, and modular thinking regarding our products, we can simply store finished modules instead of components, and thanks to our ABC-analysis we know which modules that go into the high runners so we can keep more of these in stock while we stock fewer or none of the modules that go into the worse performing products. To give an example one could say that we are storing the most popular LEGO bricks, which can then in a flexible way be combined whenever an order is received. Each time we remove one module from the stock we initialize the processes of producing and replacing that particular module, once again very aligned with the ideas of lean and the pulling techniques advocated. The manufacturing is furthermore leveled out, meaning that the foundation of further process engineering is improved, so that for instance machinery changeover time can be minimized. All in all our organization will have a more robust and flexible supply chain capable of producing fairly large quantities in a structured and standardized way, even though the end products are greatly customized. So now we have sliced and cut non-value adding time while securing a high standardized and uniform quality, from requested quote to finished product.

This sounds great doesn't it? Well we haven't even gotten to the real treasure yet! In this world that is spinning faster and faster, speed matters! This can actually become a significant competitive advantage, and the ripple effects are potentially massive! Your customers shift from just being customers to loyal ambassadors (more on that later), and you can potentially generate more customers and thus more sales. All of these potential new sales will in general have a higher margin since we are now in control of our business processes and our costs as well as the fact that you can ask a higher price since customers become impressed with your ability to generate highly unique and modified products while beating or at least matching your competitors speed and quality. Though it may be hard to quantify just exactly how much more revenue all with better margins you can generate, make no mistake. This is where the real treasure lies!

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Furthermore the structured and standardized processes related to the production sites and warehousing just discussed, will make it easier to oversee and manage multiple production sites. The simplification and standardization combined with additional flexibility enhances the opportunities to make solid "playbooks", containing the "Standard Operating Procedures" (SOP's), meaning that all manufacturing sites will be able to handle a broad variety of configured products. This can further help strengthen the supply chain, as problems of keeping up with demand in a region or area supplied from one particular site, can be balanced out as other sites might haven't reached their maximum capacity, and is therefore capable of assisting the production.

This counter measure towards uncertainty in the supply chain, is popularly known as a strategy of risk pooling and will ensure that leadtimes can be kept low, even if one site for whatever the reason may be fails to deliver. Furthermore this will lead to less over production, and thus less material and resources use. The shorter way from the site to the customers also creates shorter transportation and shipping routes on average, which lowers emissions. The multiple sites and structured systems can create jobs, even in areas where people are not highly educated as they can easily configure the products and follow the "playbook". It is a win win win.

Customers as Ambassadors

As mentioned earlier, our customers will become more loyal and increase their level of preference, and some of them might even over go from being "just customers" to actual ambassadors for the organization and the product or service we deliver. It is better and more effective than any marketing and branding campaigns that money can buy!

Following the Customer Need

At last, we become much more capable of tracking our customers and their need and pains throughout different phases, by having structured, standardized processes and systems. If we can better track our customers through all the phases, that means that the way is pathed for us to significantly increase our new sales, repairs or servicing, commissioning and aftersales. This will further increase revenue and sales and the customer will feel understood and become even more excited.

2.4 The Great Potential of a Sustainable Future

We have now touched upon mass customization and how the benefits can be related to the SDG's, in terms of the more obvious benefits, but also some hidden treasures. We would now like to invite you to think of the massive opportunities to do even more for our business to thrive economically, while adding value to the surrounding society, help tackle the climate crisis and reduce the environmental impact of industry in the future. The possibilities and the potential is enormous! There are countless of bright ideas that can be realised if we have the courage to pursue them. With DENWA it is no different, and we would like to share some of the visions and dreams we have for an even greater utilization of mass customization for a brighter and more sustainable future.

One of our ideas, revolves around the tracking of environmental impact along the supply chain in all stages of the product life time by building highly advanced configurators that will add up the emissions for every single choice made by the user. It will become transparent and clearly visible what particular combinations are the cleanest in relation to where the customer is located, where the goods are produced and/or assembled, where materials and components are sourced from and how much it will take to mine or extract the materials. We are sure that this transparency will be appreciated by customers, and furthermore it creates overview for product designers and engineers, production planners, site managers to optimize products and manufacturing towards less environmentally harmful alternatives. Furthermore, we imagine that it can be used actively when entering partnerships with suppliers and vendors, for them to live up to a high standard. In a B2B environment, one could also imagine that the customers can use it in their own marketing as they can guarantee a certain lower level of emissions than industry standards, making them trustworthy and creating good will among their customers. Additionally, we imagine that the possibilities for re-engineering and designing of products can be used to source better raw materials and, combined with the standardization and imposed structure on processes, products can be designed to go in to a circular loop reusing parts, and materials from products that have served their lifetime among the end customers, and thus build new products and/or refurbish them in a much more structured manner than what seems to be the case today.

One of our other ideas is to combine more advanced visual representation, with product configurators. Imagine for instance that you could sit in your couch at home and configure your dream car, in virtual reality! So that you could move around the vehicle and inspect all details, and have the freedom to configure a wide range of options so that it becomes perfect for what you truly desire. When you have finished your configuration you can type in your location and preferred place of pickup and instantly receive a quote with price, emissions in production, shipping and operation as well as expected time of delivery. When you then place an order the system will automatically cue the required modules that make up the car you have configured, and you would be able to track and trace the process of your car being manufactured, similar to the services we know to day with packages. What an exiting future that awaits us!

3 Authors

Anders Alexander Wagenblast

Professional Skills:
Has a bachelor's degree in mechanical engineering from DTU, and is currently studying industrial engineering and management, while specializing within production and project management. He is currently finalizing his Master Thesis where he is building a sales configurator for Gertsen & Olufsen part of G&O Maritime Group

He has previously from scratch built a real-life Excel-configurator used by the sales force at Pres-Vac also a part of G&O Maritime Group, which he currently is responsible for updating and maintaining.

Furthermore he has taken the courses “Mass Customization”, “Complexity Management” , “Supply Chain Analytics”, “Design of Production Logistics Systems (Lean)” and “Management of Sustainable Organizational Changes” which have provided valuable knowledge, and structured methodologies which can be applied to real-life settings.

Breno Renato Strüssmann

Professional Skills:
Is a Brazilian mechanical engineer and has recently Finished his master’s degree in Industrial Engineering and Management at DTU.

Additionally, he has an MBA in Project management and has a 5-year experience as a design engineer within an international engineering company.

He recently finished his Masters Thesis in a project for FL Schmidt, developing a structured approach to improving pricing accuracy for their existing CPQ solutions.

He is currently engaged in a PHD project under the supervision of expert researcher in the field of mass customization, Lars Hvam (DTU).

He is very keen on helping businesses thrive and prosper through real life application of his mass customization skills learnt at DTU.

4 Learn More...

If you found the above informative and want to know more you are most welcome to book a free 30 minute consultancy call:

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