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BRICKS AND CLICKS

NEW ECONOMY FOR THE MANUFACTURING INDUSTRY
COLLABORATION BETWEEN E-COMMERCE
AND ON DEMAND MANUFACTURING

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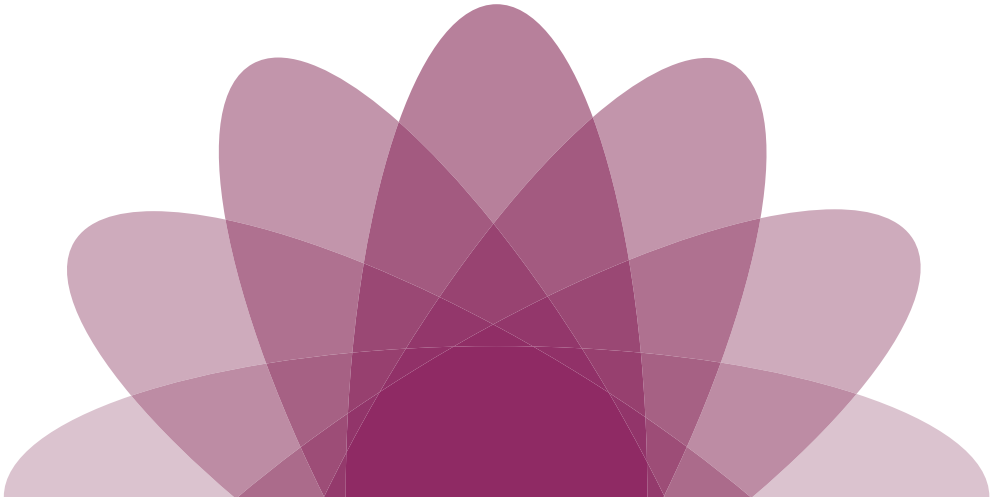

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EXECUTIVE SUMMARY

Competing with mass production and economics of scale used to be a challenge especially for SMEs, but nowadays also for big European and USA companies as well. They all are confronted with low cost and mass production from Asian countries. The rising trend of mass customization offers an opportunity, but also a big challenge for European companies, requiring different methods, resources and strategies for manufacturing and communicating with their customers.

This article explains how companies can compete and disrupt business models of sectors: By integrating and making optimal use of automated manufacturing and e-commerce; allowing for on demand and personalized products; reaching a worldwide market through the internet.

The most well known example is Nike ID (with a configurator to design your own Nike sport shoe with delivery to your home), with over 15 million people in their online community, surpassing $ 100M sales in 2010.[1] Nike achieved to make a profitable business from e-commerce combined with on-demand production.

Apple, Adidas and Levis have been successful in implementing mass customization, but revenues are still not flying. Also car manufacturers have started to take up the offerings of personalization of attributes of their car offers. Other examples are from the printing sector.

The extreme on-demand manufacturing is the currently booming trend of 3D printing. Companies like Ponoko, i.materialise, Shapeways and Sculpteo are able to manufacture your design and deliver it worldwide. However, though it is a hype, still there are lots of limitations considering materials, costs and sizing of the products to be printed.

The main obstacles to get a business with good profits from combining e-commerce with on demand manufacturing are said to be distribution, logistics, product complexity (and related manufacturing flexibility) and good internet marketing and different customers relation strategies.

The authors of this article are involved in a very successful case of integrating e-commerce with on demand manufacturing: ***casebuilder.com***. A Dutch SME, manufacturing flight cases on demand, enabling their costumers to design their own flight case with a very user friendly and smart configurator and get them delivered within 5 days. Their proof of success is reflected in their growth rate; from €100K to €4M in three years, with similar growth of profits. They are market leader in the Netherlands, on the way to become market leader in Germany, opening in Spain and France and are ready to conquer Europe.

Combining a smart configurator, with smart automated manufacturing, smart E-commerce management (with good SEM and SEO strategy (rankings in Google)), and smart logistics makes **Casebuilder** a disrupter in its sector, converting a local «niche market» into a worldwide «mass customized market».

The **Casebuilder** case shows how Manufacturing SMEs can become market leaders integrating their manufacturing capacities and knowledge with e-commerce knowledge and the adequate product design approaches.

1 *Internet Retailer*; june 2010.

THE CHALLENGE FOR THE EUROPEAN MANUFACTURING INDUSTRY

Hard competition from Asian and other low cost manufacturing countries make the European manufacturing industry suffer and many companies have to either close or move their production resources to these countries.

New manufacturing technologies enabling the digitalization of manufacturing with 3D printing as an extreme, is announced as the third industrial revolution.[2] Mass production to gain economics of scale and low costs is no longer the solution to compete in increasing demand and high variety driven markets.

«Mass customization» already started to become the future vision in 1992, but now seems to be the (reborn) buzz word and solution for European manufacturing industry to survive and retake the lead.[3]

The Internet has empowered the customer, offering greater transparency, comparison of products and a rising trend of giving the customer a voice and vote on how products should be designed and delivered.

Mass customization combined with the rise of e-commerce means a big opportunity for the European manufacturing industry but at the same time a big challenge and adaptation of their current structures and resources. It is easy to say, but difficult to execute. It is essential to find the right balance between the possibilities of offering personalization to your customers and at the same time maintain reasonable margins and a profitable business.

Mass customization and implicit agile manufacturing has been a hot topic for many years. Pine and Markell already pointed out that mass customization require not only agile and fast manufacturing capacity, but it needs a company to adopt a whole agile enterprise concept.[4] [5] Furthermore, David J. Gartner worked out a complete company strategy to transform a company from mass production to mass customization, putting high emphasis on the importance of tackling all the business aspects in order to have it successfully implemented.[6]

One step further is the combination of mass customization with e-commerce, requiring not only an agile enterprise concept, but also an internet based company thinking. It is the ultimate integration of agile manufacturing with one to one marketing thinking. Not only new and flexible manufacturing capacities, but also new forms of product design, new ways of communication with customers (implying them in the product design), new ways of distribution and logistics and new ways of organizing a company.

Considering that SMEs in general are more flexible and agile to change, the current trends of mass customization and e-commerce mean a huge opportunity for European manufacturing SMEs. However, it also means a major effort to adapt to the new rules to play in the new economy.

SOME FIGURES ON E-COMMERCE

E-commerce is a rising phenomenon with impressive economic values. In Europe e-commerce reached a turnover of €312Bn in 2012. France, UK and Germany stand for 61% of the total EU e-commerce turnover. And average growth rates are around 20% per year.

The more mature countries like Netherlands, UK, Sweden and Norway have a growth rate of 10 to 15%, but Germany, France, Italy and Spain are still increasing with 20to 25% per year, due to the still increasing number of internet-users and shoppers. The fastest upcoming markets are those of Eastern

2 *The Economist.* April 2012.

3 *http://blogs.forrester.com/jp_gownder/11-04-15-mass_customization_is_finally_the_future_of_products*

4 PINE II, Joseph: «Mass Customization: The New Frontier In Business Competition»; PINE II, Joseph ; H. GILMORE, James: *Markets of One: Creating Customer-Unique Value through Mass Customization.*

5 MASKELL, Brian: *Software And The Agile Manufacturer: Computer Systems And World Class Manufacturing.*

6 GARDNER, David J.: *Mass Customization: How Build to Order, Assemble to Order, Configure to Order, Make to Order, and Engineer to Order Manufacturers Increase Profits and Better Satisfy Customers* [Paperback]

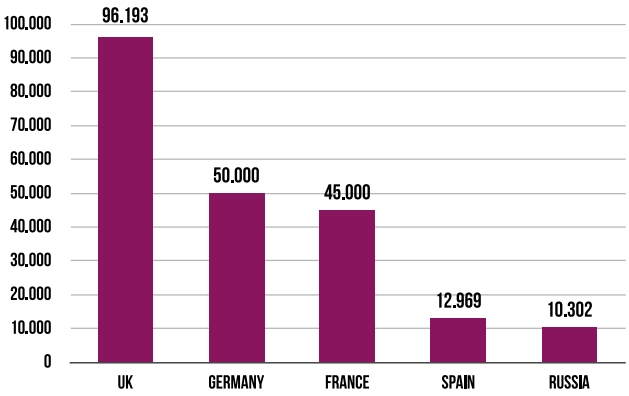
and South-East Europe: Russia, Poland, Ukraine, Turkey and Greece, with annual growth rates expected to reach 30 to 40% in the next years.[7]

Leading sectors in e-commerce growth and success are computer and electronics; books & music; video games and videos; with a new upcoming boom of fashion & apparel, decoration, furniture, shoes and hygiene and beauty.[8]

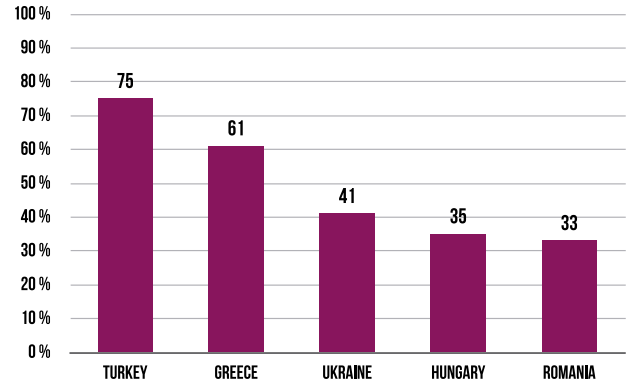
«E-tail» is now the most growing e-commerce sector. Against expectations of experts, arguing people want a physical shopping experience, e-commerce in retail (E-tail) is growing fast and showing spectacular results. With improved web technologies enabling enhanced presentation and internet experience of products, new e-tail concepts create similar or even better shopping experiences, leading to explosive growth rates.

This shows how originally off-line sectors are converted into successful online sectors, applying new concepts of packaging and offering of their products, using in a smart way the specific attributes internet technologies can bring nowadays.

EU TOP 5 COUNTRIES E-COMMERCE TURNOVER



TOP 5 EMERGING COUNTRIES E-COMMERCE GROWTH RATES



Europe is the biggest and the fastest growing e-commerce market in the world.[9] Moreover, the increasing coverage and speed of mobile networks foments this trend and offers even more opportunities.

E-commerce figures are promising and could mean a big opportunity for EU manufacturing industry; however, it requires different approaches and adaptation to the new economy rules and dynamics.

SOME EXAMPLES OF ON DEMAND MANUFACTURING & PERSONALIZED E-COMMERCE

Dell should be mentioned as the first IT company that broke the rules with customizable computers from internet, creating a whole new way of purchasing for consumers. Though Dell does not manufacturer but only assembles, they should be considered as pioneers of mass customization and ground breaking e-commerce in the IT sector. However, since 2010 Dell decided to simplify their offering and personalization possibilities as it became too complex to maintain good margins with customized offerings. Currently they offer limited customization options and leave the complete customizable options for premium customers.[10]

In the last few years Apple, ASUS, Sony and others have started to offer online customization of their IT products. Especially brands focused on gaming computers which offer customization to adopt their products to specific customer needs . An interesting initiative for specific needs is CITRIQ: *www.citriq.com*. A Spanish IT SME founded by musicians looking for better IT for music recording (competing with Apple computers normally used in this sector), cre-

7 Europe B2C Ecommerce Report 2013, e-commerce Europe, *www.ecommerce-europe.eu*

8 Mac Kinsey Infographics: *http://pinterest.com/cmsoforum/* and *http://www.linkedin.com/today/post/article/20130523114426-12921524-mckinsey-infographic-european-e-commerce-big-bang*

9 Europe B2C Ecommerce Report 2013, e-commerce Europe, *www.ecommerce-europe.eu*

10 *http://en.community.dell.com/dell-blogs/dell-shares/b/dell-shares/archive/2010/03/11/client-reinvention-building-the-most-flexible-and-effective-value-chain.aspx*

ating powerful and efficient PCs for an affordable price with the same or even better performance for recording.

Nike ID (*http://www.nike.com/us/en_us/c/nikeid*) broke the rules with its online sport shoe configurator, enabling users to create their own sport shoes, for a reasonable price and delivered at home. Nike gained in market positioning and also made important profits from this online shoe business, combining in a smart way its manufacturing capacities, their product design and an easy to use configurator.

Other sport shoes brands like Adidas (*http://www.adidas.com/us/content/miadidas/*) and Puma (*factory.puma.com*) followed, but with little economic success. Puma even had to close and re-launch its Puma factory customizable sport shoe website in order to reboot demand. The Spanish sport shoe manufacturer Munich launched its *My Munich* (*https://www.munichmyway.com/*) online sport shoe configurator very successfully through a contest in Face Book and repositioned itself as the leading fashion sport shoe brand in Spain, especially amongst the youngest target groups.

In the fashion sector several fast growing start ups have emerged since 2008, combining mass customization with e-commerce selling customizable fashion. Some examples are: female shoes at Shoes of prey (*www.shoesofprey.com*), enabling customers to design their own unique shoes with a simple configurator; the Oona Project (*http://www.project-oona.com*/) with a simple three steps (female) hand bags configurator; at Snap Totes one can design their own bag with a personal photo (*http://www.snaptotes.com/*); Blank Label (*http://www.blanklabel.com/fabric*) and Proper cloths (*http://propercloth.com/*) and Shirts My Way (*http://www.shirtsmyway.com*), all offer simple configurators to design your own (male) shirt. Many different sites exist to order your customized suit (*http://executive-image-consulting.com/homepage/top-10/custom-made-suit-online/*); highlighting Coco Myles (*http://www.cocomyles.com/*) offering a service to personalize bridesmaid dresses. Fashion Play for Girls (*http://www.fashion-playtes.com/*) is a website that successfully tackled the tweens fashion segment by offering a simple and user friendly configurator for kids to design their own clothes.

For Jewelry many sites are appearing to design your own jewel or personalize it for special gifts; Brilliant Earth (*http://www.brilliantearth.com/*) with an emphasis on responsibly-sourced jewelry and Blue Nile (*http://www.bluenile.com/*). Both offer three steps configurators to build your own jewelry with a main focus on rings. Gemvara (*http://www.gemvara.com/*) offers a wider range of design possibilities for different types of jewelry.

All these sides of fashion and apparel have created very simple, attractive and user friendly web interfaces creating a pleasant shopping experience, moreover fomenting social experiences by sharing and exploring designs of others.

However, one of the counter points of these sites are lead times of over two weeks to get your product delivered at home and some of them do not deliver worldwide.

The publishing and graphic arts sectors are changing dramatically with the booming rise of on demand printing and self-publishing of both paper and electronic books. Amazon is leading in on-demand printing of books and self-publishing with Create Space (*https://www.createspace.com/*) . Through online sales Amazon had an important increase in selling a wide variety of books, versus a decrease of traditional publishers offline book sales.[11]

Vista Print (*www.vistaprint.com*) is the best example of on demand printing of all kind of Business graphics. They originally started with an online service enabling customers to design their own business cards and delivered within 2 days. Vista Print is now world leader printing on demand worldwide all kind of

11 Europe B2C Ecommerce Report 2013, e-commerce Europe, *www.ecommerce-europe.eu*

business and personal printing materials, with an annual growth of 20% in the last few years. Their key to success has been to offer on demand printing easily and fast delivery at home or office, making on demand printing accessible to big masses.

More complex on demand manufacturing is increasingly happening in the car industry.

All known car brands (Renault, Porsche, VW, Audi, Mercedes, etc...) have their configurators that enable the buyer to compose and determine colors, accessories and other specific requirements. However, all from a controlled choice of options.

Also the food industry has started offering online on-demand production and delivery.

Chocri (*http://www.createmychocolate.com/*) claims to be first and only chocolate factory where you can personalize your own chocolate bar and get it delivered at your home within 2 to 3 weeks.

Online personalization, purchase and pick up from the shop service for birthday cakes are offered by several department stores like HEMA in the Netherlands (*http://www.hema.nl/winkel/eten-en-drinken/gebak/taarten-en-gebak-met-eigen-foto*) and Marks and Spencer in the UK (*http://www.marksandspencer.com/Personalised-Cakes-Food-To-Order-Food-Wine/b/72562031*).

The German founded SME My Muesli (*http://uk.mymuesli.com/*) enables customers to compose their own muesli with a broad choice of ingredients, delivered at home within 4 to 5 days, at a competitive price.

All these examples are companies that have started between 5 and 10 years ago and are still strong and have overcome several obstacles as some of them mention in their histories. Others with similar activities did not survive and could not overcome the obstacles of reaching the mass and achieve customization with a sustainable business model and margins.

The latest trend, with all companies in a startup phase, is the booming hype of 3D printing, being the perfect formula for combining e-commerce with on demand manufacturing. However, opinions differ on if this trend will further stay strong or if it is only a short term hype. The main and most known e-commerce companies for 3D printing are Ponoko (*www.ponoko.com*), i.materialise (*http://i.materialise.com/*), Shapeways (*www.shapeways.com*) and Sculpteo (*http://www.sculpteo.com/en/*), all offering similar platforms where designers can create, print and sell their creations.

The aforementioned examples, the promising figures on e-commerce and continuously decreasing costs of advanced manufacturing technologies offer big opportunities for European manufacturing industry... as long as they adapt to these trends and take advantage of them.

CASEBUILDER.COM – BEST PRACTICE SHOWING THE FUTURE FOR EU MANUFACTURING SMES

SHORT INTRODUCTION

Casebuilder is a Dutch SME offering an online smart and very user friendly configurator enabling their customers to compose their tailor made flightcase. However, different from previous examples **Casebuilder** has broken away from existing standards in its sector by, for example, reducing its delivery time from 4 weeks to 5 (working) days. Also, **Casebuilder** has simplified the order and purchasing process for flightcases. Making a product that used to be difficult to purchase, extremely accessible to anybody and therefore opening new market segments, never served before in its sector.

JOINT VENTURE – MULTIPLY VALUE, SHARING AND MERGING EXPERTISE

casebuilder.com is a joint venture between a small flightcase manufacturer Proflite (*http://www.proflite.eu/*) and an e-commerce agency Orange juice (*http://www.orange-juice.nl/*). The first contributes its expertise in both construction of high quality flight cases and highly automated and optimized manufacturing techniques. The second contributes its expertise in building smart and highly user friendly configurators for internet and marketing on internet.

THE PURCHASE AND MANUFACTURING PROCESS – SIMPLE, EASY, FAST AND EFFICIENT

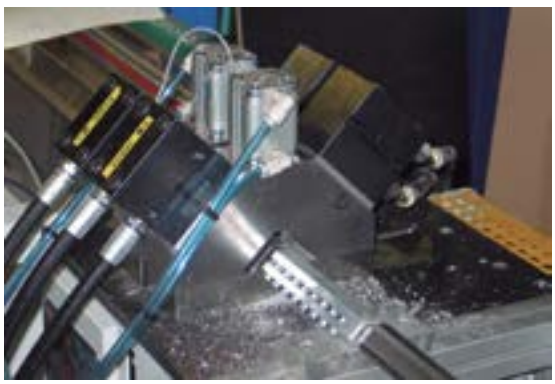
The customer designs their flightcase in the online configurator, specifying the required measurements, materials, colors and hardware options. The configurator guides the customer through the design process, with tips and recommendations for configuration, enabling the design process to the customer and at the same time guaranteeing an optimal quality design. It takes on average 10 to 20 minutes to compose your (unique) flightcase. The customer can choose to have the flight case delivered as a build it yourself package or already assembled for a slightly higher price.

The configurator was built through an intensive collaboration between flightcase builder experts of Proflite and internet experts of Orange Juice. In order to have an internet friendly configurator it was essential for the flightcase manufacturer to understand the need for simplifying the product. It was a continuous battle between understanding the attitude and the real needs of an internet user and all the options and attributes the manufacturer could and would like to offer. This was a process with many discussions between manufacturer and internet e-commerce builder, but essential to come to a simple internet focused product design and offer.

Once your flightcase is composed, with a simple click on order, the purchase order is send directly to the CNC machinery on the production floor and is planned in the production workflow. This process is fully automated and guarantees optimal use of materials (panels and profiles), high quality control and minimal use of human resources for production.

The CNC machines were «tuned» and adapted by the experts of Proflite in order to enable one by one production of the flight cases and at the same time keeping production flow and efficiency optimal. The whole production software has been built on top of the software delivered with the CNC machines. Special adaptations were made by the experts of PROFLITE, as the CNC machinery supplier was not capable to adapt the machines to their requirements. (The CNC machinery supplier even mentioned that is was impossible what they wanted to do with the machines!). Furthermore they bought a second hand machine and completely adapted it to be able to drill and cut the aluminum profiles one by one, each with different specifications.

Therefore machinery investment was kept low, though many hours were invested in the development of the software adaptations.



The last step is the delivery of the build it yourself package or the fully assembled flight case. Thanks to good deals with logistics companies **Casebuilder** can deliver their flightcases to the customers within 5 working days in the Netherlands and Germany. Moreover, nowadays, as they are having large volumes they get even better rates for transport. However, at the beginning they had to sacrifice some of their profit margins to make transport costs acceptable for customers.

DISRUPTING THE SECTOR WITH A NEW BUSINESS MODEL

Casebuilder has disrupted the dynamics and established «rules» of the flightcase manufacturing sector. This sector should be considered as an «old school» sector, with on the one hand many small workshops making small batches of personalized flightcases (as Proflite used to be) and on the other side big manufacturers (many from China) producing standard sized flight cases at low prices (and sometimes low quality).

With the smart configurator and effective internet marketing (SEA and SEO), **Casebuilder** makes flightcases very accessible and brings them closer to their (potential) customers. They do not need to look for customers but customers find them, opening up new segments that would never have purchased a flightcase before.

With the optimized production capacities and logistics **Casebuilder** can deliver a flightcase within 5 days, also triggering new clients with more urgent needs for flightcases. Moreover, clients can order only one flightcase, exactly made to their requirements.

All, with a minimal need of human resources and an optimal use of raw materials. Therefore, with good margins to make their business very sustainable.

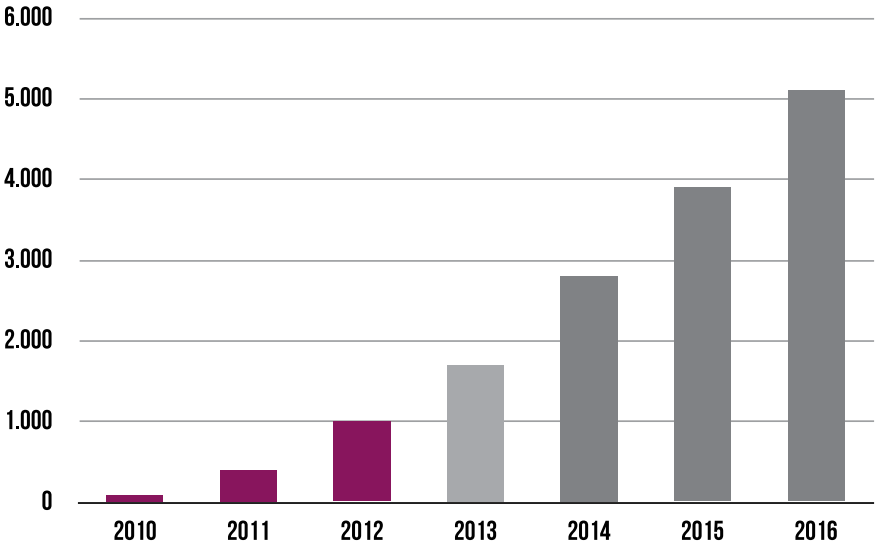
TRADITIONAL FLIGHTCASE PRODUCER SECTOR	CASEBUILDER.COM NEW BUSINESS MODEL
Batch or mass production →	On demand production (of just one flightcase)
Sales people →	Webshop
Known and activily look for customers →	Customers searching/find on the web
Complex ordering process (for client) →	Online configurator — very easey for client
Order intake / work preparation →	Workflow automated
Delivery time 3/4 weeks →	Delivery time 5 working days
Offline marketing →	Online marketing
High % of labour cost per case →	Low % of labour cost per case

GROWTH FIGURES AND EXPANSION

Casebuilder started in the Netherlands in 2010 and is now operating in Germany, Belgium, Spain and France, aiming to become the European leader of on-demand flightcase delivery.

Casebuilder disrupted the markets in the Netherlands and Germany, taking the lead in these countries with other manufacturers losing market share.

Due to the smart configurator and a highly efficient internet marketing (SEA and SEO) **Casebuilder** has left its competitors behind. As the sector is an old school sector, competitors still do not realize how they can benefit from e-commerce and on demand manufacturing. Therefore **Casebuilder** does not expect competition in the short term and aims to be a European market leader before competitors can react.



CONCLUSIONS: KEY SUCCESS FACTORS FOR APPLYING THE NEW ECONOMY TO MANUFACTURING SMES

As mentioned before, e-commerce combined with on-demand manufacturing could offer great opportunities for the European Manufacturing industry, especially for SMEs. Actually, the authors think that this new concept could save many of the manufacturing SMEs from dying in the global competitive economy.

From the examples we have shown and especially the Casebuilder case example we have extracted some key factors to successfully implement the new economy dynamics in European SME manufacturing companies.

OPEN AND FOCUS ON «NICHE MARKETS» – TAILOR MADE CRAFT PRODUCTS

SMEs should build on their possibility to be flexible and serve a unique product. Instead of competing with low cost strategies, SMEs should go back to craftsmanship and offer those products that big companies cannot offer.

Using highly advanced manufacturing technologies enabling tailor made products at a competitive manufacturing cost combined with a webshop, enables SMEs to adopt a niche market strategy and access to the world market with their unique tailor made product.

The main added value should be in the possibility to customize the product and at the same time offer high quality for a competitive price.

Those SMEs that adopt this innovative strategy in traditional markets («old school») will leave their competitors behind and have great opportunities to become market leaders.

GOOD E-COMMERCE MANAGEMENT COMBINED WITH GOOD PRODUCTION RESOURCE MANAGEMENT

Companies should reorganize and reconsider their resource assignment. Sales forces should be focused on internet marketing with good SEA and SEO strategies. The company should be prepared and aspire to reach and serve the global market.

Production resources should be focused on automated workflows, integrated with the order flow.

Companies should put a major effort on integrating the traditionally separated world of sales and manufacturing. It is essential to have an optimal integration of the e-commerce order and purchasing processes with the manufacturing processes, to reduce lead times and failures in the execution of orders.

Through good internet marketing large groups of consumers will be attracted. Combination of all those individual orders will create small batches for production on-demand. Therefore, through smart management of orders combined with flexible production capacity, raw materials can be used optimally.

«INTERNET AND E-COMMERCE THINKING» FOR PRODUCT DESIGN

Further building on the design thinking approach for product development, putting the needs of the consumer/user first, for e-commerce it is essential to design your product for the internet user and to bear in mind all the possibilities and restrictions of selling through internet.

Apply e-commerce /internet thinking to product design: keep it simple! Internet users want simplicity and fast results: «1,2,3 configure and buy» .

Traditional Manufacturing companies still use to think from a product and manufacturing view. Their point of departure is to think of all the possible features and attributes they can manufacture, offering many different options to their clients.

Even though (user centered product) design thinking starts to be more common also in manufacturing SMEs, for e-commerce, products should be designed by the internet rules.

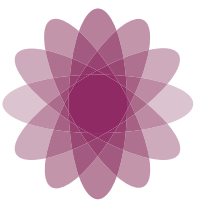
Manufacturers should learn to downsize their product and offer minimum but sufficient choice of options. The right balance should be defined between the minimal and maximum choice of features. Applying the 80-20 rule, manufacturers will find out that mostly a maximum of 20% of their customers will want all features, however the 80% of customers only get confused by too many options, especially when we are talking about internet users.

The «internet thinking» is one step further, designing the product building on and taking maximum benefits from the internet possibilities. Internet users look for transparency, fast access, guidance and at the same time freedom in choice, comparison and benchmarking, complementary information, social networking and simplicity.

EXTREMELY ACCESIBLE PRODUCT

Make the product extremely accessible: this is not only by exposing it on the internet and doing excellent internet marketing, but especially by making the purchase and delivery process extremely simple, easy and fast. In many cases the order process for personalized products is very complex, forming an obstacle for the less specialized customer to access to the product. In order to reach the «mass customized consumer», the order process should be very easy.

Thanks to improved technologies, nowadays smart configurators can be developed at reasonable costs. However, a mayor effort should be made in developing the configuration, purchase and delivery process and steps; integrating and combining the expertise of product, e-commerce, internet and logistics experts.



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