

ACCELERATING IDEA TO MARKET PROCESS IN MANUFACTURING INDUSTRIES

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Abstract: Traditional European manufacturing industries overdesign an engineer products before their commercialization. Product idea, concept, design and engineering are done in multiple stages, many times even without analyzing the real end-user needs and requirements. At the same time in ICT sector and software industries, especially in cases of start-ups, time to market process is really fast, or otherwise business opportunity might be lost. This study indicates four stages how to accelerate idea to market time in manufacturing industries, by combining lessons learned from startups and lean methodology.

Keywords: engineering, time to market, acceleration, manufacturing industries

INTRODUCTION

The product design and engineering in manufacturing industries has been the way to competitive edge, when looking for a next generation product innovations. Earlier, in the 70s-80s the manufacturing industries focus was on the streamlining and speeding up the production. Toyota's focus on quality, eliminating waste, and continuous improvement through Kanban, made the Toyota Production System benchmark for lean production globally [1]. Since then, lean has been several times a trend in manufacturing industries and surely some companies are continuously following lean principles. Womack and Jones (1996) have identified the lean principles, starting from specifying customer value, identifying value streams and then streamlining material flows, as seen in following table [2].

Table 1 – Five Lean Principles according Womack and Jones, 1996 [2]

Principle	Description
Value	Specify the value desired by the customer
Value Stream	Identify the value stream for each product providing that value and challenge all of the wasted steps currently necessary to provide it
Flow	Make the product flow continuously through the remaining, value-creating steps
Pull	Introduce pull between all steps where continuous flow is impossible
Perfection	Manage towards perfection so that the number of steps and the amount of time and information needed to serve the customer continually falls

By now, lean principles have become also important for general management, and other disciplines like IT development, which make use of lean concepts but transfer them also to nonmanufacturing contexts [3]. Not only the lean thinking but also agile project management methods has been widely taken in use to large-scale and distributed projects. Agile project management focused on four core values: customer collaboration, iterative development, self-organizing teams, and adaptability to change [4]. Together lean thinking and agile methods have been successfully applied to product development at startup companies, which is called the lean startup methodology [5]. However,

many lean startup principles may also be of benefit to established firms.

Traditional manufacturing companies have successfully implemented lean and agile methods for production and supply chain management, but at the same time product innovations, design and engineering are done in multiple stages, without any lean and agile methods. Development of complex, industrial products and services requires several engineering, operative, marketing, etc. skills for making continuous trade-offs and successful design decisions, additionally each customer delivery might include tailored and specific parts [6]. Time to market takes typically even years, as manufacturing industry companies are executing their business plans and realizing fully functional prototypes [7]. Actually, European companies are over designing and engineering products before commercialization. This study indicates best practices and defines four stages how to accelerate idea to market time in manufacturing industries, by combining lessons learned from software industries and lean methodology.

RESEARCH DESIGN

The aim of the study is to discuss the challenges that manufacturing industries companies are facing in their product innovation processes and engineering. The study seeks the answer in the question: how to improve mature companies' product innovation lifecycle in traditional product-based businesses? The study is a part of the large-scale research project creating product innovation cycle for different industries. However, the results have been analyzed so that the method can be used in manufacturing industry. The study is based on the state-of-the-art of innovation processes in startups from the literature review and on the empirical case data evidence from the multiple case studies. The qualitative case study research approach was chosen in order to gain both theoretical and empirical insight into the mature companies' innovation culture, especially in product innovations [8]. The outcome is a four-stage innovation lifecycle model for mature companies improving their product innovation speed and strategic development as well the daily operations by utilizing lessons learned from startups.

INNOVATIONS AND TIME TO MARKET IN STARTUPS

The OECD (1991) definition for technology innovation: “an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention” [9]. Later, OECD (2005) has broadened their definition “the implementation of new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” [10]. Innovation is the core for the startup, as they have to provide something new for the market, or otherwise their existence is questioned. In the cases of startups, time to market innovation process is really fast, or otherwise the entire business opportunity might be lost. In product development, the Minimum Viable Product (MVP) is a product with just enough features to gather validated learning about the product and its continued development [5]. The concept of MVP is well known for startups, but hardly heard by mature companies’ employees. Startups are focusing to solve some customer problems and create business model to solve that customer problem. Only then startups are developing real product, and firstly MVP. For existing companies, it’s different. Companies that have a business plan how to operate, and product innovations are done in linear or step-by-step methods. Product should always fit or support existing offerings. That makes it more difficult for mature companies to improve competitiveness and create something unique.

Table 2 – Different types of innovations [11]

Innovation type	Important	Typical	Challenges	Questions
Technology	Invention, R&D, research cooperation	Newness, creativity, knowledge	How to embody into products, services and processes	What is possible?
Product (good & services)	Need identification, concepts, development process, network utilisation, user involvement	Newness to user, changing, improving, combining, user driven	Timing	What is needed?
Process	Way of doing things, network	Changing, improving	Readiness for change, inter-organisational processes	How?
Strategy/business	Business models	Distribution of work in network	Changing mind set, ecosystem building	What business are we in? Who are our customers? What are we offering and with whom?

Product innovations are not the only type of innovations in startups or mature companies. Accelerate project has indicated different types of innovations, in table 2 [11].

Actually, even startups should yield different types of innovation, but different innovations need different capabilities. Comparing SME and start-up companies to large,

mature company’s in their innovation capabilities Accelerate-project find differences but also many similarities. If caricaturise SMEs, they have are more innovative in new ideas stage of the process, as their success is also strongly dependent on innovations. They are flexible and employees are generally enthusiastic about future possibilities, entrepreneurship is natural for them. Same, if caricaturise large companies, they have resources, both monetary and knowledge. Large companies have large networks relationship and processes to co-operate with other companies, universities and other ecosystem partners, which makes them better opportunities to innovate if they will. [11]. When looking at the operations, startups are more customer oriented as mature companies. The idea behind the Lean startup method is that in addition to a process for “product development”, a startup also needs a process for “customer development” to find and understand the customers [12]. This leads to developing solutions based on a user-centered approach and adapting to customer needs. Lean, agile and customer orientation is the way to success in startups, but these ideas are usually lost when company grows and get older.

NEW METHOD FOR ACCELERATION IDEA TO MARKET IN MANUFACTURING INDUSTRIES

This study indicates best practices and defines four stages how to accelerate the idea to market time in manufacturing industries, by combining lessons learned from software industries and lean methodology. Acceleration or acceleration of innovation is not a common term, and here the study understands acceleration as accelerating innovation go-to-market and commercialization [11]. Acceleration is a combination of means: processes, tools and methods, which help companies go faster to the right markets [11]. So many times can be heard from the practitioners that they have growing pressure to make product development and production more efficient to aiming for profitability. In addition, practitioners in manufacturing industries are saying their products are increasingly complex, often with high engineering content, and they need to improve product quality continuously. It is time for mature companies to change their innovation culture towards their origins, the way successful startups are innovating. According to Steve Blank (2005), most new product development ventures fail not because they lack a product, they fail because they lack customers and a profitable business model [13]. Companies in this situation should focus on searching for a product-market fit and a sustainable, scalable, profitable business model [13]. An essential product innovation activity at this phase is customer development: a systematic approach for identifying and validating assumptions about customers, their problems, product features as a solution to their problems. In cases of mature companies, the business model is not typically changed. Mature companies focus on the development of new product, which does not actually bring competitive

advantage today. Actually, product innovation should be continuous and lean process, depending on the actual stage, which the Accelerate project has indicated: Idea stage, Problem/Solution Fit, Product/Market Fit, Scaling (see table 3) [11].

Table 3 – Different stages of acceleration [11]

Idea stage	The focus of the Idea stage is to find a problem worth solving and understand it in detail. The problem must be important enough to create a solid foundation for a new business. In this phase the initial concept and vision of the business opportunities are specified, and people needed to get the development work going are gathered. The main activities in this stage are research, ideation and exploration.
Problem/ Solution Fit	In the Problem/Solution Fit phase, a solution with real demand to the earlier identified problem will be specified. At least one real customer needs to be found before going further from this phase. The main activities of this phase are the development and validation of a Minimum Viable Product (MVP) and its value proposition.
Product/ Market Fit	The Product/Market Fit phase focuses on validating your solution, market strategy and business model. It was enough to find one real customer in the solution discovery phase, but now the aim is to acquire and retain more customers to prove that your business model works. The key activities in this phase are generating a business model and testing it.
Scaling	The Scaling phase focuses on growth and it is the final step. You will get ready to scale-up and to find ways to grow quickly. This is the phase where you will reap the results of the work and investments made in the earlier phases.

The study has indicated that acceleration should be a continuous cycle. Same company can have many cycles at the same time, as product innovations might be in different stage or part of the different product lifecycles (Figure 1) [14].

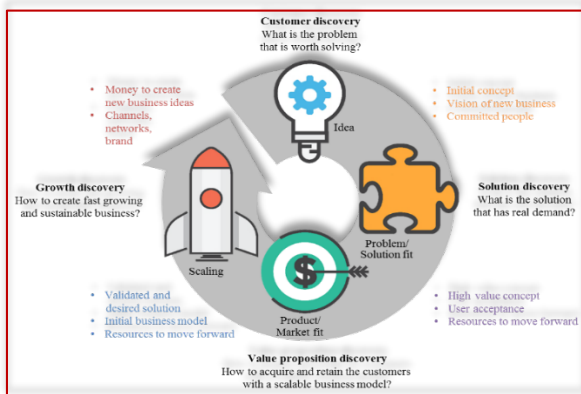


Figure 1 – Different stages of acceleration, according Acceleration stage-model [14]

To help companies identifying all required aspects in acceleration stages, the Acceleration - project have developed a self-test, which is available online [14]. Test helps companies to evaluate the status of product or service innovation development and gives ideas of how to proceed successfully from an idea to a scaled-up, profit generating product or service.

Starting from the Idea stage, companies should have a deep understanding of the customer need or problem, and data or evidence that proves its criticality and how the idea fulfils it in a new way. The idea should be documented and

development activities so far to support further development. Practitioners should identify, based on data or evidence, why it is now a good time to solve the need or problem. In the Idea stage is also needed to have initial understanding how company will generate revenue from the solution to be developed. Innovators should have looked at the existing solutions and to know that competitors do not provide the value that our customers consider important. The core team of people with versatile skills (i.e. technical, teamwork, communication etc.) should be committed to take the idea further, and have the time to improve it. They have and we know where to acquire the missing skills.

In the Problem/Solution Fit stage, a company should have defined the initial functional, economic or emotional customer value of the solution, and have built or are currently building a prototype or demo to make the idea concrete. A product owner and team are committed to take the idea into further development and they have resources for it. End-users should be involved in testing the idea and know what input needed from them. The initial KPIs should be set to measure development progress and go-to-market of the solution. Necessary funding should be indicated to validate prototype or MVP. The company should have an understanding of the earning logic of the solution. It may be a direct price or an indirect revenue model.

In the Product/Market Fit, company should have extensively validated prototype or MVP value proposition, and have evidence and data, such as customer feedback to prove its success. They have defined focus markets and customer segments, and planned how to test and validated our solution in them. Different earning logics should be validated and have a cost structure that both funding partners and company accept. In this stage the marketing and distribution channels and strategies is defined, which allow future customers to know new solutions and to get them. Initial business model is defined in this stage and planned how to test it. Mature companies might need to change their existing business model.

In the scaling stage, companies should have ensured that have the needed personnel resources and competences for scaling, such as maintenance, after sales services, marketing, sales, and technology. As well channels, which allow customers to know about our solution and acquire it. At this point companies should have reliable way of controlling costs and avoiding cash flow problems.

CONCLUSIONS

A lean product development helps companies to launch products that customers actually want, and more quickly and cheaply than traditional methods [7]. To ensure survival and growth, mature and even large companies need to keep inventing new business models [Blank]. There are many differences in startups operating lean and traditional methods of operation. Traditional manufacturers have usually long technology development cycles, which actually has been one of the main reasons for startups to failure [7]. New

ventures launch products that customers actually want, far more quickly and cheaply than traditional methods [7]. Actually traditional companies built the product iteratively, or fully specify the product before building it [7]. By that way cannot be sure that customers are getting product they want. Our model suggests improving design, engineering and product launch time in traditional companies. Blank (2003) have indicated the main differences between Lean and Traditional methods (Figure 2) [7].

Lean	Traditional
Strategy	
Business model Hypothesis-driven	Business model Hypothesis-driven
New-Product Process	
Customer development Get out of the office and test hypotheses	Product management Prepare offering for market following a linear, step-by-step plan
Engineering	
Agile development Built the product iteratively and incrementally	Agile or waterfall development Built the product iteratively, or fully specify the product before building it
Organization	
Customer and Agile development Teams Hire for learning, nimbleness, and speed	Departments by Function Hire for experience and ability to execute
Financial Reporting	
Metrics that matter Customer acquisition cost, lifetime customer value, churn, viralsness	Accounting Income statement, balance sheet, cash flow statement
Failure	
Expected Fix by iterating on ideas and pivoting away from ones that don't work	Exception Fix by firing executives
Speed	
Rapid Operates on good-enough data	Measured Operates on complete data

Figure 2 – What lean start-ups do differently [7]

This paper may contribute to a better understanding of challenges that are related to accelerating time to market in manufacturing industries. Lean methodologies, agile and customer orientation may help entrepreneurs to run their business successfully and especially for improving their innovation projects. Traditional manufacturers should implement leaner and agile methods, improve their business model and decrease time to market continuously. Customer feedback should be collected in any earlier phase than traditionally. Minimum Viable Product concept might not fit in every high-tech product, but most of the product innovations can be presented for potential customers as early as the prototype phase. It is time to stop over-engineering in manufacturing industries. Listening to the customer is the key that startups do when validating a business model [7].

The presented process model of acceleration stages is intended as a step towards a better management of time to market processes. Future work will include the application of the suggested acceleration stages in manufacturing case studies, in order to validate its advantages compared to traditional product innovation and time-to-market processes.

Note

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