

LEARNING FROM UNICORNS

How the Lean Startup Method combined with Agile Practices can be adopted by large firms and result in higher digital product innovation.

Enablers and blockers of this adoption.

Copenhagen Business School

Graduate Program of Innovation Management - HDIM 2018

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Abstract

In the last decade many industries have adopted innovation practices that introduced digital products in their markets; these have gained a significant traction and market share and in some cases have disrupted entire industries (Netflix case vs blockbuster).

Within the assets driven industries like shipping, this phenomena is yet to create a disruptive effect. However, many new entrants and unconventional competitors are starting to explore these sectors to potentially disrupt them.

These new entrants are fast in prototyping and creating new products and services; they simplify customer journeys and experiences; they offer simpler and more attractive digital products; they explore new business models. These new entrants are posing a serious threat to the shipping industry.

The new ways of working and innovating have emerged in the startup scene. Large firms have looked at the effectiveness of how these smaller and less bureaucratic firms operate and innovate and have tried to adopt their practices.

In this study we investigate how a large firm in the shipping industry can learn and adopt startup practices and adopt these for higher digital product innovation. We identify possible blockers and enablers of innovation and we discuss our findings and conclusions. We interview 5 people from a well established incumbent in the shipping industry and we combine this primary data with secondary data from surveys, statistics, and from case studies published by consulting firms.

Introduction

The rate of change in business has never been higher. It is hard to imagine that the current incumbents will be here for more than 20 years. Most of today's Fortune 500 listed companies are in danger. A study from the John M. Olin School of Business at Washington University estimates that 40 percent of today's Fortune 500 companies will no longer exist in 10 years.

Focusing on what large firms know and master is not enough anymore to innovate, especially in the digital area. Many studies have been conducted on the adoption of new practices and methods that can help large firms to innovation.

Some have focused on the adoption of Lean Startup in large firms (H. Edison et al., 2018) summarizing the inhibitors and enablers.

In the paper "Reinventing the wheel" (Antonio Ghezzi, 2017) we learned how incumbents can reinvent their business by learning from the past; since they have loyal customers, assets, and resources, it is by reinventing the past that they can create new products and services.

Usually startups aim at having a "big bang disruption effect" (Downes, L. and Nunes, P. (2013), "Big bang disruption", *Harvard Business Review*, pp. 44-56.) rather than an incremental innovation approach. Yet, both worlds have something in common: the need to find new products and services in the fastest and more effective way.

Others (Thomas Kohler, 2017) have focused on the use of corporate accelerators as sources of innovations and new product developments. Whilst these are valuable sources of innovation, they tend to create two cultures and fail in really transforming the core of the company.

Whilst Incumbents have tried to replicate the startup practices and innovation processes in their own firms with a variable degree of success, many have argued that startups are a valuable source of knowledge (Dushnitsky & Lenox, 2005); large firms should explore and exploit whilst learning from them.

Cooper, R., & Sommer, A. (2018) argue that agile methods and stage gates applied in large manufacturing firms provide some level of benefits in terms of team morale, time to market, as well as faster response to change.

Despite some have researched the topic of how large firms can learn the start-up practices, this area is yet to be understood and well explored.

Large firms struggle to implement startup practices successfully. Some of these practices include organizing the teams in smaller and cross functional teams with specific business goals; adopting a seed funding model within the firm; creating a knowledge sharing experience with

guild and communities; creating a new collaborative environment and office space; organize in a more flat structure and delegate decision making to the frontline; create an entrepreneurial mindset and allow the teams to experiment, and the adoption of the Lean Startup method. We have found that most of these studies address some areas but do not explore in deep the implementation of these practices in large asset driven firms like Maersk. We find this topic genuinely interesting and challenging. Many companies like Maersk are starting to move towards a more exploration driven approach rather than exploiting the current business. Large firms have realized that they have optimized their current business for decades and there is a need to create new revenue streams from completely digital products and services. They also know that they have many advantages compared to startups; a well established customer base, a reputable brand, knowledge in the operating industry, and huge amount of unexplored data.

Firms like General Electric have already undertaken a leap into their transformation initiatives and have created a great deal of revenue from their digital products like Predix. Other players in the financial service sector have completely transformed their operating model by embracing Agile and Lean Startup practices (<https://hbr.org/2016/05/embracing-agile>).

We find that the shipping industry is at the start of this transformation that is driven mostly by the recent threads coming from the outside.

Few players from the startup scenes are entering the shipping industry (Flexport). Large firms like Amazon are experimenting with new technologies like self driving vessels. The shipping industry is known to be well behind in the digitization area. Non refrigerated containers are still not equipped with digital devices; vessels have limited connectivity; container port movements are still planned manually; customer journeys are not optimized at all. There is a strong appetite to disrupt this industry.

Whilst this industry plays a fundamental role in global trade, we find that there are huge opportunities in the digital area. The humongous amount of data that is unexplored and not utilized can create global and local opportunities.

To do so, we believe that firms like Maersk need to start learning from Unicorns, small startups that have grown to company valuations of millions of dollars. These players have succeeded also because they mastered the Lean Startup Methods and Agile practices. We find interesting to understand the adoption of these practices, the enablers and blockers of this adoption in Maersk, and generally in large asset driven firms.

Therefore in this study we address the research question:

1. Can the adoption of startup practice by large firm result in higher digital product Innovation?

Followed by the questions:

2. *What are the inhibitors and blockers of a successful adoption of the these practices?*
3. *How can large firms like Maersk successfully adopt these practices for product innovation success?*

In particular, we focus on exploring why certain practices of digital product innovation that are very successful in start-ups, fail when replicated and implemented in large firms. These are the Lean Startup Method combined with Agile Software Development Practices.

By studying Maersk, the largest shipping firm in the world, this thesis aims at discovering what should Maersk do to successfully implement these practices.

We interviewee 5 people that work with Digital product innovation at Maersk and that can provide insights on the enablers and blockers of the startup practices in focus. Three of the interviewees have also worked for a large asset driven company in the United States and have extensive knowledge of the startup practices in scope. We combine this primary data with secondary data from consulting firms and research papers.

Our study contributes to the existing knowledge and potentially helps large firms in successfully implement the startup practices and ultimately create new digital products that will create new revenue streams.

Startup Practices in Scope

Maersk has introduced the new practices aimed at achieving speed and innovation in the digital transformation. These practices are derived from the principles of the Agile Manifesto, the Scrum Framework, and the Lean Startup Practices. There are multiple reasons for introducing this new way of working. The need for a faster and iterative product development where customers are presented with a working product at every iteration and not only at the end of the development. The current industry outlook, ever-changing and unstable. The Maersk T&L strategy of customer centric business solutions; the need of a new mindset and method that can empower cross functional teams to own and develop the product from start to end and deliver value faster (reference New new product dev game). Below we find introduction about the methods. Since the two methods have been combined into one operating model, we will also detail and describe this model.

The Lean Startup

The Lean Startup approach had been defined by Eric Ries as a new way for entrepreneurs to quickly assess a business idea and prove the potential on the field by implementing a build-measure-learn continuous loop. This practice is by far the most adopted practice in the start-up scene and has gained a lot of attention in the last decade.

(Eric Ries, *The Lean Startup: How Today's Entrepreneurs use Continuous Innovation to Create Radically Successful Businesses*, Crown Books). This method has gained a lot of attention and has been implemented in many industries. It requires that the team is able to create and release a so called minimum viable products, measure the effect on the market, and learn. Based on empirical knowledge, the method is very effective in understanding the customer and in descaling undesired features of the product. The cycles repeats until a product/market fit has been reached or the teams decides to pivot because the product doesn't have enough traction.

Agile Software development Practices

The Agile software development methods have gained a lot of attention and have been subject to academic attention. Born from the studies of Dr. Hirotaka Takeuchi and his well known HBR article “The New New Product Development Game”, agile practices like Scrum have spread all over the world. These practices are well established in startups but are very difficult to implement in larger firms. In particular, the scaling element is difficult to achieve when you have more teams coordinating the work. The Agile practices include Scrum, Extreme Programming, DevOps methods and more.

Table - Practices

Main Methodology	Practice	Description
Lean Startup	Go and Talk to customers	Derived from Lean practices (go and see) this practice entails direct contact and communication with the customer continuously and from the early stages. It is intended to understand the problem and if it worth in investing in it.
Lean Startup	Minimum Viable Products	The practice entails the creation of a product that can serve as a tool to learn customer behaviors and create knowledge for the team to further decide if this is an opportunity worth pursuing or not.
Lean Startup	Pivoting	Pivoting can be defined as a change in the plan towards targeting different Feature sets, Customer Segments, Architectures, Design, etc.. The reasons to pivot are understood from the Learn cycle in the Build-Measure-Learn. An outline of the 10 pivoting types can be found in the practice description.
Lean Startup	Actionable Metrics	Metrics that can be used to drive the direction of the product and not “Vanity Metrics”. Measurable and simple metrics that provide indication to the pivoting decision
Agile Development	Product Development Sprints	1 to 4 weeks cycles that produce a product increment that is potentially shippable to the customer.
Agile Development	Continuos Deployment	A practice that aims at deploying the software in a continuous fashion and that eliminates the sign-off processes by automating quality and controls
Agile Development	Continuos Delivery	The delivery of new features to the customers in a continuous manner; aims at reducing the cost of delay and the opportunity cost

Main Methodology	Practice	Description
Agile Development	Scrum	The framework used by the teams to develop a usable and releasable product. Defines the roles and ceremonies and the artifacts to be used in a non prescriptive manner. Based on the continuous improvement concepts and the retrospective learnings.

Table - Pivoting types

Type of Pivot	Description
Zoom in	The single feature becomes a product for itself. This is identified in the lean loop; typically the customer is willing to pay for the one feature only and the product can be packaged around this single feature.
Zoom out	If one single feature is not enough to constitute a whole product, we zoom out and open up to multiple features.
Segment Customer	The need of the customer is not satisfied by the MVP. We need to focus on a different segment and reposition the product. Unwillingness to pay for the product or unsatisfactory feature sets typically trigger a Segment Pivot.
Platform	The switch between application and platform and vice-versa.
Business Architecture	The business model and product value proposition. Could be placing the product in a niche (lifestyle product) or aiming at lower prices but high volumes.
Value Capture	How the product makes money. The revenue model and value proposition design.
Engine of growth	The model for growing the product or service in the market. The lean startup uses the Viral, Sticky, and Paid Engine of growth.
Channel	How the product is delivered to the customers. Online, Point of Sales etc.. are examples of sales channels
Technology	Pivoting Technology is particularly important for digital products. Using different technologies can be the disclaimer between being able to scale or not. Pivoting the technology is very common especially in the early phases of a startup.

Adapted from Eric Ries - Lean Startup

Methodology

In this research we are addressing the research questions:

1. *Can the adoption of startup practice by large firm result in higher digital product Innovation?*
2. *What are the inhibitors and blockers of a successful adoption of the these practices?*
3. *How can large firms like Maersk successfully adopt these practices for product innovation success?*

Our assumptions are that firms similar to Maersk can learn from this study and apply more successfully these methods. This will result in a higher digital product innovation. We define companies that are similar to Maersk as large companies that have more than 5000 Employees and a turnover of more than 1,5 Bil Euro. We have chosen this definition because we believe that companies that exceed 5000 employees have the similar complexity of processes and will encounter similar issue in adopting the startup practices.

Since the problem we are researching is not yet well understood and developed, we will use a case study approach and qualitative research methods combined with quantitative research methods like surveys. This will allow us to better understand the phenomenon and will keep our research open to explore the subject. We have not developed an hypothesis or theory to prove, hence the nature of this study will be highly exploratory and aims at better understand the effects of adoption of the Lean Startup Method combined with Agile practices in large Asset driven firms like Maersk. We believe the research complements the current literature and creates knowledge and field for future studies.

Research Context

Maersk has adopted a model that took practices from both the Lean Startup and Agile. Since the lean startup is mostly useful to identify what to build, and agile practices and frameworks define how to build it, the assumption has been that combination of the two models can result in higher innovation. The practices we will focus on in this study are highlighted in the table below. We have chosen to focus on these practices because they represent the core of both worlds and because previous studies have mostly focused on one or the other and not on the effects of a combination of the methods. The pivoting practices are also explained in the table below. Here we provide an explanation of the the pivoting types that will be investigated. We believe its important to understand this core practice and how it is implemented at Maersk.

We impose the above selection criteria because we want to collect data not from teams that are experimenting with the methods and are only at the early stages of the adoption, but with teams that have collected learnings and can share more insightful data about the adoption. For this reason we have discarded the teams that are in the early stages of the implementation. We

believe these teams are Mose suitable to shed light on the blockers and enablers. For our interviews, we used a narrative interview method with open ended questions that allowed us a more exploratory approach.

Data Selection

Since the methods are adopted by the product development teams, we believe we will focus on investigating the teams by interviewing different people in the teams. Hence the unit of analysis will be the product development team. We have selected roles and people in the teams that can provide evidence and help us to better understand the enablers and blockers of adopting the methods in scope for this study. We have adopted the following criteria to select the interviewees.

- The interviewee have worked in the product team for at least one year so he can provide deep information about the methods and their effect. He needs to have at least some level of experience in the implementations and use of the methods.
- The interviewee is fully allocated to the product team and has exercised a role as software developer, product owner, scrum master, or agile coach. The roles external to the teams had only a superficial understanding of the practices and wouldn't be able to provide enough knowledge.
- The interviewee have both a senior manager level and individual contributor level. The choice towards different levels is to gather information about the enablers and blockers that happen both at the management level and at team level. The assumption is that there are in both levels and the study aims at identifying both.
- The interviewee was part of a product team that had full end to end responsibility of the ideation, prototyping, development, and commercialization of the product or had a management role hence had a more holistic view on the blockers and enablers.
- The people interviewed had either extensive experience with the methods and with Digital Product Innovation or low experience. We chose to interview people with extensive to increase the external validity of the study since we can relate the findings to previous external experiences. On the contrary, the people with less experience will provide an unbiased look into the subject and would be less prone to jump to conclusions.

Table - Interviewees profiles

Interviewee Position	Seniority in Maersk	Gender	Age	Prior experience with the Methods
Scrum Master	5 years	Female	32	7 years
Senior Developer	2 years	Male	45	20 Years
Chief Digital Officer	2 years	Male	38	13 Years
Product Manager	3 years	Female	32	2 years
Team Member	7 years	Male	43	8 years

This primary data will be combined with secondary data from Maersk sources such as power point presentations, training materials, documentation about the Agile and Lean Startup implementation. This triangulation aims at collecting even more information and also to increase the internal validity of the data.

We have followed this process to selected the content:

- We proceeded in collecting all the materials in the intranet that were tagged with the keywords in the table below (Intranet search keywords).
- We checked that document was relevant during the implementation of the practices by asking the teams to recognize validity and relevancy of the document. To do this, the teams rated every document with as very relevant, less relevant, not relevant; valid and in use, not valid.
- We discarded the content that was tagged as not valid, and ranked the rest by relevancy.

Table - Intranet Search Keywords

Keyword	Rational
Lean Startup	Generic understanding of the Lean Startup methods applied at Maersk
MVP	How Maersk understands and implements this concept.
Minimum Viable Product	How Maersk understands and implements this concept.
DevOps	How DevOps practices are implemented at Maersk
Sprint	What is the definition of this component of scrum in terms of duration, rationale for implementing this concept, definition of the concept
Agile Practices	Broader understanding of the Agile Practices implemented at Maersk

Keyword	Rational
Scrum	Understanding of the scrum practices at Maersk
Customer Discovery	Understand how this phase is implemented at Maersk

Data collection

Four face-to-face in-depth interviews of the employees with different people that cover roles and responsibilities within and outside the product teams. The interviews were conducted by one researcher and have a duration of approximately one hour. The interviews were held in a newly formed collaboration space at Maersk in an informal and confidential manner. We believe that this has enhanced the quantity of information and that the interviewee can be more free to speak about the blockers of this innovation. The interview style was informal and encourage the interviewee at being really open especially in speaking about the blockers of the adoption. The interviewees were kept confident.

The qualitative data of the interviews is also cross references with the data collected from the intranet.

This included a survey was conducted on the product teams and aimed at focusing in identifying if the implementation initiative was successful. The team satisfaction was measured; the survey also aimed at collecting data regarding the successful implementation of the methods and the impact on customers, product quality, and speed of delivery. These elements have been historically low at Maersk. The purpose of collecting secondary data source is to identify further enablers and blockers that might not have been identified in the interviews and also to quantify the data and rate the enablers and blockers of the adoption.

The interviews were executed from June 15th to June 29th 2018. One of the interviewees was interviewed for a follow up session to further explore an enabler. The interviewee asked to get back to his team and collect further data and then come back to us.

All of the interviews were done in the Maersk Digital office, face to face. The interviews were recorded with a digital device and transcribed by the researcher with the aid of a software. During the interviews the interviewer took notes for each of the respondent answers.

Given the nature of the study, we also collected secondary data such as power point presentations, training materials, documentation about the Agile and Lean Startup

implementation. The intranet of Maersk proved also to be an excellent source of data where we found interviews of senior people and other materials such as newsletters and content in team sites that proved to be useful in coding the data.

Table - Interview Guideline

Area of Interest	Specific Question
Introduction of the methods	How was this new way of working introduced? What training was provided to you? Did you receive coaching and mentoring on this method? Was the coaching and mentoring a one off activity or did you have assigned coaches and mentors?
Adoption and maturity of the methods	How well is the method working in the team? What is working of the method? How did people reacted to the introduction of this method? Today, are you tailoring any of the mentioned practices within your team??
Influencing Factors	In your opinion what are the organizational processes that need to change to enable the full adoption of this method?
Outcomes	What are the outcomes so far that you have observed by introducing this method?
Influencing Factors	In your opinion, is the Maersk Culture an enabler of this adoption?

Data analysis

The data collected consisted of the interviews and the secondary data collected in the intranet and data sources at Maersk. We used a thematic analysis, that is a search for themes that are identified as being relevant in describing the phenomenon. Thought this process or iterations we read data codes and found themes and concepts as in (Rice & Ezzy, 1999, p. 258). In this analytical process the themes become the main focus and emergent areas that helped identify how to do this analysis. The coding process followed an analytical process of thematic analysis in which data, in both quantitative form (such as questionnaires results) or qualitative form (such as interview transcripts) are categorized to describe the phenomena. These themes are considered relevant for our analysis (Daly, Kellehear, & Gliksman, 1997). The methods will involve reading the data in different The purpose of our coding is to create an understanding of the current state and help identify the enablers and blockers of the adoption. We will use a thematic synthesis approach to coding with a six-step process. We being with basic coding in order to understand overall themes and associate parts of the interview to these; we continue

with a deeper, interpretive code in which more specific trends and patterns are better understood and helps us to identify higher patterns.

The first scrutiny of the interviews happens line by line and the researcher associated parts of the interview to the coding scheme. The second data analysis will associate these themes with higher order themes.

The coding process will follow a three step approach. We will at first analyze with an open coding technique. We will than use an Axial Coding technique to reconfirm the Open coding results.

- Open Coding: At first we will read the data line by line and we will identify distinctive concepts to aid the categorization of data. We will break down the work into high level concepts that constitutes themes. With the themes we will identify categories that will constitute sub categories of the themes. This step has been done manually by reading the four interview transcripts and the selected secondary data.
- Axial Coding: Once the coding has identified the different concepts and categories, we will use these to confirm that the concepts and categories are really representing the data results and also to explore how the interrelations of these are connected. This has aided us in identifying the causes and interrelations of these causes and what influenced the behaviors.
- The third step will be to create a coding table with the results of the first and second step. We will transfer final concepts and categories into a data table. To validate the relevance of the data, the table was also used to analyze the secondary data and to find patterns and correlations in the data.

Coding table Extract

Initial Themes	Sub Category	Sample Coding text
Culture	Empowering People	<i>At every iteration we have to prove ourselves and ask ourselves if we have a shippable product. This drives a performance culture and springily, the team members are happier to work like this. They feel more empowered to take ownership</i>

Initial Themes	Sub Category	Sample Coding text
	Management Culture	<i>"Its a big change. For example, we had to go back to management and say that we where not doing the predictive dashboard anymore because there was no value in doing that. We proved that by involving our customers and the feedback was negative.</i>
	Mindset	<i>We introduced a crazy amount of wasteful activities and nonsense roles. Everything went to stall. And they say methods are just tools. I think they can drastically change everything and create a new mindset.</i>
Customer Value	Customer Satisfaction	<i>I haven't talked to a single customer for 5 years, which it made it extremely difficult to understand what to prioritize and develop. Not only we didn't have a way to measure the customer satisfaction, we simply didn't even have anything to show</i>
Processes	Release Processes	<i>The management in this case will hear the story from our users directly. They need speed and want new features rapidly. This means that we need to have nimble release processes and a DevOps setup. The IT management is not willing to embrace this journey; they are most willing to sit on the old procedures.</i>

Initial Themes	Sub Category	Sample Coding text
	Budgeting Processes	<i>“I almost get depressed about the budgeting process. As a product person I simply cannot relate this old stuff. I understand the company wants control and needs to know the budgets that they spend money on but if you do it this way you even loose control.”</i>

Findings

Outcome of applying the practices

In this section we will describe the outcomes that the practices have on Maersk Digital Production innovation. We have used the data from interviews and found common traits that have emerged from the interviews and from triangulating this data with the secondary sources. The data is presented in chapters. Every chapter describes a theme as explained in the coding table. The chapters are not organized in order of importance. In each chapter we present the findings and an indication of the internal validity of the data. For example, we have found that a positive outcome of the adoption of Lean startup practices combined with Agile Practices, has been a higher Customer Satisfaction score for the digital products.

The correlation between Customer Satisfaction and the adoption of the practices in scope, is demonstrated by the data points collected. We have also found that there are negative outcomes to this adoption like the Employee churn. This was not something that was predicted or is not indicated in any literature review.

Customer Satisfaction

In this section we will present the data and findings that are related to the Customer Satisfaction theme. The startup practices in scope have amongst many, the underlining objective to improve the customer satisfaction. This can be done by constantly involving the customer in the development process; by prototyping and researching the customer needs on the field; by focusing the team on what provides more value to the customer and iterating this at every sprint.

Our research shows that everyone interviewed mentioned the customer satisfaction as a positive outcome of the implementation of the practices in scope for this study. The customer satisfaction was measured by the teams in different ways, being Net Promoter Score, and various CSAT techniques the predominant ones. The previous methods to develop digital products at Maersk stemmed from a standard project management approach and did not include an iterative conversation with the customers. An analysis upfront was done to develop the requirement specification documents. Business review meetings were held to evaluate if the plan execution was on time and on budget, but, they discarded the customer involvement. As one person describes it below, not only the customer satisfaction wasn't measured, customers were extremely far away from the development teams.

“we talked to multiple stakeholders on a weekly basis. Most of them represented our customers, but where not our customers. I haven’t talked to a single customer for 5 years, which it made it extremely difficult to understand what to prioritize and develop. Not only we didn’t have a way to measure the customer satisfaction, we simply didn’t even have anything to show”

Or as another interviewee stated, the teams almost got obsessed by these metrics.

“After implementing these practices we have developed a customer obsession... Everything we do needs to be related to an outcome for a customer. It’s almost too much! But seriously, this has helped us enormously. We even have a higher satisfaction in the teams, because the customer is happier, we see results and have more energy to continue. Before we did not get anything out in time, and it honestly got boring after some time. We just didn’t have the energy to continue anymore like that. Today we are always waiting for the customer feedback about the latest feature and we can correct our approach every second week, because we know what they (the customers) are saying about the latest version”

And furthermore another team member identified the time to market of one product as being crucial to the success.

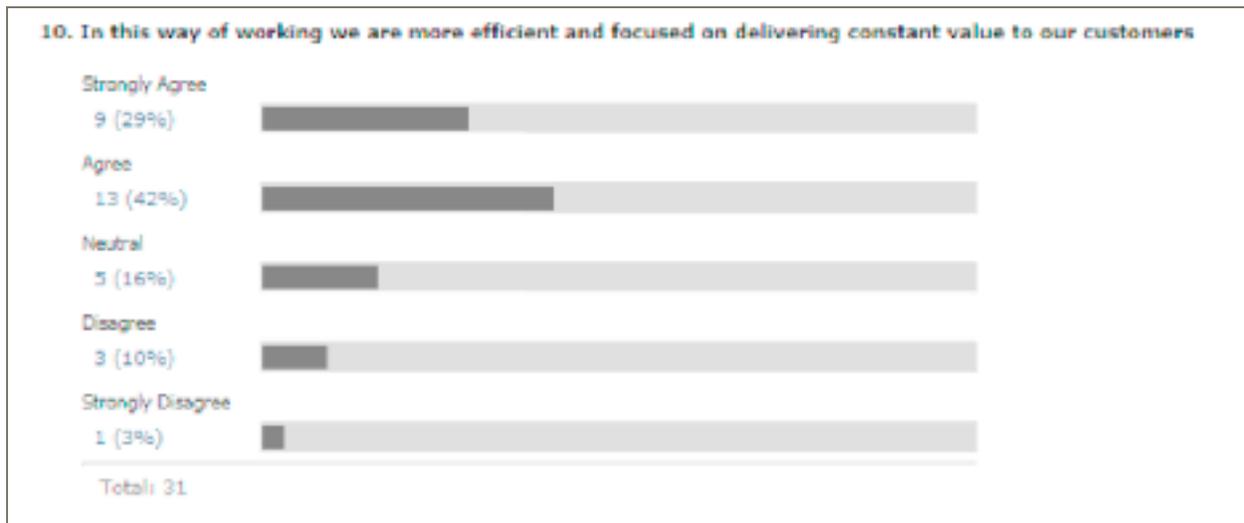
“We are building an optimization tool of the container flow. This is a crucial tool for Maersk and is the core of logistics. We gave the tool in the customers hands after 50 days of development even if it wasn’t ready at all. This was a crucial move to start a real dialogue with the customer and build the customer feedback loop efficiently and to get traction. We measured the user traction and the feedback and build on it. We didn’t develop half of the features that we thought we would. Also, we would never get funding if we didn’t have users on the platform. In the future we will do the same; first lesson we learned, get something in the customers hands as fast as possible”

The customer satisfaction was measured at every major release, every 2 to 3 months for products with long release cycles. For product with more frequent release cycles (weekly or even daily cycles), the customer surveys varied in frequency. Generally, the response to the question “how frequently do you collect customer feedback?” was not consistent in terms of time but was consistent on the explaining the purpose. Most of the interviewee held customer feedback activities almost as a continuous flow of activities. Customers where invited to calls with product managers and with the team members to provide feedback and clarification on

features. This also included collecting feedback about their satisfaction. Particularly, the interviews showed that the customer satisfaction was directly related to the sprint iterations activities. The customers were not only happier in being heard, but mostly in being part of the development process. As an interviewee stated:

“Being as execution oriented as we are, there is a risk that we don't take enough time to understand the problem before we go for the solution. We don't have a strong culture of being user and customer centric. We sometimes lack the patience to consider a failure a learning and still give it another try. The new approach helps in doing this, and our customers are extremely happy to collaborate with us”

The survey on Agile at Maersk also confirmed this view. In this case we are not specifically talking about the Customer Satisfaction but above delivering value to our customers. There is of course a strong correlation between the two themes that will be discussed in the discussion section; for now, this data point reinforces the findings that this customer centric method is more efficient to deliver value to customers.



Every team had visuals on the customer satisfaction metrics. Paper or Electronic versions were kept in Jira and were consulted to triangulate the data above and confirm the findings.

Team satisfaction

Startups are usually considered a vibrant and energetic workplace to be in; they engage their employees and constantly discover new ways of innovating. However, by simply implementing the practices in a large corporation, it is not taken for granted that the same environment can be

artificially created. Team satisfaction is usually measured at the end of each sprint (product development iteration of 1 to 4 weeks). The measurement is consistent across teams and consists of a 1 to 5 rating scale where one is the lowest satisfaction and five the highest. The rationale of measuring team satisfaction is that the Agile practices consider this one of their pillar to enhance productivity, velocity and creativity. As one of the interviewers said

“A happy team produces more, is more engaged, and will walk the extra mile to solve a problem. Our ESS (Employee Satisfaction Score) has risen of many points compared to last year”.

This pattern is overall present in all the interviews. Every team member interviewed mentioned the “Team Happiness”, “Team Morale”, and “Team Satisfaction” as one of the key improvements after the introduction of the methods. Multiple where the reasons behind a higher team satisfaction rate. The combination of Agile Methods and Lean Startup practices also introduced a higher customer focus and a performance culture.

“At every iteration we have to prove ourselves and ask ourselves if we have a shippable product. This drives a performance culture and springily, the team members are happier to work like this. They feel more empowered to take ownership”

Or as another interviewee stated regarding the reasons of the increase in team happiness:

“The team is happier than ever; they can talk to customers, create products and ship them to customers and collect feedback, they release whenever there is value in doing so, not when you have to because if a schedule”.

Multiple responders also stated that the team happens is mostly due to the fact that now the teams are making progress faster and the time to market is considerably reduced.

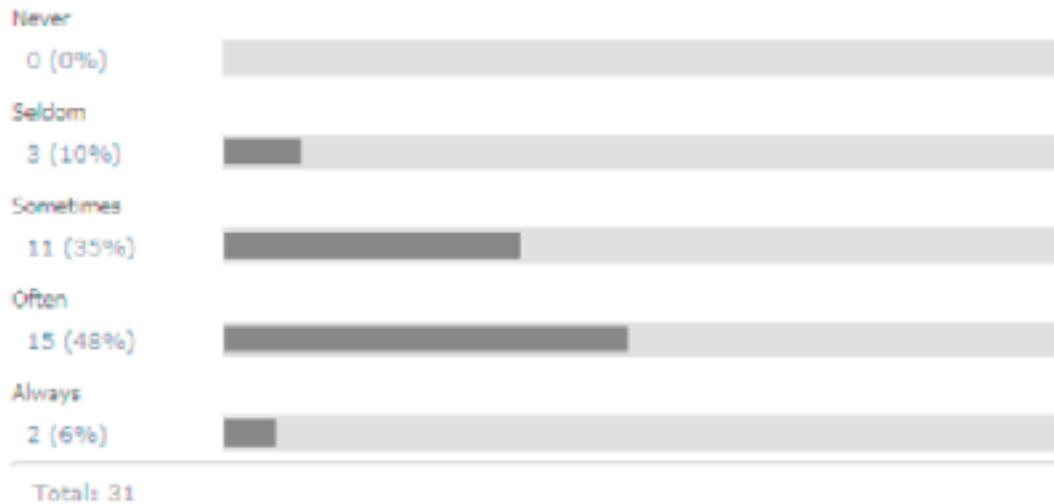
“Before to do one software release we had to have a change manager and fill out a lot of useless forms. The purpose was to ensure quality, but honestly, it was just a bureaucratic exercise. Now I feel way more motivated to release to production and have our customers use our features on a weekly basis. Its really great to see how we progress and that we are able to progress”.

Our research shows that there has been a considerable increase in team satisfaction after the adoption of these practices and that there is a correlation to productivity of team.

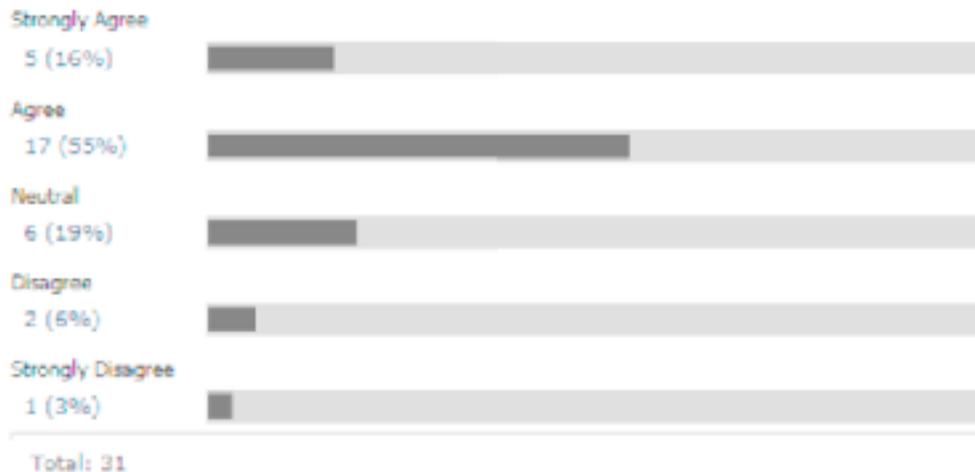
Another data point related to the team is the empowerment and decision making process. The survey and the interview reveled that the most of the respondents feel empowered to take

decisions and that the goals of the teams are more clear. The team has a better direction and knows what needs to be done to achieve them.

2. In this new way of working, I feel empowered to take decisions



6. The goals and objectives are more clear and you know what needs to be done to achieve them



We also collected data points about the team acceptance of these new methods by asking if they would ever go back to a more waterfall approach and the response was the same from both interviews and the survey. In the survey 100% of the respondents stated that they would never do anything else than agile.

Also, the survey showed a clear result in the motivation of the team.

16. Do you feel more motivated to work in this way?



17. Do you prefer to work in traditional project management methods like waterfall or with Agile methods?



Time to market

The time to market of every product is defined as the amount of time it takes to develop and idea into a usable and shippable product. Maersk always had huge issues and challenges in bringing its digital products to the market. One example is the remote container management solution that was developed around 5 years ago. With this solution, customers that where shipping perishable goods could see the temperature of their cargo at any stage of the lifecycle. This included having the chance to control and change the temperature. The product was never launched. Actually, the product never even made it to the testing phase. Underlining this failure, is the methods used to develop these solutions. Instead of looking at how digital products are made, Maersk copied the stage gate Model that was successfully used to build ships not considering that building software is quite different from building ships. Many other failures have been described by the interviewee: large transformation programs that aimed at simplifying the customer experience, implementation of enterprise resource management systems, and even smaller initiative that failed to hit the market. The reasons explained by everyone interviews point to the underling cause of heavy governance, shallow objective settings, and a culture of building large initiatives rather than pragmatic approaches. As one interviewee reveled:

“We planned for months in every single detail, even how many days the testing of a small features would take. The problem was, we didn’t know at all what and

how much it would take. We were obsessed of doing things right and we never focused on doing the right thing”

Others have expressed this issue in other words:

“The release is a problem. To release you have to have done you change management, your impact analysis, your testing and security controls, your ready to run procedures and the list goes on forever. The problem is that no-one is helping you in releasing to your customer and achieving value, everyone is only looking at their small bit and trying to achieve their own objectives.”

The new methods have introduced a radical shift in this metric. One of the key objectives of the pilot projects was to evaluate if the teams could be faster in delivering. The Build-Mesure-Learn practice combined with the iterative Agile sprints promises a working product increment within weeks rather than months or years. Actually, the more you release, the more you learn. Analyzing the interviews, we have found that most people highlighted the Time to Market as a drastic improvement and as a radical shift. This was not visible at the beginning. Actually, most of the interviewee responded that they did not have any working product in the first 4 to 6 months. The underlining reasons of this delay where numerous. Most of the teams had to first build up the team working agreements and dynamics, gain access to the data sources, build the pipelines and the testing environments, gain access to all the environments and finally have at least 2 to 3 sprints to build the first iteration of the product. Once the previous conditions where met, the product increment and the new features took even less thane sprint to build. The time to market was measured buy each team in their feature board in an electronic report. The feature was accepted and ready to be put into a sprint, it was than developed and market as done once accepted by the product owner. The average time to market was indicated by the interviewee as something between 2 to 3 sprints. This data point was cross referenced with the data from the electronic development boards.

“When you consider that before the introduction of these methods we basically never deployed anything to production, this is a huge improvement. It is still suboptimal because we could do way more, but its a real first step to agility. By more I actually mean delivery more frequently and even shorten the duration of the experiments.”

The findings related to the time to market metrics are also confirmed by the survey that was deployed after the pilot phases of the methods in May 2017. The survey question “is the team

delivering working software at every sprint iteration” showed 87% of people responding to yes and 13% responding to no.

Waste Reduction

In this paragraph we present the findings related to the wasteful activities and how the methods have helped the product teams in reducing them. Wasteful activities are defined as tasks that produce poor or non-existent outcomes and value. These activities have been constantly mentioned in the previous implementation of Lean practices at Maersk. However, all the interviewees identified this as a considerable outcome and something that could be further improved. The non-value-adding activities have been referred to as “Waste”, “Features that no-one wants”, “Checkbox Exercises”, “useless meetings”, “un-prioritized mess”.

Since the Lean Startup and the Agile practices “force” you to reprioritize constantly based on customer value, it is likely that some features never make it to the development pipeline. This means that teams are constantly looking at prioritizing their product backlog, that is the list of user stories that will constitute the product features. This activity also leads to a reduction of waste or, as the interviewees defined it, the “principle of simplicity”.

This principle was explained as the “Art of maximizing the amount of work not done” (from the agile manifesto). When the methods were introduced, an extensive training was rolled out and performed to everyone in the project organization. This also resulted in certain principles to be well perceived and understood. One of these principles was the reduction of waste. The interviews identified that this practice was implemented in almost every team. Most of the interviewees identified that this is a key outcome to this transformation.

“In big companies like Maersk there is an enormous opportunity to optimize the process. We did a lot of Lean trainings and this practice was well exercised in Maersk. Then we started using this Prince2 method around 3 years ago. We introduced a crazy amount of wasteful activities and nonsense roles. Everything went to stall. And they say methods are just tools. I think they can drastically change everything and create a new mindset.”

Or as someone else stated:

“We only have 2 weeks. It's quite simple, we don't have time for nonsense activities; we have to deliver a product. That's why everything we have on our table (referring to the daily tasks) needs to be justified as something that contributes to value generation, quality of the product, risk reduction or avoidance. We mixed

certain parts of the methods and do value mapping exercises to identify wasteful activities.”

To the question of how much waste have you removed from your process, the interviewees responded in different ways. All of them were able to identify wasteful activities and indicated a percentage of wasteful activities removed. Also, a description of the waste was provided. To categorize and rank the importance of the data the interviewees were asked to rank the most important wasteful activities.

Financial Savings

Based on our investigation, there is a correlation between the methods implemented and the financial savings that are claimed by the teams. The majority of the interviews (3 out of 4) confirmed that the teams were able to have run cost that was considerably lower than the previous cost. The run cost is defined as the cost per month of the team salaries, the resources in use if the teams, the administration costs associated to the product development and the Marketing of the products. This aspect required a deep down and clarifying questions since it is of complex nature. One of the key aspects of Agile development is that the team is empowered and commitment to the product success. All the interview highlighted the fact that external contractors could not have this level of commitment as internal developers. This also meant that the transformation provoked a shift from outsourcing to development companies, to build internal software development capabilities. Combined to this, all the interviewees also talked about the belief that smaller product teams are more efficient than large scale programs with more than forty people.

“One of the coaches initially mentioned that smaller teams are more efficient and move faster, and plus they are cheaper. He said that we could save a lot of money and produce even more. We thought he was overselling it at first. Actually our burn rate has gone down from 457.000 USD per month to 310.000 USD per month. The amazing thing is that we produce actually because we are more focused on only doing the minimum to prove our assumptions. We try to simplify everything, even too much sometimes.”

Or as another interviewee stated:

“The costs are considerably lower since the teams are smaller. We changed one of our biggest programs to internal developers and we realized we only needed

two scrum teams instead of four. We previously had multiple roles and profiles in the teams: architects, testers, quality assurance people, front-end developers, back-end developers and the list can continue forever. What we did was to hire full-stack developers that can take of almost everything. They cost way more than a normal employee, but they can do the work of five people. Its pretty amazing”.

In another interview the cost of the administrative costs was raised as a concern and confirmed by two other interviewees. With administration costs we mean the costs associated to the tools and platforms needed by the teams, that is, cloud services subscriptions, development tools of the teams, software and hardware in general. The concerns raised where about the predictability of these figures. The team works with the concepts of emerging architecture and does not have an upfront design of the envisioned end state. This means that the teams cannot predict the overall costs and the procurement department does not have time to negotiate better prices and services. This overall trend is due to the fact the teams are shifting from an outsourced based development capability to an internal capability. The implication of this shift are multiple: on one side the teams will have to start designing solution on a data layer only and iteratively refine the architecture, on the other side they have to start decoupling the process complexity on top. This uncertainty causes a raise in the platform costs.

Our findings confirm this statement in the other interviews since everyone stated that the team size has been drastically reduced and has an overall impact on the financials.

People and Roles

Multiple studies have focused on company culture and how new profiles of skilled and digital natives millennials can cause a culture clash in large and established companies like Maersk. One side effect of the transformation that took place at Maersk is that the current employees find it difficult to collaborate with the new profiles. The newly hired software engineers, data scientists, data engineers, product owners and coaches, find it extremely hard to cope with this clash of cultures. This is what emerged from the interviews. Every interviewee admitted that there is a New Maersk and an Old Maersk and the two sides have difficulties to understand each other and collaborate.

This patters is present in every interview. As the Scrum Master defined it

“It is like a reaction to a virus. We are trying to provoke a transformation and bring this company into the digital world. Initially, everyone thought this was just a

way to develop software. Now they realized that their roles will have to change and that they might not have a job in the future. We have to change most of our processes, technology and operating models. This environment is not motivating to digital natives and it's uncomfortable for the old-timers as well".

This data was also confirmed by another interview with a Senior Leader:

"We see people leaving us all the time. Project Managers and Project Controllers, people that were in administration functions within the Information Technology department and newly hired skilled developers. Both sides are affected and this has not been managed by Maersk in a good way. We lose the new people that can bring us in the digital era; we lose the old people that know everything about our business. This is not good for everyone. We need to realize that the two sides are the sides of the same coin; without one or the other, there is no value."

The main roles that are affected by this transformation are the standard project management roles and functions. The interviews revealed that this layer in the organization is impacted by the adoption of these practices. All the interviewees stated that they did not see this role as a key role of the future Maersk. The reasons were explained by one interviewee as

" These roles are difficult to place in the model. There is no place for Project People because the tasks of a traditional project manager are done by the teams themselves. The team is the unit of delivery and they feel the pressure and commitment to deliver. They are the driving force. Actually, they don't want to be managed."

This is fundamentally different from the previous setup of heavy governance and project management.

Mindset

Another interesting data point that emerged from the interviews and from the surveys is the broader theme of the mindset. We found that there is friction caused by digital natives behaviors and beliefs. These are the new employees that work at Maersk Digital. These appear to be in contrast with the traditional way that Maersk operated. As explained by one interviewee:

"There is a tendency to reject the new ideas that can disrupt the ivory towers people have built for years. We need to push authority down in the organization and/or give development teams more access to senior decision makers. Build a

culture of trust. Trust = (credibility + reliability + intimacy)/self orientation. Senior Management need to work more with direction and less with KPI setting. This creates agility in the execution. It takes good insights at the senior level to set appropriate directions Manage funding based on product lines instead of projects”

This is particularly true in the new teams and the contrast that they have created in the organization. As the Maersk Chairman, Jim Snabe, explained in one of the town halls addressing the Digital organization:

“What this organization has created (referring to Digital) is of enormous potential. ...The results you have created in terms of provoking a transformation of this dinosaur are impressive....We need to reinvent this business, create a new mindset where customers are the center of everything...we can do this in two ways: we can isolate this department and ring fence it, or we can embed it into the organization. If you do the first strategy, you do not change an organizations mindset. This is like a speedboat not a tugboat. I would rather have you guys being the tugboat that drags this old vessel towards a new future”

Also, this was confirmed by another interview:

“Talking about the culture- transitioning from waterfall to agile is a huge change and it is easier for some than others - Resources not being 100% allocated to the scrum teams impacts the team's productivity due to switching times and competing priorities - Governance & processes- less is best...these two cultures cannot coexist. This mindset is the future of the company”

We also find that the teams consider these practices as useful tools that aid the adoption of a new mindset and that these practices constitute the framework that enables a new way of thinking and behaving. It is clear from the interviews that everyone understands that the Lean Startup and the Agile practices have a way higher impact and constitute a mindset change.

As one interviewee stated:

“Agile is a Mindset, scrum is a framework. I thought that when we started this, this would be yet another process implementation. Here is what you have to do and how, here is your role, this is what we know and what we should do and so on.. Actually, the very first training we received was completely different. It was fresh and interactive. It was really motivating. There I really got interested cause it was mostly about the Mindset part. Have a customer focus mindset, go out and

see, experiment with MVPs, learn, learn learn...this is a new mindset, there was nothing in the trainings about process and how to do things.”

We also find that the Maersk employees find this more engaging and challenging at the same time. The implementation of new processes and a prescriptive approach is easier to implement. For employees it is easier also to follow it.

“Its easier to create a new process and rolled it out. This is what we are used to at Maersk. Its way more challenging if you are given a goal and some tools to get there, but not a prescriptive recipe for success.”

Or as another interviewee stated:

“If you do what you are told, you are fine. You follow your work stream from A to B and hand it over. Done. I reached my goal. This way of working is way more interesting but also more difficult. We work on the value added services and we need to discover with our customers what we can build with them that can be of value to both parties. Its more explorative, and people are not used to work in this way”

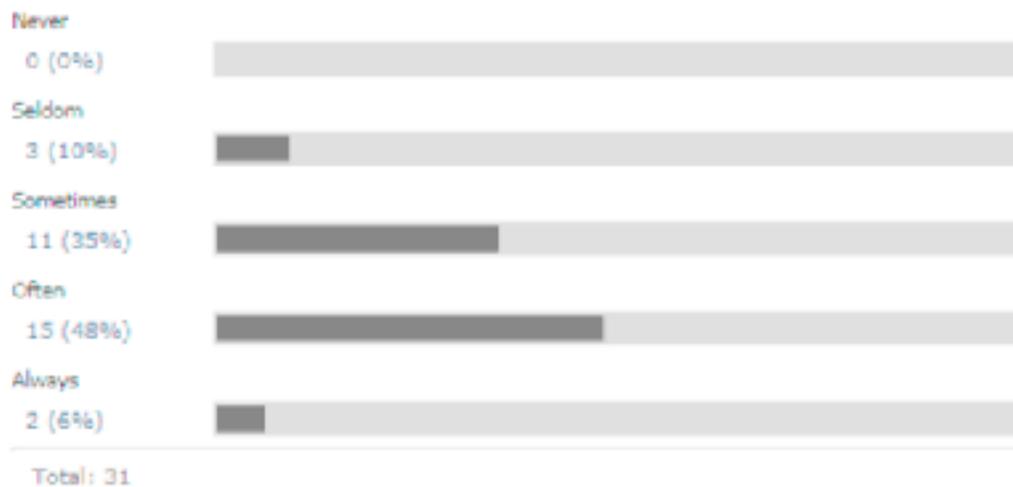
This also means that the digital natives are more suitable to work this way and can really make a difference in cross pollinating this mindset to the rest of the company.

We find that there is also a correlation to the trust and empowerment aspect and this is related to the behavior and beliefs that constitute the mindset. The element of trusting individuals has a particular focus within the Agile methodologies. That is, trusting the team that given the right conditions, it will solve a problem and create value for the company. We also find that it is the conditions that we are in that constitute the key enabler of trust. This can create a new mindset of entrepreneurship in the teams, which in turn can lead to the team taking more responsibilities and reaching higher targets. The teams that have been empowered by their management have had better results than teams that have less trust from their management teams. The former team have received a problem to solve rather than a solution to build and have not been under the project management reporting mechanisms. The problem to solve was framed as “fuel savings on 300 vessels of at least 3%” and the team could chose whatever way to solve this problem. The management trusted the team to come back with an initial proposal of how they could possibly solve the problem and was invited to all the iteration demos. After only 4 months the solution was installed on 100 ships and started to deliver savings. This element of trust from the management was a key enabler of provoking a new mindset in the teams.

“We usually get a plan to execute and a solution to build whilst here we got more freedom... its actually very different and more interesting. We get a problem or a target to reach, a business outcome, nothing else.. how we get there? That is our business... this really makes people think in a different way, makes you take initiative to solve the problem and you are more free. Its also more difficult cause some people don't like it, they prefer to be told exactly what to do.”

This result also appears in the survey response where 54% of the respondents said that they feel more empowered to work this way.

2. In this new way of working, I feel empowered to take decisions



We also find that there is a connection between the scrum framework and the adoption of this mindset.

Influencing Factors

During the interviews we have also found that there are some influencing factors that directly enable or block the adoption of the practices and consequently influence digital product innovation. The outcomes above were observed and described in the interviews and triangulated with the secondary data like surveys, powerpoint presentations, documents found in the Methods sites and best practice sharing community sites. This also led to the discovery of the factors that can influence the successful adoption of the Lean Startup Methods and Agile Practices and consequently lead to higher digital product innovation. The influencing factors are

organizational structures, processes, people and team behaviors, group dynamics and values that can positively influence the adoption of these practices or act as impediments to the transformation. The findings presented will shed some light on what are the enablers and blockers to the adoption of these practices and what are the common impediments and enablers.

Leadership Behaviors

In large transformations the leadership and management practices play a fundamental role in enabling or blocking the adoption of the new practices and the creation of a new culture and mindset. In our interviews and by triangulating the data with the secondary sources, we have found this theory confirmed. Since we took an explorative approach, we did not have a precise theory and did not develop a framework to prove our assumptions, instead we wanted to know more about the role of the leadership in this adoption. Our data analysis confirmed that depending on how the leaders behave, they can both act as champions and promoters of the practices, or they can be an obstacle to the adoption.

Leaders that have managerial power to , for example, change processes or release budgets, have high influence in the success or failure of the practices. A common finding in the interviews is that the leaders that could have change the release processes, did not act fast in doing and considerably slowed down the teams.

“We had everything ready and wanted to release to production our new start connect product version. This product helps the Captains to take sailing decisions. With our tool he knows about the trim (The trim of a vessel is the difference between the forward and aft draft), the speed of the vessel, and other parameters. We can save millions of bunker and pollute less the environment by taking data-drive decisions. The problem is we cannot release to production without going through forms and checkbox exercises. Useless processes that make us loose lots of money. All this could be changed in one meeting, but the IT managers don't want to do this; they like to sit on an ivory tower”.

This was also confirmed by the secondary data sources from the team retrospective. The teams used something called the Spotify Health check. This facilitation tool is very useful to detect the blockers and escalate this to management teams for resolution. The team runs a workshops where members of a squad discuss and assess their current situation based on a number of

different perspectives (quality, fun, value, easy to release, etc.). Each member explains the rationale of his rating and everything is documented in a retrospective document. The teams then create a graphical summary of the results and use the data to identify improvement areas. This valuable data was triangulated with the interviews and what we found was that the “Easy to release” dimensions had the most negative ratings in every team. Only one team out of 14 had a medium rating. The other 13 teams rated their release process extremely low (very difficult to release). The rationale behind this rating pointed to the IT Management not taking a decision in simplifying this process. In a follow-up interview, one of the team members also mentioned that the management was reluctant to change because they basically lost their power and their controlling function.

“If you don’t know any better, its difficult to change. The management in this case will hear the story from our users directly. They need speed and want new features rapidly. This means that we need to have nimble release processes and a DevOps setup. The IT management is not willing to embrace this journey; they are most willing to sit on the old procedures. They are not innovative at all”.

This was also triangulated with the secondary data where we found a confirmation of our findings. Not only -Maersk has a very waterfall approach to projects, but the governance levels are highly bureaucratic and generate a lot of administration work for the teams.

Empowering and not micromanaging— — — — —

Workspaces

In our research we have explored every aspect that could have been identified as an enabler or blocker of this adoption. The interviewees mentioned that the newly created workspaces have had a very positive effect on enabling the adoption and success of these practices. In early 2018, Maersk opened a new collaboration space in the Digital Department that served as a hub to coo-create with customers and users, launch new products, try virtual reality equipment, etc.. In this new office space we have 2 creative rooms with writable walls and surfaces, facilitation material and movable furniture; one product pitch room where product owners launch their products and pitch for money; one concentration room, for relaxing and focused work like coding; an open area for meet ups and for face to face meetings; 3 product team rooms for product launches and team chartering activities.

The workspace has created very interesting dynamics and synergies in the teams and beyond. Customers are eager to co-create with Maersk Digital.

“This week we have had four customers coming to visit and do a Design Sprint of 5 days with our facilitators. This was pretty intense, and they want to come back. Historically, we operated in silos and we were never allowed to talk to customers. This has changed not because our management wanted so, but because our customers knock on our door. If we can do this more often, we will establish a very powerful link. This is mostly possible because of our newly created space. The facilities are amazing; we can write on walls, use different rooms, move the furniture, use digital equipment to display and design, lunch together and communicate face to face. In our old setup, we would have endless meetings where nothing was created and poor decisions were made. The new space obliges us to create something and show it back to the room at the end of the workshop. Outcomes are visible.”

Collaborative spaces have also been mentioned in the survey as an enabler of innovation and as something that can foster creativity and co-creation.

In the survey, 22 respondents stated that newly formed collaboration spaces as one of the main reasons that enable collaboration between teams and the co-creation with customers.

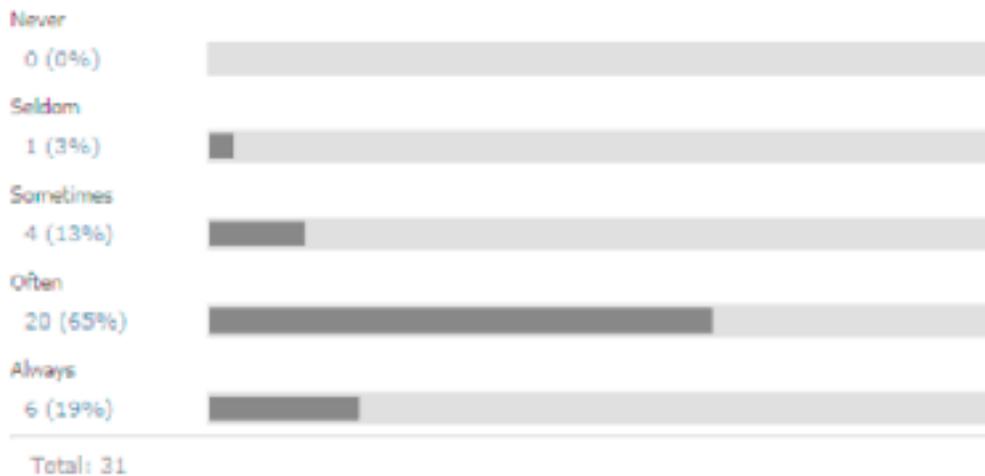
“It's easier to sit in the Hive (our design room) and co-create with the customer. We are building the new pricing engine and most of the team we need space to elaborate formulas and mathematical models. This space has the setup and we can visualize and co-create”

Or as someone else mentioned

“The collaborative spaces have created a really unique environment for collaboration. We formed the teams and since we are coming from different departments it would be impossible to sit in our office and get something done. I would have to walk around the Esplanaden building all the time. I asked to have the team collocated in the same room and we got the Product team in the Lighthouse”

The collaborative spaces also enhanced the face-to-face communication. We know that the most effective way to communicate is face-to-face at the whiteboard (Alistar Cockburn). The collaborative spaces have been designed with writable surfaces in every room. To the precise question of how often the teams communicate face-to-face, 84% of respondents stated that they now do this Often or Always. This is helping to solve one of the main problems at Maersk, which is the siloed thinking.

8. How often, when it's possible, does your team communicate face to face?



As said, the teams are collocated in the collaborative spaces. An interesting finding is that the enhanced collaboration in the newly formed spaces can be hindered by the personal objective and key performance indicators.

The personnel performance management system at Maersk entails that every employee with a manager title or above has personal objective for every year. The yearly objectives are set in April and reviewed every 3 months. The bonus calculation at the year end will define how much Maersk can distribute in bonuses. The personal objective will be a multiplier of the given bonus. In mentioning this system, 3 interviewee out of four stated that this management system can hinder the collaboration in the teams. The reason for this is that the functional management (Finance, HR, IT, Commercial, Operations) set their objectives and this is cascaded to the employees in each department.

“People can have the best intentions but if the personal KPIs are set in the opposite direction of the product OKRs, than there is nothing we can do. We had a team member that was measured in terms of process adherence, he was imposing release processes and slowing things down considerably. I am measured in product outcomes like usage, customer satisfaction. If we cannot release new features, these metrics go down. We have conflicting KPIs...this is crazy”

Or

“We clearly need to align KPI system as that has proven a significant roadblock to success. When people pull in two different directions, that can be very harmful

for the product success. The team should have a balanced performance measurement system. Balanced I mean considering financial metrics, customer satisfaction metrics, quality metrics, team satisfaction metrics. This give you a very good understanding if the product is doing well, if the customers are happy, if the team is performing well, and if financially we are healthy.”

There is a correlation with team collaboration and the KPI setting. This finding was also clear from the employees engagement survey where 56% of the Maersk employees in Digital stated that the personal objectives are one of the main reasons why people do not collaborate.

“The KPI system is so old and outdated. Not only it forces people to be selfish, its really a killer of collaboration. We divide and are more divided with this system instead of being united by a common objective. I see this as a major impediment rather than an enabler and motivator of the teams.”

Release and Security Practices

A particular focus needs to be put on the data access and security practices. Our investigation has shown that many processes need to change to enable the continuous delivery of software. In particular, the Agile DevOps practices of continuous deployment and delivery, need a drastic change in the release procedures and security practices. The current release procedures are very focused on manual sign-offs and handovers. The different staging environments like development, pre-production, testing, training and production are controlled by a manual procedure. This means that each team needs to submit a request to push a new version of the product from one environment to the other. This is controlled by a release manager that will request paper documentation to move everything from one environment to another. The documentation entails screenshots of executed testing, architectural documentation and requirements that are not applicable when you want to continuously release software.

“I cannot understand how these people think. I am the product owner and I need to be able to release whenever I need to do so. This is why I need a real slick pipeline and a green button to release to production. There is an opportunity cost here... and it can be very high if you have to wait weeks to release to production.”

We find that the opportunity cost is tightly related to the release practices and the practice of continuously releasing to the customer.

“A new feature in production can save us 30 to 50 USD per hour on our vessel consumption, multiply that by 800 vessels that cannot use this for weeks.. and there you have it... its not peanuts we are talking about. Bunker is our biggest spend and if we optimize by small percentage this has a great lever on the bigger scheme of things”

The mindset of creating minimum viable products and the build-measure-learn practices are also highly influenced by this process. We find that these practices are almost impossible to implement and exercise if the the release process is not streamlined and changed by automating the pipelines, the testing scripts and by simplifying the staged environments. This type of work has been done by one team. Here we find that the build-measure-learn cycles have been reduced to 2 weeks instead of 5 to 7 weeks for the standard projects. The latency time is obviously waiting time and process time instead of development time. It can take up to one week for one deployment to pass thorough the pipeline. The practice of time boxing into sprints is also not possible with these procedures.

“Whenever we have a release the sprint goes to hell. We use roughly 8 days to develop some features that achieve the sprint goal, but then we are never done-done because of this problem of releases etc... We cannot afford to have this waste, its costly, its demotivating, and we never get anything out there so we never learn from customers, achieve value, get stuff done.”

Budgeting Process

A particular mention needs to be reserved for the Budgeting Process. This process has been identified as a key blocker for the adoption of the practices by all the interviewees. The triangulation with the data has also confirmed this finding.

Maersk follows a traditional budgeting process that follows a yearly cadence. The process starts in mid August where each initiative and program will submit the ask for the following year. A steering committee than evaluates the project charters that have been submitted; they sum up the ask for the coming year, and evaluate against the budget availability. The functional leaders are than asked to revise their ask based on the budget calculations or a granted the asked budget.

Whilst there is a heavy discussion on planning, resources and costs, there is very poor attention to the value, that is, focusing on outcomes not outputs. The current process is a heavily focused on the business cases and plans based on assumptions that have not been verified.

“They submit promises and smoke. The people that know other people get the funding. Smoke in mirrors, that is what it is.”

Or as another interviewee described it

“Its not even a sales pitch its a big circus and a farce. We need to change to venture capital style budgeting. I come from San Francisco and everything we do there is never based on paper but on evidence of what you can build and for who. I love to say that we go to work everyday to build something that people want. Nothing else. You can prove this by having a product and some traction. If you only have idea its fine, but you get a seed funding A, which is just enough money to startup and prove your value. Than you ask for more and so on. Here at Maersk you get the full funding from day one. This makes it difficult to kill stuff, cause you already spend 4 mil USD so you will likely put another 4 to maybe finish it. The team is also not motivated to find and learn as they go. They are from day one on the execution and delivery treadmill case they have to deliver the promise that someone else made. How can you pivot in these conditions? You tell me. Fail fast, or as I prefer to say learn fast. That is what we should do. Not even GE uses that type of budgeting anymore. Because we found out they don't work at all.

This also reflects the interview findings where

“I almost get depressed about the budgeting process. As a product person I simply cannot relate this old stuff. I understand the company wants control and needs to know the budgets that they spend money on but if you do it this way you even loose control. There is no track record of success with this. We had a program called Simplification that was supposed to simplify the customer experience end to end and we killed it with governance and controls. In the end, we didn't even talk to customers. We spend more than 300 Million Dollars on it, yes you heard me... because its easy to spend that amount if you are Maersk and hire 200 consultants to work on it.

As another interviewee described it

“We are constraining ourselves with this process. We have to build up project plans, business cases, use cases, and potential deliveries upfront. We actually don't know if this will work, because if you look in the history, we failed when we did this approach. We got trained in the Lean Startup method and it seemed very

logical for us. Build small prototypes and minimum viable products, give them to the customers, understand and reiterate. Then you can take decisions on what to build”

Or as another interviewee stated

“The budgeting process is a real killed of agility. We are locked into a plan, a scope, a resource plan and of course quality. This means we cannot pivot and change, we have to deliver what we agreed on in September. We cannot allocate the money to another initiative as it’s been allocated already to one product. This is really an outdated process that needs review. We cannot Innovate in this way.”

Also, the survey done on a population of 31 people showed that the budgeting process together with the software release processes was at the top impediments list. 87% of the respondents said that this process together with a seamless release process was a top impediment for the company. There is correlation between the successful adoption of the practices and the hindering processes like budgeting. The Pivoting is basically not possible since the teams are on a preset agenda and plan of delivery. This is visible from the fact that every interviewee states that this process can demotivate the teams, hence lower the productivity of the teams. Also, the budgeting process has an effect on the practices like pivoting. By adopting zoom-in and zoom techniques, the team can decide to pivot and expand or focus the functionality scope of the product. This decision is based on the customer feedback. The practice is not possible if during the budgeting process there is a “promised” or “locked” scope. The pivoting practice in general is not possible if the timeline, the scope and the resources are locked. Also, the build-measure-learn practices are quite useless in this context.

“We can sprint as much as we like, learn, build and release as much as we like, but if someone else already decided what we will deliver, well then there is no change at all from the previous project model approach where everything was analyzed to death until we could even start developing anything. How does the MVP approach even fit into this process?”

Another practice that is negatively influenced is the MVP (Minimum Viable Product) practice. This practice entails that a creation of a MVP is done to measure and learn from real customers. The MVP definition can be of many shapes and forms. As one Product Owner defined it:

“We did a fake website, a usable one, we did something in someones else name (not a Maersk branded site). The MVP can be of many forms and shapes. I like to

defined it as anything you can do to collect information that will tell you to go on or not. Wizard of Oz is a great example: we create a booking customer experience that looked fully automated but in reality behind we have 30 people inputting data in other systems. We learned that the customers were not too interested and we should have pivoted, but we couldn't cause this was already sold as a success and in one year we had to build it anyway. What a waste!"

Customer Access

We find that having direct access to the customer is a key enabler of the practices and results in faster and more valuable product innovation. With direct customer access we mean frequent direct contact, either face to face or through phone and video, with real customers. Historically Maersk has always made use of business reference groups, intermediary sales people, agencies and others to access the customer; this was a way to elicit requirements, clarify directions, take policy decisions and so forth.

"We had to have a steering committee approving a customer visit and we were always escorted by other people like sales and commercial people. We could not even ask the customer something, it was ridiculous. Now we even went to Costa Rica to visit our best customer that ships Bananas with us, to understand his pain points and the key gains we can have."

The direct customer access also appears to be the only way to learn from the delivery of a minimum viable product and the only way to close the build-measure-learn cycle rapidly. Without the direct customer access the team cannot understand and create products in the first place. Also, we find that the teams that have direct customer access are more committed to the product and more engaged:

"We had a really good understanding of the problem during the trip; it was great because when we came back to the office we actually thought about what we were solving and for who, we had a personal attachment to the problem and felt responsible for solving it."

We also find that there is a relation between the products created by teams that have direct customer access and the waste of functionality, that is, the features that are created by the teams and that never see the light because they are discarded by the customer. We know that internally in Maersk this waste is of around 45% (internal analysis on the booking system). This means that almost half of the software features that are created, are never used. By having

direct customer access the teams can prioritize with direct customer input and descale the functionalities that are not needed before they are even developed.

Coaching and Mentoring

Our investigation has highlighted a key enabler of the adoption that can lead to higher digital product innovation: the coaching and mentoring activities.

During the implementation of these practices an extensive training program was rolled out to train everyone involved in the Scrum practice. The trainings targeted the different profiles and people involved with a specific curriculum. The Scrum Masters and Product Owners were not the only ones involved in the trainings. The entire teams went through a program to understand the basics of the practices, the methodologies involved, and the models to be applied. Product People were involved in extensive trainings about business models, discovery techniques, and more. Although the trainings programs were well perceived, this was not enough.

“The trainings are really good. We learned a lot. But I need someone who knows this stuff in deep and can help me on a day to day basis. Its not enough to get trainings, the difference is really with the coaches that did this before. We can rely on them on a daily basis and get advice. They are really key to this change”

Or as someone else noted

“We have seen so many trainings programs fail because if you don't change many other things around the teams, nothing eventually changes. I mean the budgeting process, the team staffing and KPIs, the mindset of management and leadership”

There is a correlation between the coaching and mentoring activities that have been performed and the implementation of the practices.

“Without the coaches we would fall back to what we know best. Controls, Project Management activities, and so on. They push to act and think differently and make a leap of faith into the future. Its really experimenting and learning”

Or as another interviewee stated

“Its a big change. For example, we had to go back to management and say that we were not doing the predictive dashboard anymore because there was no value in doing that. We proved that by involving our customers and the feedback was negative. The coaches told us to create an MVP and present it to our users.

We thought it was a crazy move, cause it was unfinished. Actually, no-one noticed that, but they focused on functionality. This made us learn that we should have created a suggestion system on the single trades, not a dashboard of data”.

The importance of the coaching activities is also confirmed by the fact that every team that really succeeded in shortening the time to market was supported by a coach.

We also find that there is a relation between coaching and the outcomes listed under waste reduction. As two of the interviewee stated:

“The coaches ask questions. The first time they told me I had to have a coach, I never understood what he wanted and why I needed it. I thought what kind of nonsense is this. At the first meeting he said his role was more to ask questions rather than give answers. I also thought that was weird. In fact, after 12 months into this journey, I would say that he was fundamental to our success. He immediately asked why we were doing things like documenting the architecture before it was even build; exploring all the use cases and documenting a lot of stuff we would never read nor use”

“The coaches are really great to have. We have inspiring sessions and one to ones, they are awesome and have really fancy tools to visualize waste. Our coach always asks us questions like - Is that activity bringing you closer to understand your customers? - or - Do you do that because you will use it or because the process tells you to do it? - All these provoke a learning mindset and a waste reduction. We have reduced the architecture documents to 4 pages ... instead of 60-80 pages of stuff that no-one was reading. The funny thing is that now everyone wants to have a coach and copy our documentation style”

We also find that the outcomes enabled by the coaching activities have a cross-pollination effect. This means, other teams in other departments want to learn how these practices are implemented and ask to come and see how the team applies them. This effect of cross pollination is a particular scaling technique. In a big organization like Maersk its very difficult to drive change in a sustainable way. Most of the programs imposed new processes and ways of working, without creating a culture and mindset that would stay in the company for many years. Instead, they created process adherence rules. When the new rule came in, the old was just wiped away. As one of the interview stated:

“Lean Startup and Agile are more about a culture and mindset. The supporting processes need to enable this mindset and the practices, but they can and

should change all the time. If you threat them (Lean Startup and Agile) as a process, than people will apply them by the book. To make this culture stick, we need to provoke a movement and really crowdsource this change”

This crowdsourcing effect of cross pollinating the practices between teams has also been mentioned by another interview.

“They (the coaches) are pretty smart. They know it would take 40 or 50 people to roll this out to the entire company. Instead, they really focus on one team and that team becomes really good as say MVP. Than they use that team and some people in the team to train others and spread the word. They usually still come back and see if errors are propogated in this process and correct them. In this way you create a sustainable capability. They are really there to make themselves redundant”

We also find that there is a relation between coaching and mentoring and the team satisfaction. The teams that have a coach assigned have expressed greater satisfaction and score higher at in team satisfaction at the health checks.

Discussion

We have set out to research and explore the implementation of the Lean Startup combined with Agile practices at Maersk, a large corporation within the shipping industry. We have also explored the enablers and blockers of this implementation and the correlations between these elements. We also intended to find general directions that large firms like Maersk can adopt to have higher success in digital product innovation.

We find that there is a strong correlation between the influencing factors and the Outcomes, and that there are blockers and enablers of the implementation that can be generalized to large firms like Maersk.

To successfully implement the practices of Lean Startup and Agile, we believe that Maersk should not compromise on the principles of Agile delivery nor the Lean Startup practices. There is evidence that these practices constitute a mindset that the organization have to embrace to be successful and have greater product innovation. This approach is more radical than a standard process or methodology implementation and requires that everyone in the organization understands the implications on going on this journey. Compromising these practices by tailoring them to fit the current structures, processes, and mostly the Maersk Culture, will pose a thread to the outcomes. Actually, we find that the best outcomes have been achieved when the teams were able to start from a clean slate and completely rethink the way they work, redesign the processes around them, question everything and change things. Compromising and find a common ground can result in poor outcomes and higher costs of operation. Having a project model that follows a waterfall approach with the roles and processes involved, and at the same time having an agile product model with different roles and governance structures, is sub-optimal. However, having a tweaked model or a Water-Scrum-fall model, can be even more confusing and cannot achieve any benefits.

Another important element of this implementation is the organization of the teams and the roles within them. We find that these roles are very new to Maersk where a project management culture has been present for many years. This strong part of the organization have a different operating model and mindset; they pursue and execution model, instead of an exploration model; they outsource and contract negotiate instead of insource developers and collaborate. They are set to deliver based on a preplanned scope and timeline, instead of delivering value and adapting to market conditions. They are focused on internal outputs instead of customer outcomes. The new practices require new roles. The Product Owner, in particular is a key role for the success of this implementation. The practices explored, require strong empowerment

and entrepreneurship spirit. These two elements are condensed in the product owner role. This key role is very important to reach the ultimate goal of getting successful products out on the market and is the Key role and the main enabler to the success of the product teams. To successfully implement the practices Maersk needs to excel in the product owner role to drive success and not repurpose current roles into new roles, hence externally hire people that have done it before and bring a new mindset in the organization. It would be way to costly to repurpose the current roles in the new roles and have a mediocre product organization.

In our opinion this has been identified as the weak link in the roles and them most difficult role to fulfill. Another interesting fact to note is the current setup of the development organization. Currently, the engineers are mostly outsourced developers from consulting companies. The new strategy is to insource this capability and have internal developers. We find that the reasoning behind this move is in line with the practices and will enable them. The trust and empowerment factor is highly influenced by the fact that these people actually work for Maersk; they are not contracted on a fixed scope and time, but instead they are contracted by Maersk and want to achieve the best for Maersk. The motivation factor is also higher if you can control the outcomes and steer the technology direction of the product as well as the ownership of the practices and product pipelines. As we explained in the findings, the Agile Coach and Scrum Master role is a key role to enable the transformation as well as cross pollinating and crowd sourcing this transformation. These roles facilitate the discussion and the setting of structure and mindsets that create successes. We interpret this as a key role for the successful implementation of the practices; without a constant coaching and mentoring role, the teams would fall back to their old practices and would settle in an interim state. The role of facilitating the discussion and creating a learning culture and a retrospective culture of improving thorough the understanding of the past, can be successful only if someone is actually taking this as a main responsibility and duty. Making sure organizational impediments are visible to the leadership; making sure the teams are going towards an empowered and self-organization culture; coaching and mentoring and even teaching the practices; all these are duties that the role of the scrum master and Coach will cover. This role in our interpretation is a key enabler of the successful implementation.

Regarding the technology stack and the deployment practices, we believe that an increased maturity of the technology stack would provide considerable speed in delivery, increase the team satisfaction and reduce the opportunity cost.

The automation should include the provisioning of new environments. Currently this practice is controlled by a global process that has a service level agreement of at least three weeks.

considering that the team has to experiment new features, the creation of environments where hardware and software is provisioned automatically is a key enabler of speed and experimentation. Also, the submission of justification and business cases to create environments that have a cost of less than 5K USD is perceived as a huge waste and a detractor of the team motivation. The practices of continuous delivery and deployment can only be exercised if both the technical stack and the processes are streamlined and simplified.

We believe that also the testing practices have an important role and need to be automated. In accordance with the above considerations, to respect the sprint practices and the continuous delivery, testing needs to be automated.

Another relation that we find to be very important to create successful products, is changing the budgeting practices and move towards a seed funding model. The current annual budgeting process that locks the scope and the timelines is completely unsuitable with the practices above. Changing this core process is a key enabler to also change a mindset of “command and control” where the business sponsor that spends money also decides and controls the projects he is funding. In these conditions the teams are not able to experiment and create minimum viable products with their customers; they cannot pivot based on the input; they cannot time box the development into sprints because everything is already planned upfront. These conditions are extremely hostile to the implementation of Lean Startup practices. A change in the budgeting process will also provoke a new mindset and culture of trust and empowerment. That is, trusting the product owner and the development team to achieve value, doing everything to remove impediments for the teams, accepting failures and experiments, as long as done as early as possible and as quickly as possible. This could eventually also change the leadership behavior. However, we find that for the management level it's quite difficult to unlearn the old practices and lose control. The future leaders would have to learn when to apply situational leadership and move their role as coaches instead of key players.

This means that the current leadership will have to be supported by continuous coaching and mentoring until the new styles emerge and are sustainable. This culture and mindset change in the leadership level is key to successfully create digital products.

We also believe that the cross functionality of the teams needs to be scaled to the organizational level. It is not enough to have the teams staffed with people from the commercial department,

human resource, finance, operations, Information technology and digital into small cross-functional teams that can create an end to end value to the customer. Everyone belonging to these teams will have personal objectives that reflect the department objective. Even if the team members are driven by product objectives like increasing the usage by 40% percent within 6 months, their line manager will still have department objective that will cause friction in the functions. Moving towards a cross functional setup by organizing on value streams, end to end customer journeys, could be a great experiment and a subject for future studies. We know other have successfully implemented this setup in the banking and telecommunications sectors where digitization is more advanced and there are indications that this could also work in assets driven companies like Maersk.

Limitations of this study

This study has been undertaken in Maersk on a limited amount of people and the learnings can be applied to firms that have similar structures, processes, size, and industry type. Heave assets driven firms are likely to have the same cost saving focus like Maersk. These practices and the adoption have demonstrated the potential outcomes, however, large firms will likely have the same blocker and enablers to the adoption. The study has not focused too much on the history of the company and why the old practices where never successful. Hence, it might be useful to understand why the adoption of Waterfall practices has never succeeded in Maersk. The population of four interviewee is also a limitation. Given that the practices have only been introduced at Maersk in 2017, it will be easier to collect more knowledge in the coming years when the maturity of the practices has taken a step further and when the practices have been scaled to the broader organization. The research is also biased by the fact that the researcher works at Maersk and has personal relationships with the interviewee. This was mitigated by the fact that the interviews where filmed and supported by other people in the department as film operators and recorders.

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