



INTERNATIONALLY SCALABLE BUSINESS FROM DIGITALITY

FINAL REPORT

2019

UNIVERSITY PARTNERS

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// EXECUTIVE SUMMARY

Digital transformation is occurring in all industries globally. Companies develop processes and business operations to increase effectiveness, and new business opportunities emerge as a result of the digital change. Similarly, digitalization provides major opportunities for Finnish companies to improve their international competitiveness.

DigiPro—internationally scalable business from digitality—is the joint project of two research institutions and four Finnish small-to-medium enterprises (SMEs) financed by Business Finland (9/2016–12/2018). The project was initiated based on the need of the participating companies to develop new types of digital solutions for more efficient management of complex projects and to commercialize the solutions for the international market. Therefore, the joint objective of all partners in the project was to increase the knowledge and capabilities of Finnish SMEs to develop internationally scalable business models and to commercialize digital solutions internationally.

In this report, the focus is particularly on the current status of the digital operational environments and changes taking place in the project industries in Finland as well as on the role of digital solution developers that drive change in these industries. Based on the research findings and knowledge gained in the project, the report presents implications for industry end-users and digital solution developers as well as for policymakers and other stakeholders.

To efficiently manage large projects, industry ends-users need, for instance, new ways of capitalizing on data and digital technologies that involve several interfaces. However, the processes and operations need to be improved first in order for the digital transformation to be truly effective in companies. Some project industry customers are still unaware of the potential that digitalization can offer them, or they are cautious about carrying out the deeper change process that the digital transformation in business operations requires. However, digital developers see the potential of digital development in a more far-reaching way. Therefore, digital developers, on one hand, need to have a deep understanding of customer needs, but on the other hand, they need to be able to communicate the value added to the customer. Furthermore, digital changes in the business environment often lead to changes in the business models of companies, which may turn out to be a competitive advantage for the companies.

The digital shift requires investments and effort into the change processes. Furthermore, successful digital transformation requires interaction and joint actions between several stakeholders. It is not only a question of companies, together, working with the challenges and opportunities that digitalization produces but also a question of collaboration between companies, research institutions, and policymakers together finding new solutions in regard to industry needs.

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Applying digital tools to an old process is unlikely to improve efficiency.

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// INTRODUCTION

Industrial projects in, for instance infrastructure, construction, or shipbuilding, are complex and long undertakings. Project management plays a critical role in the success of such projects. Digital tools open novel possibilities for project management as they enable data collection, use, and sharing better than ever before. Hence digital solutions can be an important factor in improving industrial mega projects' productivity. This project report focuses

on these opportunities, but above all, the report discusses the preconditions that must be considered before digitalization can contribute to productivity.

Improving the productivity of industrial projects is a topical issue. Primarily, the construction industry has been in the headlines due to the very poor productivity development reported by Barbosa et al. in the 2017 McKinsey Global Institute Report. There





is a compelling need to improve productivity particularly in the construction industry so that the industry is able to respond to market demand but also so that the cost-level can be held in check. The development of technology and successful track records from various use cases in different contexts also induce interest in the use of digital solutions in project efficiency initiatives.

Digitalization indeed touches nearly all business operations today. It is a phenomenon that carries versatile promises and opportunities, yet digitalization does not necessarily add value. Applying digital tools to an old process is unlikely to improve efficiency. Therefore, reaping benefits from digitalization requires careful preparation. It is certainly not just a question of technologies. In addition to functioning technologies, it is critical that the underlying way of operating supports the use of the new tools. Equally important is designing the processes such that the digital tools can deliver the expected value. One of the most significant reasons for digitalization failing to deliver added value actually relates to attitudes, management, and business practices (Bowersox et al., 2005). The way the work is organized is critical for improving its productivity (Pritchard, 1995).

This report presents the main research findings from the DigiPro research project (9/2016–12/2018), which

was funded by Business Finland. The project was the joint endeavor of two universities and four Finnish SMEs. The report also analyzes the most important lessons learned and some best practices in the joint project context.

At the outset the goal of the project group was to find a joint project management solution. Each of the companies planned their own project to support the whole. The project plan was designed to be refined during the project through iteration. Early on after the initial stages it became clear that instead of one joint solution, each participating company should work on their own solution, tightly linked to the project scope.

The report is organized as follows. First the project objectives are discussed in greater detail, and thereafter the project process is described. Section 4 presents the most important results of the project. First the academic findings are examined, after which the participating firms' results are briefly presented. The last part of the section includes the practical tools and frameworks developed during the project. Section 5 discusses the lessons learned during the project concerning university–industry collaboration. Finally, section 6 presents the conclusions.

All of the participating companies work closely with their customers to improve their customers' operations.



INTERNATIONALLY
SCALABLE
BUSINESS
FROM
DIGITALITY

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// PROJECT OBJECTIVES

The goal of the university research projects as defined in the project plan was to scrutinize the business models for commercializing internationally scalable digital solutions that are created as a joint effort of a network of companies. In addition, the universities were appointed to support the participating companies in developing their business models and to disseminate widely what is learned to Finnish companies.

Each participating company had their own development project aimed at contributing to a project

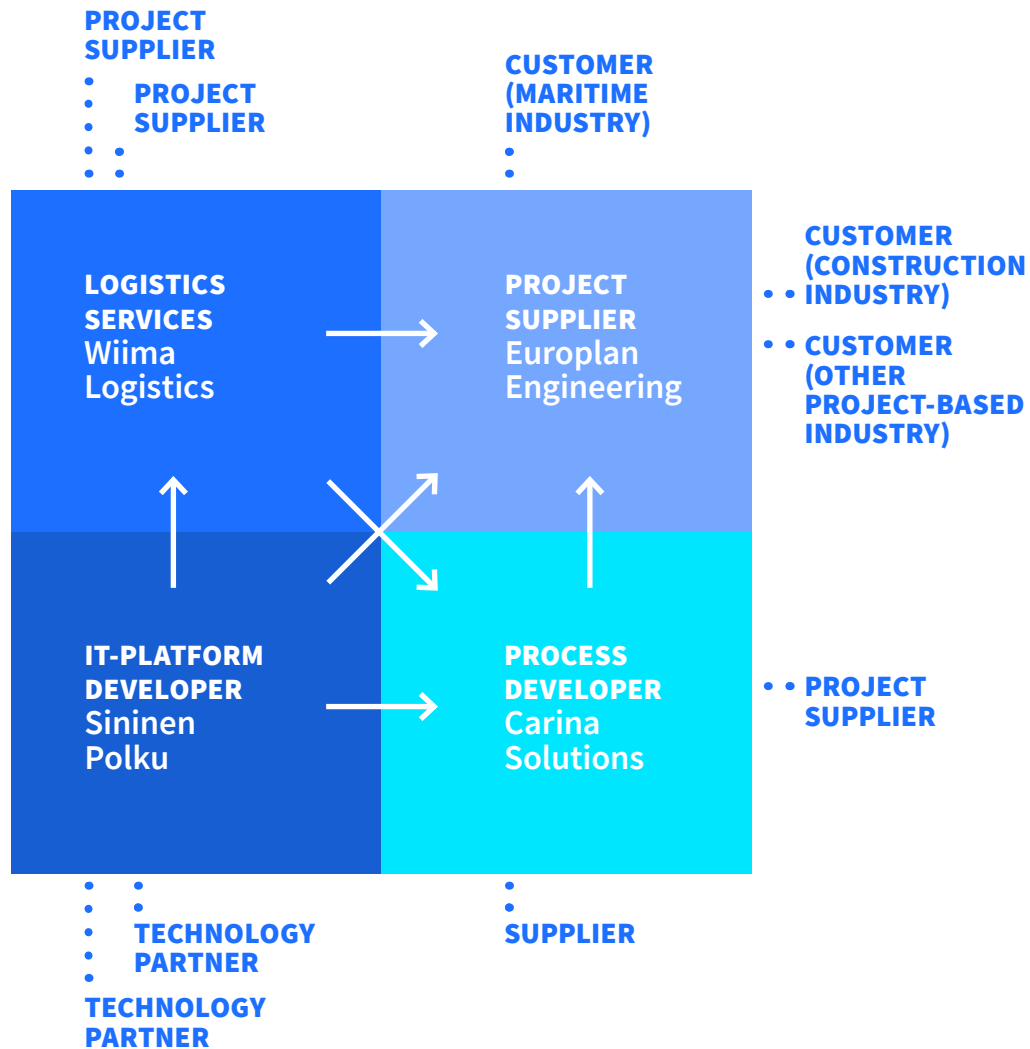


FIGURE 1.
ECOSYSTEM OF
THE PARTICIPATING
COMPANIES

management solution. The project ecosystem is illustrated in Figure 1 on the left. The four participating companies are shown inside the blue boxes.

The arrows between the companies illustrate the collaborative relationships. During the project the companies were all open to discussing and exchanging thoughts on the solutions. Despite the initial plan for one joint solution, the iterations during the project execution led to the decision to invest in complementary yet separate solutions.

All of the participating companies work closely with their customers to improve their customers' operations. The project management solution that they developed during the project adds important value to their offering and gives them additional tools for creating value for/with their customers.

In developing the solutions, the companies needed researchers' input into numerous processes. Academic researchers supported the companies primarily in the following activities:

1. developing a deeper understanding the customer problem the solution solves;
2. determining the roles, goals, and requirements of different partners in the network;
3. defining and understanding cost and revenue streams in the complex network;
4. developing measures that support customer value transparency.



While cooperating with the companies in collecting and analyzing data to answer their questions, the academic team accumulated research data.

According to the project plan, the research project will benefit the participating companies and also disseminate the findings broadly to Finnish SMEs. The plan included various academic contributions on the following themes:

- How do companies on one hand recognize and on the other hand create an opportunity to create value through digital solutions?
- What kinds of needs for change do digital solutions create for individuals and companies (work tasks, systems, processes)?
- What kinds of business models are feasible to build around digital solutions in a value network?
- How do companies build internationally scalable business models that promote committed customer relationships?
- What kinds of capabilities do the implementation and commercialization of the solutions require?

In addition, the objectives were to:

- Map the existing digital technologies and analysis of the business models and the network interactions around them;
- Engage in practical yet science-based cooperation with the companies to develop tools for building and analyzing business models;
- Accumulate rich process data through company-specific interviews and observations as well as through action research within the group of firms and in the horizontal and vertical workshops;
- Enhance understanding of the demands the technological context sets for the business model and of the interaction and integration processes required in co-creating such business.



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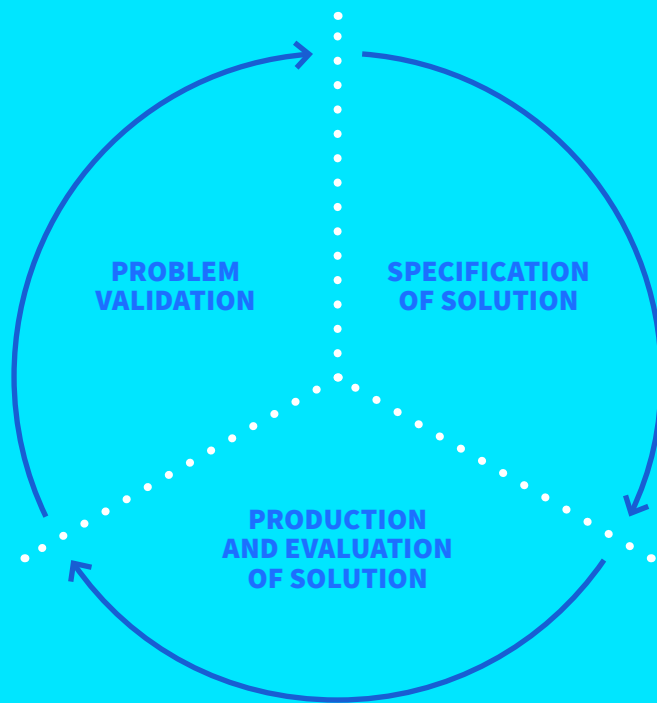


FIGURE 2.
THE PRODUCT
DEVELOPMENT
PROCESS OF THE
PARTICIPATING
COMPANIES

// PROJECT PROCESS

The process of the DigiPro research project can be described from two perspectives. On one hand, the four participating enterprises followed their own project plans, which proceeded in parallel within a defined time window and set goals. The product development of companies followed iterative cycles (see Figure 2) in which problem validation and specification of the solution option as well as the production and evaluation of the solution proceeded one after the other.



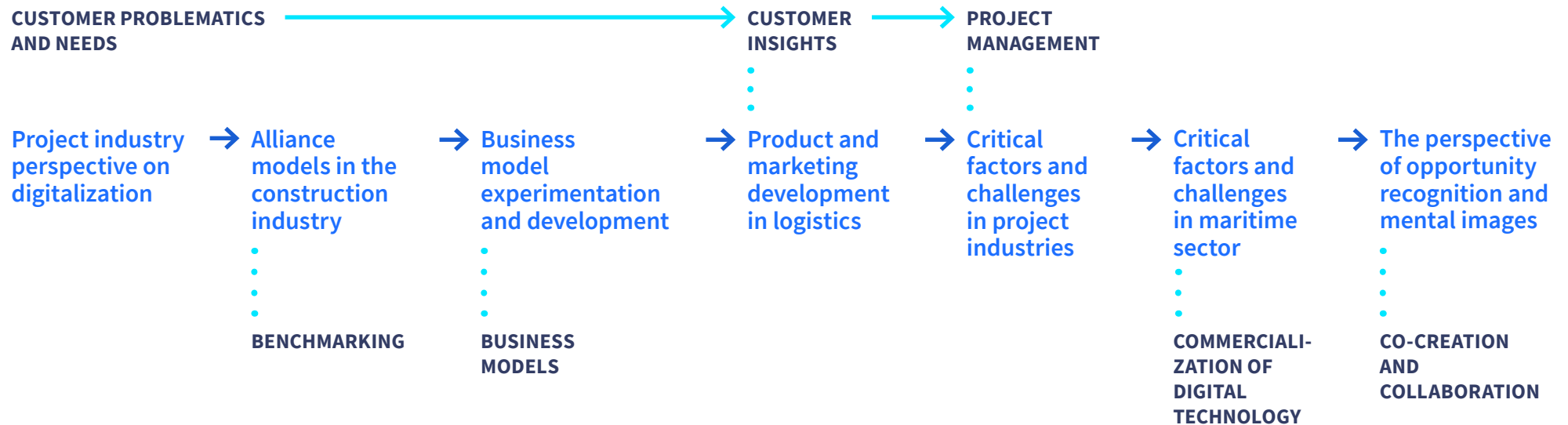


FIGURE 3.
THE THEMATIC
PROCESS OF THE
PROJECTS

On the other hand, the work of research institutions followed the work pace of the enterprises as project activities were largely planned based on the emerging needs of the participating enterprises. The project activities consisted of different types of workshops, seminars, and events as well as data collection and publication activities. For instance, the enterprises and researchers worked jointly on the arising problems of the enterprises in several workshops where specialists from different fields participated. Moreover, data were collected during the product development process both within and outside of the project in order to examine various types of research questions relevant to the project.

As far as the content of the project activities are concerned, various themes were dealt with during the project (see Figure 3). Different methods were utilized for the collection of data depending on the theme and purpose of the research, involving, for instance, in-depth interviews and an online questionnaire. First, the project started by gaining an understanding of the problematics and needs of current and potential customers in project industries. This was a crucial stage in the project since the process helped the companies to validate the previously defined customer problems. Second, deeper benchmarking on the construction industry was carried out in order to gain insights into new



types of collaboration models between several partners. Third, business models were examined, for instance, in reference to the changes that digitalization creates. Fourth, deeper knowledge of customer insights during product and service development was investigated. As a fifth and sixth theme, critical factors and challenges related to project management and the commercialization of digital technology in the domestic and international markets were explored. Furthermore, as the development work proceeded, the researchers collected longitudinal data on the progress of the process and collaboration within the project partnership, which was

later analyzed, for instance, through opportunity recognition and mental image concepts.

To summarize the thematic process of the project, the themes varied during the process. However, one main theme repeatedly emerged during the project: knowledge of the customer need in the project management. It proved to be essential to return to this theme along the project implementation in order to further specify the needs of the customers and validate the problems.



A common and problematic routinized model is that customers put off purchasing until the last minute, and orders come in too late.

4

// RESULTS

Academic results

The focal findings from the academic research conducted during the project relate to the following themes: business models, customer understanding, project management and alliances, and, finally, internationalization. The discussion begins with an examination of business models since the utilization as well as selling of novel digital tools necessarily demands changes in a company's business model.



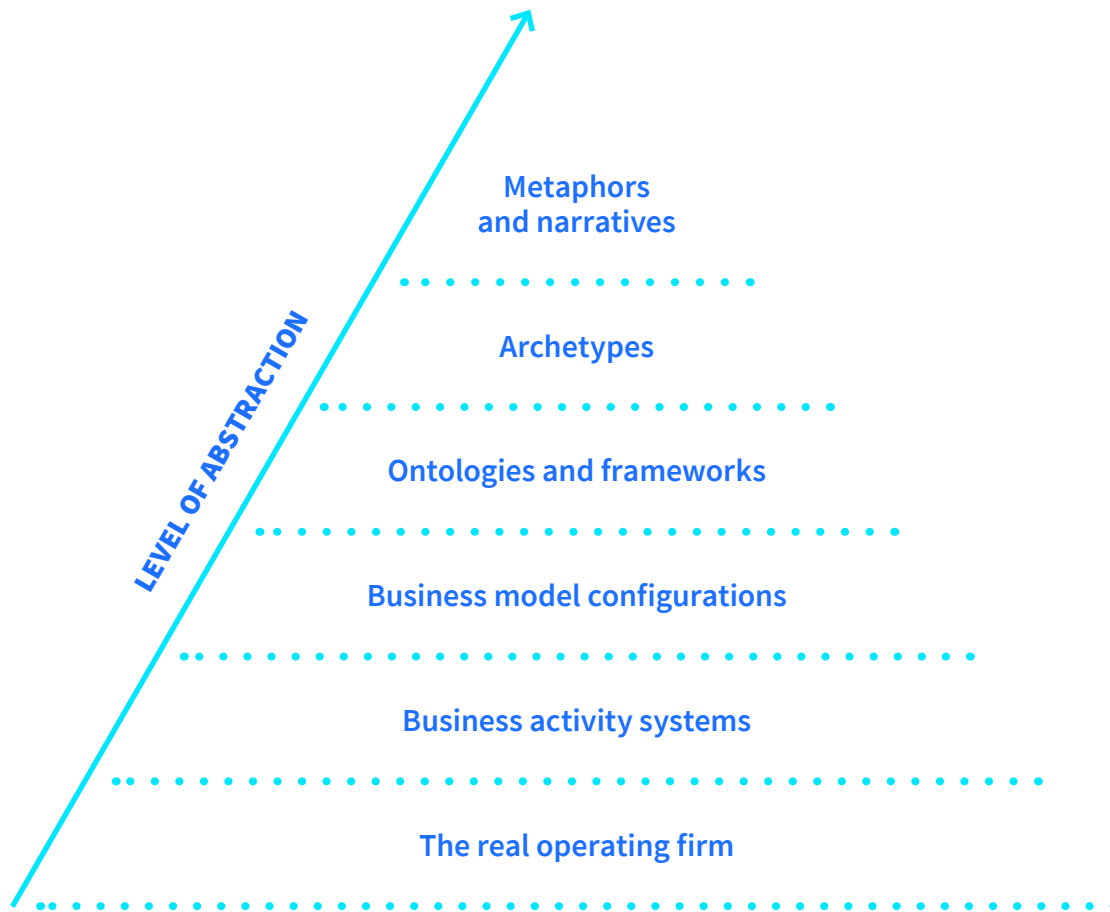


FIGURE 4.
LEVELS OF BUSINESS MODEL
ABSTRACTION (ADAPTED
FROM MASSA & TUCCI, 2013
AND NIELSEN, LUND, &
THOMSEN, 2016)

Also, becoming a part of an ecosystem has implications on the business model. Secondly, the project demonstrated very well the significance of customer insight and the understanding of the customer need. These issues were discussed with the participating companies throughout the whole project. Additionally, the results shed light on the alliance model as one way of organizing large projects and on the critical factors and challenges of the international commercialization of digital solutions.

BUSINESS MODELS

As the Internet spread and became a common tool in companies, suddenly a plethora of new business models became available for companies. The late 1990s was a golden age for new “dot-com” companies, which that based their business models on the fast-spreading Internet. Since then, hundreds of research articles have been published on different aspects of business models.

The business model concept can be defined in many different ways. One of the most important aspects in defining the concept is the abstraction level from which business models are examined.

Figure 4 is description of different business model abstraction levels described in detail in the dissertation of Rissanen (2019). The original figure is adapted from Massa and Tucci (2013) and Nielsen, Lund, and





Thomsen (2016). Metaphors and narratives are the general entrepreneurial stories describing the business. Archetypes refer to the “razor and blade”-type generalizations of business descriptions. Ontologies and frameworks include Osterwalder, Pigneur, and Tucci’s (2005) business model canvas, which simplifies the business model into a given framework. Business model configurations comprise a detailed set of different configurations that can be set to different modes. Business activity systems come from Zott and Amit (2010) and provide a detailed description of a company’s business activities. The bottom layer is the operating firm in detail.

For companies, the business model canvas framework by Osterwalder, Pigneur, and Tucci (2005) is by far the most well-known. It provides enough detail to describe the strategic choices of the company but is simple enough to be presented on one sheet. The business model canvas is not a very useful tool for running the business, however, as it lacks the dynamics that all businesses face. The business environment undergoes constant change, and the basis on which the business model canvas is made is easily deteriorated.

For the reasons mentioned above, the research in this project has concentrated on business model change and experimentation processes in internationalizing companies. Internationalization has been

chosen as a context because it is present in different ways with all the companies that participating in the Digipro project and because it is a major reason why companies must change their business model.

Business model change is a research problem that does not have easy answers. In the research papers published in this project, there are a number of outcomes that provide some further insight into the topic, however, as follows:

- 1.** The home market plays an important role in the key decisions an internationalizing company makes; a company from a country with an immature home market may be able to enter international markets more easily than one with a mature home market. In addition, the way companies use their home market context while in the international markets depends on the situation in their home markets.
- 2.** Companies have different ways they can run multiple business models at the same time. They can (a) build separate structures within the company or establish a spin-off company for business model experiments; (b) they can alternate between exploring new business models and exploiting existing business models; or (c) they can run different business models with the same team simultaneously. Option (c) is more likely to be utilized by startups, while option (a) is better suited to incumbents.

3. Depending on the development stage of the company, its international business model, and its international growth strategy, there are at least four different approaches to business model experimentation while internationalizing. *Upstart startups* make a business model pivot and jump into international markets in a lean startup mode. *Lean global startups* use technological innovation to build competitive advantage in the international markets from the beginning. *Cautious late bloomers* are incumbent companies that enter international markets after enjoying success in their home market. Finally, *seasoned buccaneers* are born global startups that have successfully pivoted with their business model during their internationalization process.

PERCEPTIONS OF PROJECT MANAGEMENT: CONSTRUCTION & MARITIME INDUSTRIES

Project managers' perceptions of the state of project management in the maritime and construction industries

As a part of the project, the research team conducted an empirical survey. The purpose of the survey was to identify how companies perceive their own project-based business processes and how they deal with the challenges that emerge in project-based business environments.

Quantitative empirical data were collected in an online survey targeted for project managers in the maritime and construction industries. The respondents of the survey were contacted via the firm in which they worked. A list of all companies operating in Finland's maritime and construction industries and employing between 10 and 250 employees was compiled. For the construction industry the search was based on industry classifications. In the case of the maritime industry, the selected industry classes had to be screened because they also included some other than maritime industry operators (e.g., among engineering firms only some companies work on maritime industry projects). Hence, only part of the companies under the selected industry codes were included. Altogether 334 companies were contacted, and the response rate was 22.5%.

On average the incumbent companies (N = 75) are, according to their own observations, doing fine, and they perceive their project management to be in a relatively good shape. For instance, 85% of the respondents found their projects to be completed on time. This view was shared in both industries: in the construction sector that figure was 86.3%, and in the maritime sector it was 82.8%. This result is rather surprising as it is commonly expected that projects will face delays, especially construction projects. The potential reasons at least partly





explaining this result are selection bias (representatives from high-performing companies), or the respondents were overly positive.

In any case, the incumbents do not see major reasons for business model changes or increasing innovation activity in their own processes. The project management in these companies perceives that the project management practices and processes are functioning well and that the projects are generally successful. Furthermore, differences between the construction and maritime sectors were rather minimal.

However, discussions on the survey findings with industry outsider experts triggered the need to examine the responses more in-depth. To reach a deeper understanding, a follow-up interview was conducted with respondents having experienced problems with these issues (“outliers”). The companies were typically small and mid-sized firms, whose turnover varied between 3–20 million euros representing the maritime, construction, and mechanical engineering industries.

Their problems were related to the following root causes: the management culture of SMEs, subcontractor network operations, and the maintenance and repair project model. These factors together

explain some of the underlying reasons why the adoption of new project management models and digital tools is challenging. The following gives a summary of the issues encountered in the interviews.

Management culture of SMEs

An important factor behind the perceived challenges in current project management practices was found in the management culture of SMEs.

Project business in some Finnish SMEs follows a one-off pattern. Projects are sold one after another and realized with a team where the members remain the same and everybody knows roughly what to do. A new project is started when the previous one is ending to keep resources in productive work. As long as project bids are won and a certain profit comes from the projects, things are left as they are. There is little room for developing processes or taking new project steering tools into use.

In privately owned enterprises the owner influences much of the project management and decision-making culture, especially in family-owned firms. In the case of a strong owner and CEO who has a dominant position, the resulting culture is one of avoiding responsibility and unwillingness to participate in open collaborative decision making. Project



information is not shared openly across projects, which leads to difficulties in cross-departmental collaboration. Things have to be done through unofficial channels.

In the opposite case, if the owner and CEO is disinterested, a management model prevails where upper management does not participate in project steering meetings and is not interested in project challenges or project assessment. Therefore, project objectives are scarcely followed with project managers who assume an independent role as individual entrepreneurs inside a company.

An SME can grow through buying other small firms. In one case the former owners of the bought firms continue as project managers and as shareholders in the growing firm. The project managers are independent in their work and do not recognize the need to share information with others. They also continue their individual types of project management. There is no chance of reaping benefits from common operational models and measures. A subsequent feature in SMEs is a lack of feedback and bonus systems. Usually schedule and budget goals are set for projects, but follow-up and reward systems are lacking. The prevailing assumption is that if a project manager delivers business as usual, there is no need for feedback nor discussion from the owner.

In another example, the project manager gives feedback to his team through email upon the project's end. Still, company management does not participate, and no development efforts outside project activities are carried out.

The role of the owner and top management in SMEs seems central in defining the management culture of a company. Therefore, if project management practices are to be developed, we have to start asking, *What are the key objectives for the SME owner, and how should these expectations be re-examined?*

Subcontractor network

The firms that operate as subcontractors are in a position where they are highly dependent upon the network's performance. This was a reason behind perceived difficulties in project definition and scheduling as well as difficulties in managing changes during the project.

For example, a mechanical component manufacturer has its immediate customer in Finland, but the end clients are large, multinational firms, who are represented by foreign engineering firms. A subcontractor cannot participate in project planning early on in this network, which leads to late orders, and approval chains in project changes can be cumbersome.



The supplier has good personal relations with its immediate customer, but it cannot reach further in the delivery chain for information about incoming orders and timetables. The other way around, the immediate customer does not forward data on the parts of the larger delivery. The subcontractor data are lost in between and remain only an isolated part in the network.

In maritime industry repair projects, the network consists of a ship owner and its representatives; a repair integrator firm; and various subcontractors, such as architects, assembly contractors, and component suppliers in Finland and abroad. The owner and project integrator headquarters can be located in Europe, and there is no access to them. In this setting a Finnish subcontractor delivers its work and does not communicate with others except its immediate customer, which is another subcontractor of the ship repair project.

In addition to the subcontracting network, project definition was experienced as problematic due to reasons related to large customer organizations. As an example, a large public customer organization with internal departments for procurement, engineering, maintenance, and use has a complex decision structure. End-users focus on quality but

overlook costs, whereas procurement lives within a complex budgeting system with public procurement rules.

In this situation the project manager wants to hear from the end-user and tries to steer the customer to define their requirements while at the same time trying to balance costs with the procurement people. Project definition gets into problems related to changing customer needs, multiple customer interfaces, and difficulties in interpreting functional specifications.

In sum, a central problem in subcontractor networks is that the customer requirement remains unclear and out of reach because the purchasers and users are separated. How can a subcontractor then specify a project? At delivery this leads to dissatisfaction due to missing customer requirements.

Maintenance and repair project model

The maintenance and repair project model is characterized by simultaneous design and realization as a project unfolds after dismantling a machine or tearing down a building under repair. For this reason, such projects have low predictability and the work planning is superficial. There are many variables in repair projects that affect the budget, and the whole project can change so much that the budget is no longer usable.



The maintenance and repair project model was identified as an important reason for having unclear project definition and project aims in the survey response. As a consequence, repair projects require more resources than new building projects. The model requires skilled project managers capable of making judgments on-site and communicating between the project's parties over the course of the project.

The maintenance and repair project model also brings with it additional work that can be of great significance and cause costs not taken in account. This can also be an intentional business model used by some firms for getting a deal first and selling more afterwards. This makes it difficult to plan a project because a project manager's work is to sell extra work on-site.

The experience of the customer was found to be important for successfully managing maintenance and repair projects. Experienced customers are prepared to project changes, but problems arise with inexperienced ones when the budget exceeds expectation. These are often small customers who do not understand what is to be expected and whose expectations exceed what can be done in reality.

Some of the sub-component work can be estimated precisely, but the overall scale of the project is unpredictable. Also, it was found that there were few statistics for predicting because follow up is based on accumulated human experience. Project offering is also based on the experience of the project manager.

Challenges for project management

The current way of doing business in the networked environment creates many challenges for project management.

A common and problematic routinized model is that customers put off purchasing until the last minute, and orders come in too late. The customer's purchaser does not think about the order in time or does not specify clearly enough what she wants. The orders in come so late that there is hardly enough time for manufacturing, even when working overtime. Time is lost due to this delay, but the deadline does not change for the actual delivery. The offer's validity has already passed, but the subcontractor has no alternative other than to fulfill the offer despite the lack of time. It has become a type of competitive advantage for the subcontractor to be able to deliver in such a short timeframe.



One reason mentioned were the different expectations regarding project realization between the supplier and the customer. The customer expects that the project has already been planned and can be realized fast and directly after the order is made. In reality there are few resources for planning the project in detail because of competition in the sector and consequently a small share of the project budget for planning. There are many open questions that require additional planning and iteration after the order. The supplier wishes for more iterations between the parties to obtain the necessary customer feedback.

Another view was that the network lives in a design world and not in a realization world. For instance, in the beginning of a ship project, time is lost in architectural design, and no thought is given to realization or making orders from subcontractors. There are two different professional worlds that do not meet. Alternatively, in the ship operating business there is nevertheless a long-term planning culture, and the repair projects could be planned better. In the face of time pressure, the subcontractor uses pricing to prevent certain changes in a project. If a change is seen as impossible in a given timetable, then a high price prevents the customer from making the change. If there is enough time for the change, a lower price is given to get the deal. This

is called project “game intelligence,” and the project manager is the business maker in this type of project business.

In response to unclear customer needs and problems in project definition, the cascade project model has been rejected by some firms. Instead, a last-planner type of project management is adopted, referring to taking on tasks that have enough information and delaying tasks that do not. This causes friction in an institutionalized sector that is used to operating with a straightforward cascade model.

Contracts

In the survey, contracts were considered rather unimportant in managing projects. Further interviews revealed that in practice projects are based more on trust and the reputation of the personnel’s competence and the firm than contracts. It is based on taking responsibility to ensure that what is done also works and that in a conflicting situation the firm is ready to take responsibility for their mistakes. This was possible in an established network where everybody knows their role in the network operation and their duties and responsibilities if something goes wrong.

Contracts are in the background, but actual project steering is conducted in collaboration with the customer, through mutual deliberation on the



situation. The guiding principle is seeking the best solution for the customer. It was also stated that contracts should not define a project, but instead the business should guide a project. Contracts should be signed proactively so as to support and enable the kind of business that the project is aiming to conduct.

In many cases a contract is not signed, and instead the documentation consists of the documents from offer to order and subsequent mail exchange. The documentation is rarely revisited. In the maintenance and repair model some projects expanded greatly. In this case contracts were made orally as verbally agreed types of contracts.

CUSTOMER INSIGHT FOR NEW SERVICE DEVELOPMENT

The role and utilization of customer insight in new service development was examined in a qualitative sub-study. Particularly, the following issues were addressed:

- 1.** How to acquire relevant insights for the development of a new service
- 2.** How to integrate customer insights into the development process of a new service

Based on a review of the academic literature and interviews with one service provider and six prospective customers, the study finds that the

process of involving the customer and accumulating customer insight is a valuable opportunity to educate the customer about the new service. Hence, in addition to enhancing service development, accumulating customer insight in a dialogical process potentially also promotes sales or at least customer interest as well as longer-term customer relationships. Engaging prospective customers in the customer insight process makes them aware of the service provider's genuine interest in customer needs.

Customer insight must be accumulated in various ways and in different phases of the service development process. The study focused on experimenting with interviews as the customer insight method in the service specification phase. The company had developed a vision based on the initial idea and started the basic technical development work. The prospective customers were interviewed regarding the challenges they face and the potential benefits of the envisioned service solution. The interviews were actually conducted by an outsider agent, not the service provider, which proved to be an efficient solution.

The findings highlight the importance of including variety in the customer insight process. Each customer has their unique perspective, and it is important to be able to distinguish the customer-specific needs from the more generic needs. In addition to the information on the customer's

needs, the customer insight methods also generate information on the potential customer's concerns regarding the service under development as well as understanding on the potential barriers that the customer has in regard to implementing the service.

Overall, the findings support the significance of accumulating customer insight during the service development process. Nonetheless, customer insight methods may have also some negative influences, which were not examined here. These remain for future research to scrutinize.

With industrial customers it is also worthwhile to go through a facilitated customer process mapping to gain a thorough understanding of the pain points in the customer's operations that the service can alleviate. This was tested in the project with one of the participating firms and their customer concerning a novel service that was being developed. The key to the success of the mapping was that it was a structured exercise and that the workshop was facilitated by a trusted, neutral outsider.

INTERVIEWS WITH PROJECT CUSTOMERS

In the beginning of the project, the challenges of project management in project industries as well as customer needs for solving the challenges were explored from the perspective of digitalization in

two industries: the maritime (shipping companies, shipyards, and suppliers) and construction industries. Several representatives from both industries were interviewed. The purpose was to gain a deeper understanding of the challenges the companies face in industrial project management and what types of current and future needs they have.

The capitalization on data in industrial projects proves to be an important factor in improving the performance of companies. Various digital tools are already in use in different phases of the processes. However, creating an overall view of the project is sometimes a challenge for the project management: even if the project were to proceed on schedule, the risk of not noticing some underlying factors that might affect the whole project is present. The findings show that a new type of data usage as well as new digital tools for the real-time control of work, material, and devices are needed. The improvement of control and time management has become especially important due to increased production volumes and, thereby, high workloads. However, new digital systems must meet the needs and requirements of the processes, and these systems need to be effectively integrated with the other systems and solutions of the company. Furthermore, some respondents addressed the need to involve the subcontracting network in the system integration to improve the transparency and maximize the





benefits. However, this type of major transformation creates further challenges. One of the challenges relates to data protection issues, that is, the extent to which companies can share tools and data between different partners within a network. It is an important issue to be addressed in case the subcontracting network is involved in the process. However, one respondent expressed the importance of focusing on the improvement of internal systems in one's own enterprise instead of the involvement of the subcontracting network. Alternatively, some respondents noted that digital tools had already been acquired but that the willingness and capability of the personnel to use them play a more critical role in the change process. The systems and tools need to be easy enough to use to make them more user-friendly to the personnel. Another essential factor affecting the pace of digital change relates to the internal decision-making process in companies, which was perceived to be slow in some.

The digital transformation also requires a deep understanding of the industry dynamics on the part of digital developers. Indeed, it is expected that the value chains and the role of the players will experience transformations in the near future. For instance, new players that manage the utilization of data better than the project customers are expected to enter into the value chain. Nevertheless, even though several respondents noticed that it is neces-

sary to utilize external partners in the new business development, the findings also indicate that some actors have expertise inside their organizations, which is why they seek to avoid close partnerships external to the enterprise and instead focus on internal system development. Moreover, it is important to note that opinions between the leaders of different departments and the management team sometimes differ as far as the system procurement and utilization of partnerships are concerned.

Digitalization is a great opportunity for project industries, but, simultaneously, some companies consider it to be a threat to their current business operations and business models. Yet, significant changes are occurring in the industry, which will force all companies to change their business practices in the future.

PROJECT ALLIANCES

Project alliances are one way of organizing large-scale projects. Customers have begun opening projects in alliance form for competitive bidding, particularly in the domain of infrastructure. The objective of organizing projects as alliances is to improve efficiency and quality and to reduce costs by increasing cooperation and coordination between the companies involved in delivering the output (Airola & Heikkinen, 2013).



Partner selection is one of the most critical issues for alliance success. The selection process and criteria were examined among Finnish companies involved in infrastructure projects. The process of partner selection proceeds in rounds of self-assessment—partner evaluation—negotiation and final choice. The most notable characteristic of the project alliance partner selection process is that it begins before the official call for bids. Due to the limited number of potential winning partners, companies have to start the selection as soon as they get the first clue that a project might become an alliance project.

First, the company evaluates whether it has the potential to win the bid alone or whether it needs partners. If partners are needed, it initiates the first round of partner selection. After the selection of the first partner, the process becomes dialogic, and together the companies evaluate the need for further partners. Generally, firms aim at keeping the number of companies as small as possible because a large number of companies possibly leads to problems in, for example, fitting company working cultures together.

The selection criteria fall under the three following categories:

- 1.** Technical factors
- 2.** Project alliance-specific factors
- 3.** Partner fit-related selection factors

Based on the identification of these factors, we present a tool to guide alliance partner selection in the section titled “Practical tools and processes” of this report.

Case Vt 6 TaaLa: Improving knowledge sharing via digitalization

One industry sector in Finland where project alliances are the norm is the construction industry. The case of the Vt6 TaaLa project is to improve the highway from Lappeenranta to Taavetti by expanding it to a 2+2 lane highway with median barriers and provides an illustrative example of both the challenges and opportunities for improving knowledge sharing in project alliances through digital tools. The highway to be constructed is 28 km long and consists of 11.5 km of new highway and 16.5 km of the broadening of existing highways. There are five interchanges and 20 bridges, of which four are renovations and/or extensions of existing bridges and 16 are new constructs (Lindell, 2018).

The client for the project is the Finnish Traffic Agency, and the type of contract is an alliance. The alliance is formed by the following four partners, each with different roles:

- Finnish Traffic Agency (owner/client)
- Skanska Infra Oy (constructor)
- Pöyry Finland Oy (designer)
- Ramboll Finland Oy (designer)



The total cost estimate of the project for the client is 76 M€, of which construction fees to be compensated are 61,515,000 €, and the constructor's fixed fee is 5,339,802 € (Lindell, 2018). As part of the study on this case, different knowledge flows in the project were identified and their bottlenecks examined, with possible remedies suggested.

Overall, the level of the digitalization process in the project was found to be relatively primitive, and the utilization of digitalization and IT systems in the case project were also found to be extremely undeveloped. The information mostly resided in poorly utilizable formats; there were barely any integrations between IT systems, and the access to these systems was often restricted between the project partners. There were also no formalized processes for knowledge transfer. Because of these factors, for the project partners to identify a single point of targeted improvement turned out to be challenging for all parties involved.

Based on the case, we concluded that many of the efficiency problems in the industry are related to the knowledge-sharing culture (or rather, lack thereof) present in the industry. The main conclusion from the case was that for the project to perform as an industry-changing front runner in the field of digitalization would require a great deal of extra effort in IT system development as well as in the mindset of the

companies involved. Therefore, extra research into the subject would be required to make more than the most general of recommendations.

We observed that all of the participants in the alliance seemed to be very wary in regard to trying to change the industry via methods knowledge management. We suggest that every participant in the alliance has the potential to try to move the industry toward a better direction by taking a more sales- or marketing-centric approach to knowledge sharing. Someone will eventually change and define the future of the industry, and the participants should consider whether they are the ones leading the industry's change or those that have to adapt to the change promoted by others. This kind of mindset is also a risk management strategy since some investments made by the companies might become obsolete as the industry standards would be defined by someone else (Destia, for example, has been an active participant in defining the final documentation for infrastructure projects). As a major customer, we would suggest that the Finnish Traffic Agency should also take its role as the industry definer as improving the quality of the construction projects industry-wide serves everyone's benefit in the end.

Organizational learning is a process that more emphasis should be placed upon. Best practices should be spread from one project to another to



increase the effectiveness of the companies. Only Pöyry had at the time of the interviews started to pay attention to the matter. A major factor for organizational learning from an analytical perspective and also for the quality of the explicit knowledge and information created during the projects would be to store the codified knowledge and information in a reusable format. This would mean that the data would be stored in BIM or databases. These kinds of changes to the predefined templates for documentation would enable the different kinds of documentation to be produced automatically or prefilled from the data in databases. Also the change would serve as an enabler for the future integration of different IT systems. As a major construction company, Skanska could also consider the option of providing project IT infrastructure as a service and thus reduce the chance of unnecessary integrations.

One easy way of tackling problems related to day-to-day communication tied to time and place would be to start using a tool such as Slack, making it possible for different organizations to use different channels to communicate with each other. Slack of course is not the only option for such a task, but the tool chosen to be utilized should provide its key features, such as the possibility to chat, store message history, and search; user rights management; ease of use and access so that people with limited IT skills could participate; a cloud-based

system so no installations/infrastructure are required; and easy scalability. Slack was chosen as an example as it is quite common tool used in multi-organizational IT projects.

Many of the problems present in the construction industry have been solved in other industries involved with complex multi-organizational projects. Overall, the case indicates that companies working in the field of the construction industry should actively be researching how project management is conducted in other fields of industries and reflect as to whether the methods used there could be utilized in their own projects.

INTERNATIONALIZATION

Digital transformation creates major opportunities for enterprises and industries globally. Similarly, new business potential has been identified in the maritime industry as a need for new types of digital technologies has emerged for improving processes and business operations. Several SMEs, including young startups, that specialize in technology and software development have responded to this need by providing new digital technologies. Based on the interview data of six SMEs and startups, three in Finland and three in Denmark, we explored critical factors and main challenges involved in SMEs' commercialization processes in the home and international markets.



The commercialization of digital technology plays an essential role in the process of innovating new products and services (Chiesa & Frattini, 2011), which is why companies need to have enough resources to invest in the process and identify the critical factors for successful commercialization. However, when commercializing new products and services, companies may face several challenges that complicate a successful launch into the market (e.g., Sandberg & Aarikka-Stenroos, 2014). Moreover, companies need to acknowledge possible differences between the commercialization in the home market and in the international market. For instance, new types of commercialization and internationalization paths have emerged as a result of digitalization and the creation of digital platforms (Ojala et al., 2018).

The empirical findings indicate differences between the enterprises in terms of commercialization practices used. Some of the enterprises rely on predetermined plans or steps to be followed when commercializing new products and services. Others commercialize products and services more on the go. Based on the findings, critical factors regarding a successful commercialization as well as the challenges faced in the commercialization process are identified on the following four levels: 1) the customer level, 2) the supplier level, 3) the external level, and 4) the country level. Below, major obser-

ventions are presented on each level (for a more detailed description, please see the publication; the publication list is attached in the end).

1) On the customer level, the effects of digitalization on the business processes of the customer and the needs of different customer segments should be considered. For instance, several respondents noted that not all customer segments in the maritime industry are making the most of the digital development even though the need for new types of digital solutions for improving business processes and eco-efficiency exists. For instance, some customer segments are cautious about carrying out changes and the major investments required by the digital transformation, which creates challenges for the solution provider. As far as customer needs and providing customer value are concerned, they play a critical role in the commercialization process of digital technologies since without putting effort into understanding the needs, the value added is difficult to demonstrate to the customer.

2) Other critical factors influencing the success of commercialization relate to network and ecosystem advantages on the supplier level. Especially in the maritime industry, forming networks plays an important role in commercializing new products and services. In addition, some managerial and organizational factors need to be addressed, which



may pose both opportunities and challenges for the supplier. For instance, the small size of the enterprise may prove to be either a challenge or an opportunity depending on the situation. Startups may face challenges in the commercialization process due to limited capital and resources and because of limited established networks. Alternatively, sometimes small size enables more agile and flexible actions as well as a more favorable balance of power, which customer enterprises may appreciate.

3) The external level involves different types of regulations, which may either address challenges or create new opportunities for the enterprises. For instance, a new industry regulation may complicate the commercialization of new products, and adjustments need to be made for the products. However, regulations may produce a competitive advantage for an actor who can answer a new customer need resulting from the regulation.

4) The last level refers to the country level. As far as the commercialization process in the home market versus the international market is concerned, the findings indicate some differences between the perceptions of Finnish and Danish enterprises. Two Danish enterprises pointed out that commercializing new digital solutions in the home market is easier than in the international market. The main challenges in the international market relate to

cultural differences, the limited local networks, and the fact that customers often prefer a local supplier to a foreign one. The third Danish enterprise agreed with the notion that the enterprise had had some challenges in the international market due to its small size when they started doing business, but the challenge had later been solved. Two Finnish enterprises perceived the situation as the contrary. According to these enterprises, commercialization is often easier to carry out in the international market when compared to Finland based on the markets where they had experience. The reasons mentioned were, for instance, the following: foreign customers show more willingness to change and more readiness for risk taking and large investments and seem to be capable of faster decision making in comparison with Finnish organizations. Several factors may explain this difference and need further research; for instance, the size of the enterprises in question may affect the investment plans and ability to invest. The third respondent in Finland did not have experience in commercializing digital technology in the home market, even though they recognized the challenges caused by cultural differences. Nevertheless, the findings further indicate that acquiring know-how in international markets by establishing and maintaining networks aids enterprises in the commercialization process. Moreover, the establishment of offices with local staff in international markets enables an easier entry into the markets,

which may even become a competitive advantage for the enterprise. Yet, one respondent mentioned that sometimes cultural differences appear internally e.g. between their Asian and Scandinavian office. In order to avoid any misunderstandings, the company has considered paying more attention in the cultural mix in the office.

Company-specific results

Four SMEs from the Turku region in Southwest Finland participated in the project. The common goal of the companies participating in the project was to develop a digital solution for improving the management of complex industrial projects. During the development work, it was discovered that several solutions should be developed for different purposes as each enterprise had specific expertise needed for a successful project implementation and the development of these solutions.

Carinafour (Carina Solutions Oy) develops and operates modern production systems and supply chain processes providing its customers with measurable added value and constant improvement of their processes. The enterprise generates renewal, growth, and higher performance in industrial ecosystems offering project management, production and supply chain expertise, among other services. The company

was founded in 2012 and the actual operation started in 2013. At present, the main customer segments involve companies in construction, maritime and production industries.

Carinafour's role in the project was to carry out research on the customer needs related to new products and services as well as to explore the requirements for the creation of a new type of digital platform. During the project implementation, Carinafour deepened the knowledge of the needs and requirements, whereby new products were created for the product portfolio and the main customer segments were analyzed in detail. Another important result in the project was the verification and assessment of the customer value added of the products and services. Furthermore, as a result from the product development, need for new business models became evident. Therefore, during the project implementation, the company worked with business model development, which further supported the initial aim set for the research project.

To mention a few examples, Carinafour developed the following services during the project implementation: *C4 Take-a-Grip* and *C4 Assembly and Logistics Unit (ALU)*. *C4 Take-a-Grip* improves the transparency and the management of the supply chain and manufacturing processes of the customers. *C4 Assembly and Logistics Unit (ALU)* provides a solution for





supply chain optimization and quality management close to the production facilities of the customers. ALU improves the material management during production providing the assemblers with pre-assembled material packages making sure that materials are located at the right place at the right time. ALU increases the transparency as well as improves the quality and cost-efficiency of production processes making the overall management effective.

Wiima Logistics Oy is an integrated supply chain company specializing in complete logistics services, known as 4PL logistics (fourth party logistics). The 4PL service offers the customer a full service for the coordination and management of the supply chain. The scope of services provided by the enterprise is flexible, and, in addition to the full-service coordination, the enterprise answers to smaller service needs. Wiima Logistics is a global company with offices in various countries in Europe and Asia as well as in the U.S. Wiima Logistics started its operations in 2010, and its customers represent different types of companies in various industries, such as project companies, product manufacturers, and import and export resellers as well as pharmaceutical, bio, and diagnostics companies.

The objective of the company in the project was to develop a new type of service for the management of project logistics. Based on existing customer needs,

the company developed a service concept called *project logistics management*. The service integrates various system interfaces, which enables the evaluation of the overall project status of its customers from the beginning to the end of the project, whereby the control and management of the project significantly improve. Project logistics management provides new types of tools and operation modes, transparency, and performance predictability as well as value added to the internal project management of the customer. Additionally, the service contributes to smooth project logistics management and improves the cost-efficiency of the customers.

Europlan Engineering Oy is a project management company that provides turn-key deliveries in domestic and foreign shipyards. The turn-key supply service offers the customers a complete turn-key solution starting from planning and design to material procurement, installations, and post-delivery support. The company has strong in-house expertise, focuses on cost-effective project management, and collaborates with a large subcontracting network. In addition to shipbuilding projects, the company has carried out floating construction projects. The company has operated in the market since 1990 and has a wide customer base both in Finland and abroad.

The initial plan in DigiPro was to pilot new digital solutions on a specific end customer case of



Europlan. During the project implementation, however, the project of the end customer was delayed due to external reasons, and the initial focus set for DigiPro changed. Because of the delays, adjustments to the timing and setting of the pilotings needed to be done, and Europlan's piloting activities could not be conducted as originally planned. Despite the changes, Europlan continued to be involved in DigiPro, providing as well as gaining important new insights into customer problematics and needs as well as the management of complex projects.

Sininen Polku Oy focuses on improving the productivity of its customers in several business areas. The core business areas of improvement involve supply chain management, quality management, and IT systems. Additionally, the company provides reporting solutions, data sourcing systems, operational efficiency improvement projects, and case-specific management consulting to its customers. The company was founded in 2015 and has become a core partner for companies in several industries.

In the DigiPro project the company accumulated knowledge on customers that operate in complex projects. In addition the company put efforts on examining the prerequisites for and possibilities of automatization of routine-like decisions that project managers have to make.

Practical tools and processes

BUSINESS MODEL DEVELOPMENT PROCESS

In companies, there is a longish tradition of using the business model canvas and its derivatives in building a visual representation of the business model canvas. It is an excellent tool for creating an easily accessible one-sheet visualization of the company's business model. Furthermore, the value proposition canvas provides a deeper understanding of the customer needs and the value proposition offerings in regard to that need.

While the business model canvas is an excellent tool for understanding the business model of a company, it is not very useful for the strategic planning or management of the company's business model. To understand the potential changes in the company business model, the value proposition canvas can be used to map out different current and potential customers and their needs. This provides the management some clues as to the different needs the different customers may have.

To evaluate a business model in regard to potential changes in the long term and building understanding on the potential changes needed—or even changes in the business model that would enable the company to become a disruptive force itself in

	New capabilities	New technology	New partnerships	New processes	New offerings	New customers	New channels	New customer relationships	New revenue models	New cost structures
Effects of big data	.	.	.	.	.	.	.	.	.	.
Effects of algorithms	.	.	.	.	.	.	.	.	.	.
Effects of connectivity	.	.	.	.	.	.	.	.	.	.
Effects of cloud services	.	.	.	.	.	.	.	.	.	.
Effects of new hardware	.	.	.	.	.	.	.	.	.	.

FIGURE 5.
MATRIX OF BUSINESS
MODEL CHANGE
AND FORCES OF
DISRUPTION

a market—business model development must be tied to the process of understanding the disruptive forces in the market and mapping the potential futures for the industry. Our suggestion as a practical, dynamic disruptive business model development process consists of the three following steps: (1) identifying industry change drivers and disruptive forces, (2) evaluating how the changes will affect the business model, and (3) mapping the optimal business model to drive the disruption.

There are numerous tools for evaluating and envisioning future changes in industries, such as Delphi, scenario workshops, SWOT, and PESTE. The tool

itself is not important, but building an accurate understanding of the possible futures in the industry is. The more realistic the results are, the better the company can prepare itself for the coming changes.

Key to future success in a turbulent business environment is the ability to evaluate the effects that future changes will have on the current business model. In Figure 5, changes have been drawn from five digital technologies that are currently changing the business environment. These forces are valid for almost all industries, but the actual disruptive forces have to be mapped individually for each company.



The third step in the process is to find the optimal business model configuration for the company to endure or even thrive in the changing business environment. For this the company needs to have a thorough understanding of the forces changing the industry, a clear vision as to how these changes will affect the current business model of the company, and the courage to define a business model that can challenge the existing *modus operandi* in the industry.

PROJECT ALLIANCE PARTNER SELECTION

The empirical examination of partner selection in infrastructure projects in Finland led to the identification of a number of factors. The frame is intended to serve as a benchmark for developing the project alliance partner selection process. The selection factors that have proven to serve the examined firms well can be arranged as shown in Table 1 on the next page.



TABLE 1. SELECTION
FACTORS OF THE
EXAMINED FIRMS

TECHNICAL FACTORS	
TECHNICAL CAPABILITY	Is there a match between the competences of the prospective partner and those required in the project?
KNOWLEDGE-BASED CAPABILITY	Does the prospect have knowledge or experience of a similar kind of project?
RESOURCES AND SIZE	Are the prospective partner's resource endowments credible? Can the partner assign an A-level team to the project?
PREVIOUS REFERENCES TO MEET PROJECT REQUIREMENTS	Does the prospect have experts with previous project alliance experience and relevant references?
PROJECT ALLIANCE-SPECIFIC FACTORS	
ALLIANCE CAPABILITY	Is the prospect able to perform in alliance projects?
KNOWLEDGE SHARING	Is the prospect able to communicate productively in planning workshops?
WILLINGNESS AND COMMITMENT TO ALLIANCE PROJECT	Is the prospect able to allocate best experts' time to the alliance project and uncertain bidding process?
ALLYING WITH THE WINNING TEAM	What is the client's perception of the prospective partner?
PARTNER NOVELTY	How novel is the prospect to us?
PARTNER FIT-RELATED SELECTION FACTORS	
STRATEGIC FIT	What is the fit between us and the prospect beyond the alliance bid at hand?
COMPANY CULTURE	How open is the prospect to sharing information?
TRUST & REPUTATION	What is our evaluation of the prospect's reputation and trustworthiness?
PEOPLE	Are the prospective partner firm's employees able to contribute?
PREVIOUS RELATIONSHIP	Does the prospect have a track record of earlier successful collaboration and/or earlier bidding processes?



Businesses need to be able to take time and look at the big picture in order to understand the underlying change factors.

5

// WHAT WE LEARNED ABOUT // PARALLEL PROJECTS

Parallel projects are the favored collaboration tool for universities and companies by the co-financer Business Finland. From the university perspective it is a research tool very different from the previous model, in which companies participated in research projects mainly as research objects and beneficiaries of the results by providing 10% of the funding for the projects. In the parallel project model, the universities and companies have their own independent research or R&D projects that are united by a mutual project plan. Since the beginning of 2018,





these kinds of co-innovation projects are the only source of major research funding for universities from Business Finland.

The long-term vision of the parallel project model is to get research benefit businesses better and to integrate actual business problems better with research. That is a valid objective that will benefit both companies and universities in the long run. There is a discrepancy between the speed at which companies and research institutes operate, and the parallel project model pushes both parties to improve their operations. Universities need to do basic research, but they also need to develop tools for providing applied research at a much faster pace to provide results that are relevant in the fast-changing business environment to benefit companies. Alternatively, businesses need to be able to take time and look at the big picture in order to understand the underlying change factors in their business, and universities can provide tools for that.

DigiPro was one of the pilot projects for university-business collaboration in the co-innovation model. All the companies had very little experience with this kind of multi-partner collaboration projects beforehand. Although the project was very well planned, and the structure stayed very stable throughout the project, the importance of the project preparation phase must be emphasized. A parallel project means

that all project partners have their own projects in addition to the responsibilities coming from the overall project. These responsibilities and the benefits received from the parallel structure have to be very well communicated and understood before the project begins. The better the preparation phase is performed, the more smoothly the actual project will run. It is particularly important to set the shared objectives of the project in such a way that is acceptable to all partners. Also, the partner roles in the overall project need to be addressed thoroughly before the project begins.

The aspect of time is another critical issue. A parallel project structure requires all projects to begin at the same time. Aligning the company schedules and research schedules together is a demanding task. The actual beginning of the project should be set far out enough so that project partners can commit to it. Our experience suggests a six-to-nine-month period for preparation activities before beginning the project. During this period it is crucial to collaborate between the partners but also with Business Finland experts to ensure that the preparation is done properly and that the project is also possible from the funding perspective.

The project plan for the overall project must be ambitious and clear, but it also has to be flexible enough to allow for changes during the project.

It is impossible that all partners of a parallel project will stay the same and be able to fulfill their individual projects exactly as planned. Although Business Finland-funded projects very often reach the objectives set for them, the actual manner in which the results are reached is seldom the one set forth in the project plan. In a parallel project these changes in actual project activities are multiplied by the number of project participants, and therefore flexibility in the project activities is essential. From the university point of view this means that the core of the research agenda needs to be solid even though the actual collection of the empirical material can change during the project. For companies, the input they provide for the overall project and the gains they expect from the project should be clear from the beginning although the actual manner in which these inputs and gains are provided can change. To succeed, a parallel project must prepare for these “hiccups.” There can be minor and even major events that change the individual projects’ courses, and the whole parallel project consortium must have tools to address these issues.

Considering the high demands of successful parallel projects, DigiPro succeeded well. The project consortium was very committed to the mutual project, and even though there were several unexpected events that affected the individual projects, the overall project could be continued and finished. The companies were mostly very successful with their own projects, and both universities reached their goals research-wise. However, the preliminary vision of an actual co-founded new project for international markets could not be built. During the project this was quickly understood as this kind of collaboration would require deep integration and a very high level of trust between the project partners—and even though the project companies had had some previous collaboration before DigiPro, they were far from the intimacy required for a mutual product for international markets. Despite this, the project was far from a failure. The company projects yielded many new growth opportunities that were realized during the project. The research unveiled new understandings on business models in project industry and the managerial myopia that is present in stagnant industries such as maritime and construction.



The prospective customers who are industry insiders view the situation differently than service providers outside the industries.



6

// CONCLUSIONS

Overall, the project activities revolved more around customer need than was originally planned. The participating companies voiced over and over again the need to focus more on the understanding of customer needs. Due to the significance of the issue, the project plan was recalibrated to give more weight to the customer understanding. Hence, the project involved initial customer interviews, an examination of the customer need as part of business model iteration, an examination of the utilization of customer insight, and finally the project manager survey.

The participating companies' need to focus a great deal on customer needs reflects their orientation toward the market. The companies in question understand the importance of the customers' perspective. It is also linked to the complexity of the digitally enabled service solution. In addition to the actual features of the service, it is important to know what the most valuable aspect for the customer is. Finally, it also reflects the phase in which the companies are at. Hence, the findings from the project are the most valuable for SMEs operating in a rather similar development phase, where the operations have gotten off to a good start, and the company is able to put effort into business development through the carefully planned development of service-based solutions.

In addition, the problem of prospective customers' unawareness of the potential to develop their operations was another common theme. This is a more challenging issue to tackle. The project manager survey shows that the prospective customers who are industry insiders (in the maritime and construction industries) view the situation differently than service providers outside the industries. Industry outsiders appear to be better able to critically evaluate the processes and the operating models that dominate in an industry and hence see the potential for improvement.

One way to address this challenge is through accumulating customer insight in a dialogical process. In this process there is the possibility of gently educating the prospective customer. However, it is a costly and relatively slow process for advancing benchmarking and knowledge transfer across industries.



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// APPENDIX 1

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- Bruun, Robert, Eriksson, Taina, & Rusanen, Helena (submitted) Towards better project performance – Partner selection in project alliances. Submitted to Long Range Planning.
- Aro, Elisa (to be submitted) Insights into commercialising digital technologies – Evidence from the maritime industry in Finland and Denmark.

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- Aro, Elisa & Haaja, Eini (2018) Why the collaborative development of a digital solution fails? A case study viewed through opportunity recognition and mental image concepts. EIBA conference, Poznań, Poland.

Practical papers

- Rissanen Tommi & Koponen, Aki (2018) How to disrupt your business and make it great again. ISPIM Connects Fukuoka conference, Fukuoka, Japan.



