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# The unexpected consequences of the Covid 19 on managing ETO projects

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**Abstract.** This paper presents findings of the consequences of the recent Covid 19 pandemic on the shipbuilding industry. Through qualitative interviews with key stakeholder on their experiences, the paper identifies an increased emphasis on contracts as regulative for collaboration. This increased focus on legalism in the shipbuilding industry was already triggered by the recent oil crisis yet escalated to a new level by the rules and regulations imposed by the pandemic. The paper argues that the ramifications of this pandemic cannot be understood without interpreting it in respect to the ongoing market transition the industry was already facing when the pandemic hit the world. The findings of increased formal regulation of collaboration, requires further studies and have implications also for the ETO literature.

**Keywords:** ETO, collaboration, legalism

## 1 Introduction

Engineer-To-Order (ETO) is a business strategy where each product is delivered through a project-based approach that ensures the level of customization required by each specific customer [1]. One important characteristic of this strategy is that, due to a need for specific components, material, equipment, as well as specialized workers to install these elements on the final product, most ETO companies have implemented an outsourcing policy that gives them flexibility in choosing suppliers that can deliver within the required quality and price [2]. However, this extensive outsourcing of both materials, components, and workers has lately been affected by two major events that together increased the focus on how contracts are written and followed by all parts involved in delivering an ETO product. These two events are the oil crisis that started in 2014 and the Covid 19 global pandemic that started in 2020. The former created an unbalanced relationship, with both customers and suppliers, that was further accentuated by the pandemic constraints. One of the most relevant elements of this changed

relationship is the way contracts between project participants are negotiated and applied in practice. The consequences of this change are observed at several working levels as shown throughout our research.

This paper presents preliminary findings from a qualitative study exploring the impact of the pandemic on the shipbuilding industry that was already affected by significant changes. A few years ago, most shipyards located in the western part of Norway had to adapt to producing cruise vessels after several decades of delivering specialized vessels for the offshore market. While working with offshore customers and suppliers, these shipbuilding companies had developed relationships based on trust and mutual understanding that ensured a close collaboration between the project partners. Changing markets meant that new suppliers and collaboration strategies had to be identified and the contract took on a more central role in defining the relationships between project participants. This process of transition from one market to the next was on its peak when the Covid 19 pandemic hit the world affecting all kinds of businesses and services including the shipbuilding industry.

To fight the rapid spread of this virus, most governments enforced several restrictions on travelling outside own countries, as well as quarantine rules for people arriving from another country. For the case companies, which are dependent on foreign workers to execute large parts of the project, these restrictions led to a change in the way work processes are managed and planned. Now, team leaders must consider the risk of prolonged quarantine or lack of competent workforce when allocating work packages and activities to be completed by the selected suppliers. All that in a context of projects sold with low profit margins and short project delivery time.

Subsequently, the case companies had to deal simultaneously with two types of challenges: 1) to adapt working with new and unfamiliar customers and suppliers; 2) deal with the constraints imposed by the pandemic rules and regulations. Based on these matters, the main research question is: *How did the recent pandemic affected the collaboration between project participants in ETO shipbuilding companies while transitioning between markets?* This research question addresses the context of transition as an underlying factor that started a “legalism<sup>1</sup>” trend which was accentuated, and later elevated to new levels, by the pandemic rules and regulations.

## 2 Theoretical background

ETO products are delivered through a project-based approach where each one of them is designed and engineered according to specific requirements made by the final customer [3]. To accomplish these specifications, each project includes numerous engineering hours and a close collaboration between the project team, the customer, and several specialized suppliers [4, 5]. Most European shipbuilding companies have, over the years, implemented a strategy where about 60-80% of the value added to the final product is externally procured from specialized suppliers. These suppliers offer services

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<sup>1</sup> Strict adherence to law or prescriptions, especially to the letter rather than the spirit ([www.dictionary.com](http://www.dictionary.com))

and products that varies from simple standard parts to highly complex equipment, materials, and components. They also offer design and engineering services as well as specialized production workers [2]. Such high dependency on suppliers is usually regulated by contracts that during the years have become more detailed, increasing the focus on the legalism aspect of each deal between the shipyard and the supplier [6]. In the project management literature, contracts are seen as a “*glue for good project management and relations, and that they are a good and effective control mechanism, reducing risk for project participants*” [7]. Yet, results from the industry show that focus on contracts reduces the likelihood of achieving a good project control since they are usually subject to different interpretations that depend on the economic context. When the economy is booming, securing profit, and ensuring a steady supply of appropriately skilled workers is unproblematic, but the situation changes when the economy is heading for a crash. Thus, the way a contract is interpreted has a huge influence on the profitability of the work specified within this formal document [7], challenging also the collaboration between project participants

In his article, Emblemsvåg [6] describes the negative effects of increased focus on defining and following contracts in project-based industries by referring to cases from shipbuilding and other similar environments. The author argues that due to limitations imposed by contractual agreements, the collaboration among project participants and the expected product quality are now suffering severe drawbacks that can affect project-based industries on the long-term perspective. Among the drawbacks mentioned in the article were more manual work and reactive quality management that decreased the level of open and constructive cooperation between the project participants. Thus, following contracts to the letter creates an increasing bureaucratic approach to collaboration, resulting often in an adversarial attitude among project participants. On the other hand, detailed contracts makes it easier for incapable suppliers to win bids by offering low prices, but failing to deliver within the agreed budget and time [6].

Relationships based on a legalistic view result often in an attitude where project participants stop inviting each other to discussions on finding the best possible solution for the project as a whole [6]. This approach has negative consequences in the Norwegian context characterized by a cluster culture where companies in the maritime industry are recognized for their collaboration in developing new and advanced technological solutions [8]. Reducing the collaboration possibilities due to more focus on following contracts to the letter, has unwanted consequences on maintaining the competitive advantage brought in by the cluster culture. Moreover, the consequences of increased legalism are high costs and risks for each entity involved in a project [6] in a context where shipbuilding companies and their suppliers are increasingly challenged to deliver highly customized vessels to lower prices.

The negative consequences described above are all observed and discussed during our research project, however, a surprising benefit of more focus on the contractual agreements surfaced through our recent interviews. We discuss these preliminary findings throughout this paper.

Based on the theoretical perspectives presented above, this paper contributes mainly to further develop the literature on ETO as a business model where legalism creates new challenges that limits collaboration and innovation among project participants.

### 3 Research methodology

The data presented in this article is primarily from two qualitative interviews with key stakeholders, discussing the experience of dealing with the pandemic from the perspective of a director of the purchasing department at a yard and a managing director at a supplier company. The supplier is an international supplier that delivers products and services to several other shipyards in the region, a situation that gives them the possibility to perform a comparative view on the development and trends within the industry. These interviews should be regarded as pilots, where the authors have ambitions to explore the insights from these interviews by comparing it to experience of other yards and suppliers. However, the two interviews have to be understood as part of an ongoing research project, commencing in 2018, that study the transition from offshore to cruise in shipbuilding. The project combined has an extensive data base, stemming from over 30 qualitative interviews, 2 quantitative surveys in production (a total of 600 participants combined) and participant observations from yard activity as planning and project meetings, production work, and so forth. All interviews conducted throughout the project have been transcribed and coded in NVIVO. This wider source of data is key both to identifying the topic in question, and to the interpretation of how the ramifications of the pandemic cannot be evaluated individually but have to be interpreted as related to the context of an ongoing process of market reorientation.

Due to the pandemic, the interviews took place through Teams. Each one lasted around 1 hour and 30 minutes and were recorded with the consent of the interviewees. The interviews followed a focused semi-structured guide, which specifically targeted their experience with the pandemic. The guide started with fairly broad questions where the interviewees were asked to elaborate on their experiences and lessons learned through the pandemic, following up with more topic specific questions during the interview (the role of the contract of managing the relationship, recruiting, and maintaining workers, dialogue with the yard, outlook to the future and so forth). The topic specific questions were identified through observations and talks at the yard, as well as through issues emerging in the media about the consequences of the pandemic for the maritime industry. The open questions were meant to create a rich dialogue allowing the interviewees to bring to discussion possible information that is not easy to predict in advance [9]. The research team listened through the recordings of interviews in the aftermath then systematized, and compared the insights from the two interviews, interpreting them in the context of the findings within the wider project.

The research question for this paper seeks to understand if the existing theory explains the behavior observed in the studies cases [10]. For that, we used case studies from an industry relevant to the call of the conference. The results presented in this paper are preliminary as the research team plans similar interviews at other shipbuilding companies in the region.

## 4 Case companies

Like the European ones, the Norwegian shipbuilding companies produce mainly highly customized vessels that requires customer involvement from the design phase all the way throughout the project. The first case company produces vessels to a large range of industries like offshore, fishing, wind farms, and alike. A few years ago, due to the oil crisis that reduced the number of orders for offshore vessels, the company started to produce vessels for the cruise market. This transition required an adaptation process where the shipyard had to develop new types of relationships with new customers and new suppliers since the scope of a cruise vessel differs to a high extent from the scope of an offshore one. While the offshore customers focus on performance of the equipment on the vessel, the cruise customers focus on design solutions on the interior part of it. New relationships and new demands caused changes in terms of planning, coordination, and work practices [11]. While adapting to these changes, the constraints imposed by the pandemic challenged the newly established working procedures once more. One of the elements that needed a new evaluation was the contractual agreement between the shipyard and the customer, and between the shipyard and its suppliers.

The second case company, an international supplier working with shipyards all over the world, is also an important project partner for the main case company. This company delivers products and customized solutions to both offshore and cruise vessels managing to keep a long-term collaboration with the case shipyard. Thus, they were able to inform the research team on how the wave of changes that started with the oil crisis and continued throughout the pandemic, affected their collaboration with the shipyard. The supplier's perspective on the pandemic rules is showing how local rules imposed by the shipyard on top of the existing national and regional ones, affected their working processes that were already pressured to change due to the oil crisis. Both companies agreed that the new focus on detailing and interpreting contracts was limiting the open and trustful collaboration experienced during the offshore boom.

## 5 Findings

The preliminary findings in this research emphasize several categories of consequences created by the pandemic in the context of transition within the shipbuilding industry. One of the first consequences of these two different events was more focus on the way contracts are written and followed by both customers, shipyard, and suppliers. Yet, while the pre-pandemic contracts were reaching a high level of detail and focus on legal issues, the pandemic ones managed somehow to bring to light new types of legal topics that were never an issue before the pandemic. An immediate result of this approach is a significant increased cost of the project especially on the administrative side since both the customer, the shipyard, and the suppliers had to use more hours on solving several types of legal issues. Another result was higher cost for the purchasing of materials, components, equipment, and services from their suppliers, particularly the ones providing specialized workforce. All these unanticipated costs have huge consequences

for each project under construction as they were sold with low profit margins on a highly competitive market.

Towards the end of last year, many specialized workers were ready to leave the shipyard since they work in shifts of average one month here and one month in home country. The sudden increase in the number of Covid 19 cases urged the authorities to close the country again, creating a new challenge for the shipyard which is dependent on importing specific disciplines at specific times. Luckily for the case company, these rules landed right after a new shift of foreign workers had arrived at the shipyard after the Christmas vacation. Some of the relevant workers decided to remain for one, max two periods more, but many of them had other issues to solve their home countries. This situation led to another dilemma of how and when to import the needed workers in the context of closed borders at the national level. For the shipyard, a delayed project delivery is way too expensive if the customer decides to follow the existing contractual agreement. Moreover, given the fact that the collaboration between the ship owners and the shipyard was new for both of them, using the contract as a guide in every decision to be made complicated the evolution of the project even more.

Most shipyards outsource a significant part of their activities to specialized suppliers who in turn import these services from other countries or continents. When the Norwegian government imposed severe restrictions on travelling to Norway, most project-based industries had to start finding solutions that would keep projects on schedule without breaching the new rules and regulations. One of the solutions applied by the shipyards was to test people for Covid 19 when they entered the country, then a few days after arriving at the quarantine place at the yard, and a third time at the end of the quarantine period. As the pandemic evolved to be longer and more complicated than expected, new national rules were imposed for companies importing workforce. They had to write applications for each specific worker that would arrive at the shipyard. These applications were sent to a specific governmental institution that would evaluate them and send them back to the company that issued them. The testing process, the time spent in quarantine, and the new documentation process raised questions like who pays for the tests used for each worker? Who pays for the quarantine days? Who pays for the hours used by each company in getting the required workforce to the shipyard? New and unexpected issues had to be debated and introduced in each contract between project participants. Since no one could afford these unplanned costs alone, each of the new agreements added to the official document was seen as limiting the collaboration to the letter of the contract. Thus, workers on each side were asked to discuss every improving initiative with own leaders before it could be brought to the customer or to suppliers, an unusual approach within the Norwegian cluster.

Furthermore, based on requirements from some of the customers, the shipyard had to introduce additional rules for testing people arriving from other shipyards located in the same region. These rules are similar to the ones used for workers arriving from other countries and that created a new debate regarding who will support such additional costs since the national rules did not cover them specifically. Or the cost for keeping local workers in quarantine just because they were coming from another local shipyard. At the time of the interview, there was no clear answer to these questions, but a result of these discussions was a reevaluation of a more general contractual agreement



between the shipyard and the suppliers stipulating that “suppliers must follow shipyards rules” (I31). These rules are now becoming even more specific so that they make a better distinction between national and local rules. That created additional project costs and determined clearer responsibilities for each project participant, yet at the expense of the open and trustful collaboration observed in earlier projects.

Another challenge the shipyard and its suppliers had to deal with is related to changes in the delivery of materials, equipment and components from suppliers who have their production facilities located outside Europe. The unexpected stop in sea shipping led to increased cost for transportation due to lack of containers, fewer routes to Europe, reduced inland transport capacity due to pandemic measures, etc. As one of the interviewee states “transporting a batch of walls by plane became more expensive than the product itself” (I31). Consequently, a new discussion surfaced: who will pay for all these special transportation solutions? The customer who wants the vessel delivered on time, the shipyard who is responsible for the project, or the supplier who is bounded by a contract created before the pandemic? Questions like these opened for new types of details in the already detailed contracts. One of the most discussed issue was referring to “force majeure situations” clause that was very much used in the beginning of the pandemic but became a subject to change when companies grew more accustomed with the new rules and regulations. According to the supplier’s perspective, this clause has now a new definition and meaning, adding new constraints to the collaboration between the project participants.

When the shipyard had to impose all these additional rules for testing and quarantine, they also had to introduced them as agreements in the contracts with customers and suppliers. Beside all the juridical implications, some positive consequence on planning project activities were noted both by the shipyard and by the supplier. In order to deliver according to the existing plan, the company had to improve the quality of the existing planning process by making sure that each project participant delivers as planned. A more dynamic and proactive communication with the suppliers became necessary and the result was fewer delayed deliveries on each side. However, both companies mentioned that they now follow the plan and the contract much closer, and they perceive the collaboration as more formal than before (I30, I31).

## **6 Discussion and conclusions**

The focus in this article is on how the recent pandemic affected the collaboration between participants in ETO shipbuilding projects. Based on our preliminary findings, it seems like the contractual agreements existing before the pandemic are now under a very detailed scrutiny. Many of the elements that were quite general and somehow implied as a part of the understanding between the customer, the shipyard, and its suppliers, are now reevaluated and new, more explicit elements are getting added.

Having to deal first with a new market and then with new pandemic triggered rules and regulations, changed the perception on how contracts are written and followed both

by all project participants. Before the pandemic, the shipyard and the supplier were preoccupied by the negative consequences of more focus on contractual agreements that would restrict the informal collaboration that existed during the offshore era. When the pandemic arrived, they had to get together and find solutions that imply close collaboration in finding the right formulation on the contractual agreements. How this approach will affect the future collaboration in developing innovative solutions, the trademark of this regional cluster, remain to be seen.

Based on our preliminary findings, it seems like the rules and regulations imposed by the pandemic have changed the attitude and the approach to contracts in the ETO environment. Meanwhile, the same rules exposed the vulnerability of being dependent on imported workforce and many ETO companies must reevaluate their business models and find solutions that would keep projects on schedule despite disturbing events like global pandemics. Thus, the next step of this research is to analyze how a business model based on extensive import of specialized workforce can survive the impact of extremely disruptive events. The research team plans a larger mapping process of how ETO companies have adapted to a new way of managing their projects.

Among the limitations of this paper is that our data is mainly from the shipbuilding industry, and we would probably find different challenges in construction or other similar industries.

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