On outsourcing and offshoring: Challenges facing management and engineering

This study investigates the challenges engineering companies face when globalising the product development process through offshoring and outsourcing. Furthermore, it investigates how the companies took to address these challenges and the impact this had on the organisation, the engineering processes and the engineers. The research methodology framework developed by Blessing & Chakrabarti (2009) was employed in this thesis. This framework consists of four phases; (1) Clarifying the research area, (2) Illustrating the current situation and the desired situation, and the gap between these (the descriptive study), (3) Illustrating how to close this gap (the prescriptive study I) and (4) Validating these results (the prescriptive study II). Two descriptive studies were carried out as case studies with seven Danish multinational corporations. A total of 57 semi-structured interviews were conducted with top managers, daily managers and expatriates. In study 1 four areas were investigated: (1) the global product development process in the investigated case companies, (2) the challenges they experienced, (3) the solutions they implemented, and (4) the impact of these solutions. In the descriptive study 2 the use of expatriates was investigated in relation to their role in the organisation when globalising the product development process. Through investigating seven Danish multinationals it became clear that global product development had an impact on both management and engineering projects within the companies. The globalisation of the product development process started with manufacturing activities and later more high value adding activities like product design and R&D were added until some companies had globalised the whole product development process. The globalisation of the product development process seems to consist of four phases: 1. Motivation to move abroad. 2. Preparation phase. 3. Implementation phase. Complications. Operational solutions to complications. 4. Managing the relationship. Complications. Operational solutions to complications. Only top management was involved in these first two phases. In implementation and managing the new global projects and relationships, the daily managers and expatriates were responsible. In these last two phases the companies faced organisational and cultural issues which were hard to resolve with the technical and managerial aspects of the engineering projects. The problems within management were similar to those previously reported in literature, mainly related to culture, knowledge sharing and coordination but also change management and organisational structures and processes. The problems within engineering were related to product and process modularity as well as the knowledge properties of the product. These problems resulted in delays, misunderstandings and quality issues.

The novel aspect of the empirical investigation was the in-depth understanding of how these challenges were addressed in the company to try and maximise the perceived benefits from globalising the product development process. The daily managers implemented a series of initiatives to address these; mainly codification of knowledge, streamlined communication, training, bringing more tasks out to ensure contact between vital elements, make the product development process less complex, make the product less complex and detailed work descriptions. There was, in other words, a focus on control and minimizing risk. The result of these solutions impacted on the product, the product development process and the organisation. Some of these impacts were positive and some were negative. The positive impacts of the solutions were related to a better understanding of work processes and the supply chain whereas globalisation itself provided the possibility for an increased product portfolio and products which were better suited to local markets. The negative impacts were for example, that the product development process became slower and less integrated whereas the organisation became more focused on codified knowledge and written communication.

However, complications remained with both many of the original challenges with globalising the product development process and the negative impacts of the implemented solutions. The companies thereby went through an iterative process of facing complications and suggesting operational solutions. There was a lack of a clear strategy with globalising product development which meant a decoupling between the strategic and the operational level of the organisation. There was furthermore a decoupling between the operational and strategic layers of the organisation due to the task division between these in the globalisation process. As a result there was a focus on operational challenges and solutions in the later phases of this process. The reason for remaining challenges can be explained on two levels; the operational and the strategic level. On the operational level organisational theory, including change management and cultural studies, indicated a lack of preparation of the organisation for the change globalising product development led to. There was a lack of a clear strategy with globalising the product development which meant a decoupling between the strategic and the operational level of the organisation. Furthermore, there was a lack of an iterative and reflective process within the globalisation process itself. This meant best practices from change management, product development models like the stage gate model and outsourcing/offshoring literature concerning how to conduct the globalisation process had not been followed, in particular in the early phases as these called for extensive preparation. iii Knowledge management showed a lack of knowledge sharing initiatives within the headquarters and between it and subsidiaries as well as other stakeholders. Control theories such as organisational cybernetics show a lack of measurable outputs and continuous adjustments according to these measurements compared to specified goals. Network configuration theory within the operations research area showed a less than optimal global network configuration, which could explain issues with coordination, knowledge sharing and misunderstandings.

On the strategic level the problems can be seen as the result of the approach the companies had to decision-making; (1) a decoupling between the strategic and operational level of the organisation and (2) a focus on symptoms instead of causes. This meant that decision-making and problem solving were single-loop learning and focused mainly on short term gains. This resulted in problems that were not resolved, though the effects of the problems could be minimized. However, as more complex tasks started to move out, the solutions the companies implemented became less and less effective as such tasks in their very nature are hard to resolve using tools such as modularity, work process descriptions and decoupling to other tasks and functions. A framework was developed which can minimise the negative impact of globalising the product development process and address the challenges the company has today on both an operational and a strategic level; thus ensuring a short term as well as a long term perspective can be taken. It is suggested that companies who wish to globalise product development go through an iterative process of five stages and see their decision process as being a part of continuous adaptation and improvement to fit the organisation with an ever-changing market. This framework is called the Global Decision Making (GDM).
framework. These five stages are (1) strategic goal setting, (2) strategic planning, (3) operational planning, (4) implementation and (5) evaluation. These five stages have several steps as indicated in the following: Stage 1: Strategic goal setting 1. Clarify the desired/ideal market position for the company. 2. Clarify key performance indicators for reaching this position. Stage 2: Strategic planning 1. Clarify the current market position for the company. 2. Clarify the gap between the current and ideal market position i.e. the business problem the company seeks a solution. 3. Evaluate the best approach to move from the current to the desired position, including which factors encourage using globalisation as a tool to do so and which factors discourages this. Stage 3: Operational planning 1. Select the task to be moved abroad. 2. Clarify the possible external changes and impacts due to moving this task. 3. Clarify the possible internal changes and impacts due to moving this task. 4. Select key performance indicators. Stage 4: Implementation 1. Move the task. 2. Implement key performance indicators. 3. Implement possible changes due to measurements from the key performance indicators. Stage 5: Evaluation The GDM framework relies on going through these five stages and combining the idea of approaching the ideal market position through smaller steps while utilising best practices and considerations from several theoretical fields, including organisational theory, change management, engineering project management like the stage gate model, and network configuration from operational research. The GDM framework uses double-loop learning to ensure causes for problems are investigated and addressed. In this way the challenges seen in the case companies can be resolved or minimised at an early stage through using key performance indicators and a continuous feedback loop so the implemented change matches the strategic plan for the organisation. This research has therefore contributed new knowledge within this research area by: Illustrating the challenges, implemented solutions and their impact on the organisation and the management of engineering projects when engineering companies offshore or outsource product development process activities. Analysing these challenges and impacts using different theoretical tools from organisational studies and operations research. Demonstrating the disconnection between operational and strategic problem-solving in the organisation when globalising the product development process. Showing how offshoring and outsourcing of activities in the product development process can be incorporated into a change management and technical project management perspective. Illustrating a Global Decision Making framework which incorporates different theoretical fields in order to view offshoring and outsourcing from both an operational and a strategic perspective. Illustrating an iterative and reflective Global Decision Making framework which allows for organisational learning and continued adaptation as markets and conditions change. The GDM framework is a tool companies can use when globalising the product development process. It utilises methods which are well known in industry. The validation process showed industry partners found the tool understandable and useful although behaviour and results when implementing the framework has yet to be evaluated. The GDM framework can be customised in each company to fit their specific environment and characteristics. Furthermore, whether to make large or small changes in the organisation is up to each company depending on available resources and the aim for globalising the global product development process. v The framework can help companies address and minimise risks and could thereby help companies reach their goal and lessen the chance of costly mistakes in the globalisation of product development process activities.

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