

# The Role of Cultural Characteristics in Industrial Manufacturers Performance

## Implications of locating production in Norway

Natalia Swahn, Marco Semini, Jan Ola Strandhagen

Department of Production and Quality Engineering

Norwegian University of Science and Technology

Trondheim, Norway

{natalia.swahn, marco.semini, ola.strandhagen}@ntnu.no

**Abstract**—Geographical location is one of the factors that can contribute to the company’s competitive advantage on the global market [1]. Each location is unique in terms of its cultural characteristics; understanding the relation between cultural factors, production characteristics and performance is essential when making decisions regarding production location. This paper aims to explore the effects of national culture on manufacturing performance. We study a case of the Norwegian maritime cluster in North-Western Møre region. We evaluate the performance of manufacturing companies within the cluster, and discuss the role that cultural characteristics play in performance. The study contributes to the knowledge on how national culture can affect the performance of manufacturers by linking culture- and industry-specific factors. It further proposes some implications for the choice of production location.

**Keywords**— culture; production location; maritime cluster

### I. INTRODUCTION

Manufacturing industries have historically been an essential driver of countries economic growth. Over the last decades, globalization and high operation costs have led many manufacturing companies in industrialized countries to relocate their production to the areas with lower cost levels, such as Asia and Eastern Europe [2]. Recent research indicates, however, that companies often fail to weigh the costs against the benefits when offshoring, and have to deal with obstacles such as low quality, long lead times, or complications with communication and coordination. From the total cost of ownership perspective, offshoring production proved to be costlier than anticipated [3, 4]. There is growing evidence that the reverse trend had recently started rising [5], with numerous Western European and USA companies returning their offshore production to the home countries.

This study assumes Michael Porter’s view that the geographical location of the company can provide it with factors that can contribute to the company’s competitive advantage globally. Even though company’s performance is not determined by its location, various scholars have emphasized the effects that location-specific factors can have on performance [6]. Therefore, the choice of production location when making offshoring and reshoring decisions is critical for the company’s competitiveness. The main body of

research dealing with off- and reshoring motivations tends to apply transaction costs theory when explaining decisions that companies make about production location [7]. Industry-specific and location-specific factors, however, remain largely unexplored. A previous study of the Norwegian maritime cluster [6] indicated that locational factors such as labor and electricity costs, infrastructure quality, and proximity to other supply chain actors, R&D institutions and competitors are important factors that affect performance of manufacturing companies within a cluster. It must be noted, however, that most of these characteristics are shared by maritime clusters in the developed countries. At the same time, an overall performance varies among clusters in different countries. The factor that seems to distinguish them from one another is countries’ cultural characteristics.

While there are numerous studies on the risks of production offshoring, and limited but growing body of the research on motivations and patterns of reshoring, to the authors’ knowledge, there is a lack of research on the role of location-related cultural characteristics in performance and in choice of production location. This paper builds on the assumption that cultural, organizational and social factors have a significant influence on manufacturing performance. We study the case of Norwegian maritime cluster located in the North-Western Møre region. The companies within the cluster have proved their global competitiveness over the years. The present study aims to answer the following research questions:

- How do manufacturing companies in the cluster perform on Beckman and Rosenfield’s competitive performance dimensions?
- What are the cultural characteristics of the region, and what effect they have on performance of manufacturing companies?

This is an exploratory qualitative study [8]. The publications on the maritime cluster and its performance, as well as those presenting more general evidence of the performance of manufacturing companies were used to answer the first question. To address the second question, we applied Hofstede’s cultural dimensions and Norway’s positioning within this model, combined with our in-depth knowledge of manufacturing companies in the cluster.

The rest of the paper is organized as follows. First, we present Hofstede's framework for mapping culture. Then, we introduce Norwegian Møre maritime cluster and review its performance. Next, we discuss the cultural characteristics of the region and the effect they have on performance. Finally, we provide implications for the choice of production location, and discuss limitations and further research.

## II. NATIONAL CULTURE: FRAME OF REFERENCE

Culture influences many aspects of human behavior, and virtually all the dimensions of society. This makes defining culture, and distinguishing between strictly cultural factors and other macro-level influences difficult [9]. The conceptualization of culture originates from anthropology, and is typically considered '... a unit of tradition, social customs and attitudes, values, religion, language or a combination of any of these elements' [10]. In business studies, culture is commonly defined at the national or regional level, with a nation seen as the source of 'the collective programming of the mind which distinguish the members of one group or category of people from another' [11]. Hofstede proposed one of the most widely used frameworks for describing and operationalizing culture, which we apply in this study. The framework includes five dimensions; each national culture can then be placed within this model relative to other world cultures [11].

*Power Distance* deals with the issue of human inequality, and is defined as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally. *Individualism* reflects the degree of interdependence between members of a society. In individualist societies one's self-image is defined in terms of 'I'; people are expected to look after themselves and the immediate family. In collectivist cultures, individuals see themselves as a part of the group that looks after them in exchange for loyalty. Hofstede's study suggested that individualism and power distance are negatively correlated, i.e. high score on individualism usually implies low power distance. *Long-term orientation* reflects the approach of society members to the challenges of future: whether the focus is on future rewards, perseverance and thrift, or on traditions and norms with skepticism towards change. *Masculinity* determines whether the society is driven by achievement and success, or by caring for others and quality of life. *Uncertainty avoidance* refers to the extent to which members of a society are threatened by the ambiguous or unknown situations.

## III. THE CASE: NORWEGIAN NORTH-WESTERN MØRE MARITIME CLUSTER

In this section we introduce the maritime cluster in Norwegian North-Western Møre region, and review its performance on the basis of secondary literature sources.

The development of shipping, fishery, and shipbuilding companies in the region has been historically determined by the proximity to the sea. These industries were surrounded by related production and service industries, with strong cooperative links to fishermen and local communities, as well as to local financial institutions [12]. This cooperation shaped

the contemporary maritime industry in the region. Following oil discovery in the North Sea in the late 1960s, the maritime industry specialized in the building of vessels supporting the offshore oil and gas industry. Building of fishing boats, however, remains an important activity, and it has counteracted crises in the offshore segment over the years. The cluster consists of shipping companies, yards, equipment manufacturers, design and engineering companies, and service providers. Its turnover in 2014 was 70,7 milliard NOK and it employed over 17 000 employees [13]. Norway has one of the largest offshore fleets in the world, and almost a third of it is being controlled from the Møre region. The companies in the cluster are world leading in all the parts of the value system.

The cluster performance has been assessed in a recent report [13]. We discuss the cluster performance, and expand the analysis to include other levels such as Norway and other highly industrialized countries, based on [13] and other relevant studies. The discussion is structured according to Beckman and Rosenfield's performance dimensions.

*Cost* can be defined as the cost of the product to the customer. While price is found to be the most important competitive factor in the maritime industry, the labor cost per person is significantly higher in this region than that of the competitors abroad. Locating production in low-cost countries, however, leads to higher logistics costs, and was found to be one of the reasons why European companies choose to locate their manufacturing operations in Europe [7, 15]. At the same time, productivity, or value added per person, in maritime industry is higher in Norway than in countries such as Denmark, Netherlands, South Korea and the USA. This mitigates some of the labour cost disadvantage, and is important for the cluster's competitiveness. If the cost dimension is broadened to include the total cost of ownership, European manufacturers are likely to score better, as also other performance dimensions affect the total cost of ownership, such as quality and features, discussed in the following sections.

*Quality* dimension relates to the quality experienced by the customer, and includes aesthetic, reliability, durability, safety and serviceability of the product [16]. Menon report includes quality in wide productivity measure, and demonstrates that productivity in the Norwegian maritime cluster is higher than that in Netherlands, South Korea and USA. The ability to deliver in accordance to specifications and schedule has also been identified as one of the main reasons for winning contracts [13]. Sun [17] provides further evidence of differences in quality between Norway and low-cost countries. His study showed that Chinese companies tend to pursue a low quality and low price strategy, and companies trying to produce products to Norwegian standards end up with prices just as high as in Norway. This perception has been confirmed in various more recent studies, which all found that one of the main reasons for reshoring production from low-cost countries to Europe was quality [7, 14, 15, 18, 19].

*Innovativeness and features*: Features are defined as the inherent characteristics of the product or service, and innovativeness relates to the use of advanced technologies in

the product or process to innovate or introduce something new [16]. Reference [22] shows that the production companies in the Norwegian cluster possess strong capability of delivering innovative and tailor-made solution, such as Ulstein's X-Box design. Several studies show that developed countries perform well in innovation rankings [20-22]. According to Porter and Stern [21], the national environment matters for success in innovative activity, and an advanced economy is more favorable for innovation. In a recent report from the World Economic Forum [20], the national environment is assessed along seven criteria to measure the locational foundation for innovation. In this report, Norway is ranked as number 13 out of 140 countries.

*Availability* means that the producer can make the product available for the customers when they want it. It includes short lead times, high delivery precision, and the ability to provide a customized product. There is evidence [23] that delivery speed and flexibility to respond to fluctuating demand to be better in Norway than in low-cost countries. Kinkel and Zanker [18] identified that locating production abroad reduces the ability to deliver on time. They state that this is one of the main reasons for European companies to reshore their production back to Europe. Arlbjørn and Mikkelsen [19] identified longer lead times as one of the main motivations for Danish manufacturers to move production operations back.

*Environmental performance* relates to the product delivered to the customer, as well as to the process with which the product was made. In the Environmental Performance Index [24], Norway is ranked as number 17. It lies well above average, and significantly higher than China and other low-cost countries.

In conclusion, there is evidence that the Møre region, as well as Norway and Europe in general, score high on the performance dimensions of quality, availability, and features/innovation, but relatively low on cost dimension.

#### IV. DISCUSSION: CULTURAL CHARACTERISTICS AND THEIR EFFECT ON PERFORMANCE

In the previous section, we provided the description of the Norwegian Møre maritime cluster and discussed its performance, as well as the performance of production companies in Norway and in other industrially developed countries. This section focuses on cultural characteristics of Norway and links them to manufacturing companies' performance.

Norway is among the countries that score the lowest on power distance index [11]. That implies that Norwegian society is characterized by a flat and relatively egalitarian structure with few hierarchical levels. As an organization is a miniature replica of the society, national characteristics apply to the organizational context. Distances between management and workers are short, and superiors easily and informally accessible. The level of bureaucracy is low. A manager is expected to be a teamwork facilitator. Responsibilities are seen as motivators, and are delegated downwards, contributing to a distribution of decision-making power throughout the organization and a high level of worker autonomy. Rather symbolic hierarchy means also that there is

a relatively small difference between high and low salaries, making the costs of employing an engineer comparable to those of employing a skilled worker, e.g., an automated equipment operator [25]. The effect on performance is that in labor-intensive production in particular, product costs are driven up by high direct and indirect labor costs.

In Hofstede's [11] classification, Norway scores relatively high on individualism; it was also characterized as a country with 'individuals within a group' [26]. A possible explanation of the latter is that Norway consists of small communities that tend to be geographically remote from one another. This cultivates a strong sense of identity. Each community has specific traditions, including those of trade and craftsmanship, that are carried on with pride. The members tend to be loyal to the community and proud of their roots. Furthermore, personal opinions are respected and valued, and there is a general recognition of relevance of insights and competency of all employees. Combination of low power distance and moderately high individualism means that employees are not provided with the instructions by higher-ups, but are expected to take decisions based on the information they have access to, as well as on their own judgement. They work cross-functionally and are responsible for entire tasks. This type of working environment is often referred to as the Norwegian cooperation model [27]. Among its benefits are low levels of conflict; high levels of trust, openness, and tolerance; and employee satisfaction and loyalty [25]. This implies rapid decision processes and implementation of changes. Employees tend to see 'the big picture' of the organization, solve problems efficiently, and create innovative and effective solutions. This environment promotes employees' ability to take initiative and risks, use judgement, admit mistakes, and to learn.

Religious values and world views play a significant role in shaping economic activity [28]. The Møre region is characterized by egalitarian Christianity, strong protestant work ethics, and puritanical self-control. According to Løseth [29], this resulted in the 'industrious' culture, with strive to perform well economically and to re-invest. As Christians, people are also expected to look after each other, thus maximizing each other's business opportunity [12]. This reflects in the fact that the institutional context in the region is characterized by close relational ties between the actors in the supply chain and a high degree of informal coordination [12]. Each actor pursues their interest while taking others into consideration. This relational culture promotes long-term orientation and contributes to the development of lasting cooperation between the companies. The focus is on customer satisfaction and quality assurance, rather than just on costs [17].

#### V. IMPLICATIONS

In this section we discuss how cultural characteristics of Norway may contribute to its global competitiveness by linking culture-specific and industry-specific factors. More specifically, we will look into what type of manufacturing industries and environments will particularly benefit from Norwegian cultural traits.

Locating production in Norway entails high labor costs, in part brought about by comparably high salaries of employees at all hierarchical levels of the company. However, the same factors that contribute to relatively small differences in salaries between management and workers, and subsequently to high labor costs, can also positively contribute to the company's performance. Flat organizational structures facilitate vertical communication with the company, and delegation of responsibilities and decision-making power downwards. This enhances workers' ability to make on-the-spot informed decisions and to work autonomously, therefore increasing productivity and decreasing lead times. This type of environment offers good prerequisites for automation and digitization. It facilitates implementation and use of advanced IT and process technology. Furthermore, these factors contribute to high responsiveness and quick implementation of novel solutions and changes, particularly in environments with a low degree of standardization and a constant need to solve problems across disciplines, systems, functions, and supply chain actors.

The positive effect of the Norwegian cooperation model on innovation and competitiveness has also been stressed repeatedly [30-32]. Broad involvement and high worker autonomy lead to continuous small changes and improvements which – over time – develop into innovations and create a competitive advantage. The need for labor can thereby be reduced and the labor cost disadvantage can be mitigated. The empirical evidence suggests that lead times in maritime industry in Norway and in low-costs counties, e.g. in China, are currently comparable; the number of man-hours spent on building a vessel, however, is considerably higher in China. As China scores largely different on power distance and individualism than Norway, there is a different level of employees' autonomy and productivity. Even if Norway's competitors in lower-cost countries eventually reach the same level of automation and digitization, reduced labor content narrows the gap in costs caused by wage differences. At the same time, higher labor content might require more coordination, increasing both costs and complexity. Combined with various social, organizational, and cultural aspects favoring worker effectiveness, Norwegian manufacturers may not stay much behind other nations in terms of cost competitiveness.

When the nature of the process is such that it depends on manual labor, manufacturers in the cluster can still be competitive as they can strongly benefit from cultural, as well as other locational characteristics. This will typically be the case when competition is based on other factors in addition to cost. As the importance of the cost factor versus other factors, e.g. availability, quality and innovativeness, varies among the industries, the degree to which an industry will benefit from the location in Norway will vary among the industries. More specifically, the discussion of cultural characteristics in the previous chapter indicates that the region offers advantages for production of:

- Products with innovative features, at early stages in the life-cycle
- Highly customized products

- Products with high quality requirements

This confirms Porter and Stern [21], who state that for industrially highly developed nations such as Norway, with high labor cost and equal access to global markets, will not sustain a competitive advantage by producing standard products using standard methods. They further argue that the competitive advantage must come from the commercialization of new products and processes, shifting the technology frontier as fast as their rivals catch up. Our findings are also in line with Reve, Sasson [33] and the Norwegian Board of Technology [23], who emphasize the importance of knowledge and skills, automation and digitization, as well as resource- and energy-effective production if nations such as Norway are to be globally competitive.

## VI. CONCLUSIONS

The study assessed the performance of manufacturing companies within the Norwegian North-Western Møre maritime cluster, and analyzed the role of Norwegian cultural characteristics in the performance. The findings suggest that industries that compete on quality, innovativeness and features, and on customization of products rather than on cost will draw particular advantages by locating production in Norway due to its specific cultural traits. Our study contributes to a better understanding of the benefits companies gain from locating production in Norway, and can help Norwegian producers in developing their location strategy. More generally, the study suggests that a country's cultural characteristics may have different implications for different types of manufacturing industries, depending on the nature of the product, competitive strategy and production environment. Companies need to weigh the importance of cost, quality, availability, innovativeness and customization in their competitive strategy, and consider local cultural characteristics when making production location decisions.

A limitation of the study is that it is based on the secondary sources and does not provide empirical evidence on how various cultural factors actually affect performance. Furthermore, this study is limited to a single Norwegian cluster. This opens several avenues for further research: case studies to compare the effects of cultural characteristics on performance in different clusters in Norway; case studies of similar, e.g. maritime, clusters in the countries with comparable cultural characteristics, such as Norway, the Netherlands, and the USA, and their performance; comparative case studies involving clusters in offshore locations, e.g. China. This will shed light on the role of the cultural factors in strengthening the competitiveness of manufacturers in the region and in Norway, and ultimately help to develop country- and industry-specific best practices for manufacturing, thereby contributing to sustainable global competitiveness and a sound manufacturing base in Norway and other industrially developed nations.

## REFERENCES

- [1] M. Porter, "The competitive advantage of nations", *Harvard Business Review*, 1990. 68: p. 73-93.

- [2] S. Kinkel, "Trends in production relocation and backshoring activities: Changing patterns in the course of the global economic crisis", *International Journal of Operations & Production Management*, 2012. 32(6): p. 696-720.
- [3] P. Leibl, R. Morefield, and R. Pfeiffer, "A study of effects of backshoring in the EU", *Journal of Business and Behavioural Sciences*, 2011. 23(2): p. 72-79.
- [4] M.M. Larsen, S. Manning, and T. Pedersen, "Uncovering the hidden costs of offshoring: The interplay of complexity, organizational design, and experience", *Strategic Management Journal*, 2013. 34(5): p. 533-552.
- [5] L. Fratocchi et al., "Motivations of manufacturing reshoring: an interpretative framework", *International Journal of Physical Distribution & Logistics Management*, 2016. 46(2): p. 98-127.
- [6] M. Semini, H. Brekken, N. Swahn, E. Alfnes, and J.O. Strandhagen, "Global manufacturing and how location in Norway may give factories a competitive advantage", in 23d EurOMA conference Interactions. 2016: Trondheim, Norway.
- [7] L. Fratocchi, C. Di Mauro, P. Barbieri, G. Nassimbeni, and A. Zanoni, "When manufacturing moves back: Concepts and questions", *Journal of Purchasing and Supply Management*, 2014. 20(1): p. 54-59.
- [8] K.M. Eisenhardt, "Building theories from case study research", *Academy of management review*, 1989. 14(4): p. 532-550.
- [9] A.M. Soares, M. Farhangmehr, and A. Shoham, "Hofstede's dimensions of culture in international marketing studies", *Journal of Business Research*, 2007. 60(3): p. 277-284.
- [10] M. Ajiferuke, and J. Boddewyn, "Socioeconomic indicators in comparative management", *Administrative Science Quarterly*, 1970. 15(4): p. 453-458.
- [11] G. Hofstede, "Culture's consequences: international differences in work-related values", *Cross-cultural research and methodology series*. Vol. 5. 1980, Beverly Hills, Calif: Sage.
- [12] T. Hammervoll, L.L. Halse, and P. Engelseth, "The role of clusters in global maritime value networks", *International Journal of Physical Distribution & Logistics Management*, 2014. 44(1/2): p. 98-112.
- [13] Menon Business Economics, "GCE Blue Maritime - Global Performance Benchmarking", 2015: Menon Publication.
- [14] S. Kinkel and S. Maloca, "Drivers and antecedents of manufacturing offshoring and backshoring—A German perspective", *Journal of Purchasing and Supply Management*, 2009. 15(3): p. 154-165.
- [15] S. Kinkel, "Future and impact of backshoring—Some conclusions from 15 years of research on German practices", *Journal of Purchasing and Supply Management*, 2014. 20(1): p. 63-65.
- [16] S.L. Beckman and D.B. Rosenfield, "Operations strategy: competing in the 21st century", 2008, Boston: McGraw-Hill/Irwin. XVII, 462 s.
- [17] H. Sun, "A comparison of quality management practices in Shanghai and Norwegian manufacturing companies", *International Journal of Quality & Reliability Management*, 2000. 17(6): p. 636-660.
- [18] S. Kinkel and C. Zanker, "New patterns of German production relocation and back shoring activities after the global economic crisis", Paper presentato all'EUROpean Operations Management Association (EurOMA), Dublino, Irlanda, 2013: p. 7-12.
- [19] J.S. Arlbjørn and O.S. Mikkelsen, "Backshoring manufacturing: Notes on an important but under-researched theme", *Journal of Purchasing and Supply Management*, 2014. 20(1): p. 60-62.
- [20] World Economic Forum, "Global Competitiveness Report. 2016", [14.04.2016]; Available from: <http://reports.weforum.org/global-competitiveness-report-2015-2016/competitiveness-rankings/>.
- [21] M. Porter and S. Stern, "National Innovative Capacity", in *The Global competitiveness report 2001-2002*, W.E. Forum, Editor. 2002, Oxford University Press: New York. p. 102 - 118.
- [22] The Global Innovation Index "2015 Country Rankings. 2015" [14.04.2016]; Available from: <https://www.globalinnovationindex.org/content/page/data-analysis/>.
- [23] Norwegian Board of Technology, "Made in Norway? Hvordan roboter, 3D-printere og digitalisering gir nye muligheter for norsk industri", 2013, Norwegian Board of Technology.
- [24] Environmental Performance Index. "Country Rankings. 2016", [13.04.2016]; available from: <http://epi.yale.edu/country-rankings>.
- [25] M. Levin, T. Nilssen, J.E. Ravn and E. Øyum, "Demokrati i arbeidslivet. Den norske samarbeidsmodellen som konkurransefortrinn", Bergen: Fagbokforl, 2012.
- [26] N. Swahn, "The role of cultural differences between Norway and Russia in business relationships: application to strategic management in Norwegian companies", 2002, doctoral dissertation, Department of Industrial Economics and Technology Management: Trondheim.
- [27] M. Levin, «Demokrati i arbeidslivet: den norske samarbeidsmodellen som konkurransefortrinn», 2012, Bergen: Fagbokforl.
- [28] M. Weber and D. Østerberg, "Makt og byråkrati : essays om politikk og klasse, samfunnsforskning og verdier", Studiefakkel. Vol. S30. 1971, Oslo: Gyldendal.
- [29] A. Løseth., «Likskap og lagdeling : 1920-1972», 1996, Oslo: Samlaget.
- [30] E. Lorenz and B.-Å. Lundvall, "The organization of work and systems of labour market regulation and social protection: A comparison of the EU-15", in *Learning Regional Innovation*, 2011, Springer. p. 50-69.
- [31] B. Gustavsen, "Work organization and the 'Scandinavian Model'", *Economic and industrial democracy*, 2007. 28(4): p. 650-671.
- [32] E. Lorenz. and A. Valeyre, "Organisational change in Europe: national models or the diffusion of a new "One Best Way"?", in *DRUID Summer Conference*. 2004.
- [33] T. Reve and A. Sasson, "Et kunnskapsbasert Norge", 2012, Oslo: Universitetsforl.