

# Critical Operations Capabilities and Reshoring Drivers in a High-Cost Environment

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**Abstract.** Reshoring of manufacturing to high-cost environments has been gaining attention. Several drivers are usually involved in the reshoring process. This process also requires manufacturing companies to assess their capabilities in relationship to the reshoring drivers. However, the connection between the reshoring drivers and the capabilities that the manufacturing companies have in high-cost environments has received little attention. The purpose of this study is to investigate the connection between the reshoring drivers and critical capabilities, through a transdisciplinary approach. This study was conducted through a literature review. The first step included the investigation of existing literature related to operations capabilities. The second step included the investigation of existing literature related to reshoring drivers. The third step included an investigation of the link between the critical operations capabilities and the reshoring drivers derived from the literature. Both sets of critical operations capabilities and reshoring drivers were linked based on their respective definitions. The findings revealed that there is a connection between operations capabilities and reshoring drivers. This study contributes to the development of both reshoring and operations capabilities research streams, and to practice by identifying the specific operations capabilities that can drive reshoring.

**Keywords.** Capabilities, reshoring, literature review, transdisciplinary

## Introduction

An extensive movement of manufacturing from high-cost to low-cost environments has taken place in the last three decades [1]. The key driver for this offshoring trend has been manufacturing costs [2]. Despite achieving reduced manufacturing costs, the offshoring decisions lacked a holistic perspective while evaluation leading to suboptimal decisions [3]. These offshoring failures and changes in manufacturing strategy have led to an intensified debate about reshoring, that is when companies decide to move manufacturing back to the home country [4].

The main goal for manufacturing relocations is to achieve a competitive advantage. The fundamental strategies implemented for creating a competitive advantage are referred to as cost-leadership and differentiation [5]. Differentiation is achieved by organizing the firm around how customer value is created and delivered efficiently, and

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how these processes can be coordinated and managed. This is supported by the operations capabilities that the firm develops over time [6].

Relocation decisions require both current and future analysis of operations capabilities [7]. Furthermore, a large number of drivers are involved in the decision [8]. Therefore, it is fundamental to understand the connection between the operations capabilities that a company wants to develop and the reshoring drivers that a company takes into consideration when moving manufacturing back to a high-cost environment. The connection between the two research streams, that is operations capabilities and reshoring, is relevant to both research and practice. However, this connection has not been sufficiently investigated in the literature. In order to better understand this connection, it is important to adopt a transdisciplinary approach that allows investigating cross-disciplinary boundaries [9] and present findings from two disciplines with different theoretical foundations aligning the thoughts from these two disciplines. The purpose of this study is to investigate the connection between critical operations capabilities and reshoring drivers.

## **1. Theoretical framework**

### *1.1. Operations capabilities*

The competitive advantage is formulated as part of the business strategy and is subsequently to be transferred to the functional operations strategy. Two core elements are central to the formulation of an operations strategy [10]. The first element (competitive priorities) is a statement of what the operations function must accomplish (referred to as the tasks, objectives or priorities) and can be defined as the capabilities that the operations unit must have in order to compete successfully, given its overall business strategy. The second element in the formulation of an operations strategy (operations decisions) is the pattern of decisions that a firm makes, which determine the actual capabilities of the operations system [11]. The competitive success of a firm depends on its ability to identify, develop and continuously improve operations capabilities that provide superior value to customers. These operations capabilities can be grouped in six dimensions which are cost, quality, time, flexibility, innovation and sustainability [6].

### *1.2. Reshoring drivers*

Reshoring can be described as the return of manufacturing activities back to the home country [12]. Several decision criteria influence the reshoring decision and among them include drivers, enablers and barriers. Drivers are those decision criteria that cause a reshoring action [13]. The more common groups of drivers include manufacturing cost, product or process quality, company strategies, availability and proximity to resources, and global conditions [13]. Drivers can be categorised into different theoretical frameworks, however, not all of the drivers clearly fit into these frameworks [12].

### 1.3. Connection between operations capabilities and reshoring drivers

The topics operations capabilities and reshoring drivers come from two different research streams, having different theoretical foundations. However, these two different research streams have one common denominator which is related to achieving competitive advantage for companies in home country. On one side, critical operations capabilities are developed in manufacturing companies as to maintain and achieve a competitive advantage. When developing these capabilities, companies can build a stronger foundation for delivering a better value to the customer (through differentiation strategies) or deliver the same value more efficiently (through low-cost strategies). On the other side, the reshoring drivers reflect on why companies reshore their manufacturing (and other operations) to high-cost countries so that they maintain and achieve a competitive advantage. Therefore, the development of operations capabilities can be related to reshoring drivers for achieving competitiveness. Manufacturing companies implementing low-cost strategy might focus on capabilities in the cost dimension, while at the same time be more sensitive to changes such as increased supply chain cost as a result of reshoring decisions. However, there is a gap in the literature regarding the connection between reshoring drivers and critical operations capabilities, that contributes to the debate of strategy versus failure in reshoring decisions [7].

## 2. Research methodology

The research was conducted in three successive steps. In the first step, a systematic search was conducted to derive the critical operations capabilities for competitive manufacturing from the literature. In the second step, another systematic search was conducted to derive the reshoring drivers from the literature. In the third step, the critical operations capabilities and reshoring drivers were mapped and the connections were analysed. Different search strings were used for the two different research streams on the Scopus database (Table 1).

**Table 1.** Literature review characteristics

	<b>Operations strategy</b>	<b>Reshoring</b>
<b>Aim</b>	To derive critical capabilities for competitive manufacturing	To derive common reshoring drivers
<b>Search string</b>	("operations" OR "production" OR "manufacturing" OR "supply chain" OR "strategy") AND ("competitive priority" OR "performance objective" OR "manufacturing objective" OR "intended critical factor" OR "business priority" OR "strategic priority") OR ("competitive capability" OR "manufacturing capability" OR "strategic capability" OR "strategic dimension" OR "cumulative capability" OR "dynamic capability" OR "operational capability" OR "realized success factor" OR "competitive dimension") OR ("manufacturing strategy" AND "taxonomy")	"reshoring" OR "re-shoring" OR "reshore" OR "re-shore" OR "reshored" OR "re-shored" OR "backshoring" OR "backshoring" OR "backshore" OR "back-shore" OR "backshored" OR "back-shored" OR "Rightshoring" OR "Right-shoring" OR "Onshoring" OR "On-shoring"
<b>Database</b>	Scopus	Scopus
<b>Search date</b>	2021-01-31	2021-01-31

Search period	Until 2020	Until 2020
Initial sample	3404 (including duplicates)	1080 (including duplicates)
Inclusion criteria	English language journal papers that address critical capabilities for competitive manufacturing	English language journal papers that address reshoring drivers
Final sample	230	109
Synthesis	Data extraction and emerging coding (excel)	Data extraction and emerging coding (excel)
Output	27 Capabilities	41 Drivers

The initial sample included more than 3400 articles for the operations strategy stream and more than 1000 articles for the reshoring stream. After applying different inclusion and exclusion criteria, the final sample was narrowed down to 230 papers for the operations capabilities stream and 109 papers for the reshoring stream. A content analysis of the articles included in the final sample was conducted. This analysis allowed to create two different frameworks, one summarizing the operations capabilities and one summarizing the reshoring drivers. These frameworks were then merged to identify the connection and link between operations capabilities and reshoring drivers.

### 3. Findings

#### 3.1. Critical operations capabilities for competitive manufacturing

In total, 27 critical capabilities for competitive manufacturing were identified in the literature review. The operations capabilities identified in the literature are organized in six dimensions and the definitions for each capability are provided in Table 2.

**Table 2.** Operations capabilities

Dimension	Capability	Definition
<b>Cost</b>	Cost efficiency	The ability to provide products at low cost
	Resource efficiency	The ability to maximize utilization of process resources (machinery and human)
	Process efficiency	The ability to maximize the output of the process
<b>Quality</b>	Product quality	The ability to provide high performance and durable products
	Service quality	The ability to provide high-performance services
	Process quality	The ability to provide products/services with consistent quality (conformance)
	Delivery dependability	The ability to deliver on time
	Brand quality	The ability to build a strong and positive company image
	Supplier dependability	The ability to select and develop reliable suppliers
	Time	
<b>Flexibility</b>	Delivery time	The ability to deliver within a short time frame
	Time to market	The ability to reduce time to market
	Product flexibility	The ability to customize products based on customer requirements
	Product line flexibility	The ability to provide a wide range of products with different features
	Volume flexibility	The ability to respond to changes in market demand

<b>Innovation</b>	Production mix flexibility	The ability to change the product mix in manufacturing
	Labor flexibility	The ability of employees to perform different types of tasks
	Delivery flexibility	The ability to change delivery times and quantities within the agreed-upon delivery time
	Supplier flexibility	The ability to select and develop responsive suppliers
	Product innovation	The ability to develop and introduce new products
	Service innovation	The ability to develop and introduce new services
	Process innovation	The ability to develop and implement new processes
	Supply chain innovation	The ability to develop and implement new supply chain solutions
	Market innovation	The ability to find and exploit new markets and opportunities
<b>Sustainability</b>	Technology innovation	The ability to develop and implement new technologies
	Product sustainability	The ability to provide sustainable products
	Process sustainability	The ability to manufacture products in a sustainable manner
	Supply chain sustainability	The ability to source and deliver products in a sustainable manner

### 3.2. Reshoring drivers

In total, 41 reshoring drivers were identified in the literature review (Table 3). Note that some drivers are quite similar (e.g. different elements of cost reduction), but still represent potentially distinct effects considering the extended supply chain.

**Table 3.** Reshoring drivers

<b>Driver</b>	<b>Definition</b>
<b>1. Favorable government incentives</b>	The company seeks to take advantage of favorable government incentives that are financially related.
<b>2. Favorable government policies</b>	The company seeks to take advantage of a more favorable government policy.
<b>3. Increased access to energy infrastructure</b>	The company seeks to have better access to energy infrastructure covering utilities such as electrical power.
<b>4. Increased access to transportation infrastructure</b>	The company seeks to have better access to transportation infrastructure such as roads and transport services.
<b>5. Increased access to production infrastructure</b>	The company seeks to have better access to production infrastructure such as factory space.
<b>6. Increased availability of production capacity</b>	The company seeks to utilize the existing production capacity more efficiently.
<b>7. Increased availability of production technology</b>	The company seeks to have better access to specific manufacturing technologies.
<b>8. Increased availability of digital technology</b>	The company seeks to have better access to digital technologies that are increasingly being integrated into manufacturing.
<b>9. Increased delivery dependability</b>	The company seeks to improve delivery dependability.
<b>10. Increased knowledge protection</b>	The company seeks to improve protection for its intellectual property and know-how.
<b>11. Increased 'made-in' effect</b>	The company seeks to improve its brand image through the 'made-in' effect.
<b>12. Increased process quality</b>	The company seeks to improve process quality in the manufacturing process.

<b>13. Increased product flexibility</b>	The company seeks to improve product flexibility through customization.
<b>14. Increased product mix flexibility</b>	The company seeks to improve product mix flexibility through increased responsiveness to changes in volume and variety.
<b>15. Increased product quality</b>	The company seeks to improve product quality.
<b>16. Increased servitisation</b>	The company seeks to improve services that are related to its products.
<b>17. Increased supplier dependability</b>	The company seeks to improve supplier dependability.
<b>18. Increased supply chain control</b>	The company seeks to have better control of the upstream supply chain.
<b>19. Increased supplier flexibility</b>	The company seeks to improve supplier flexibility through flexible supplier contracts.
<b>20. Increased supply chain resilience</b>	The company seeks to improve supply chain resilience, which is the ability to recover quickly from external disruptions.
<b>21. Increased supply chain sustainability</b>	The company seeks to improve the sustainability of the supply chain associated with stricter environmental regulations.
<b>22. Increased labor flexibility</b>	The company seeks to enforce more flexible labor contracts and flexibility in hiring and firing.
<b>23. Increased access to labor resources</b>	The company seeks to improve access to highly skilled labor resources.
<b>24. Increased proximity to industrial cluster</b>	The company seeks to increase spatial proximity to an industrial cluster.
<b>25. Increased proximity to R&amp;D</b>	The company seeks to increase spatial proximity to its R&D function.
<b>26. Increased proximity to suppliers</b>	The company seeks to increase spatial proximity to its suppliers.
<b>27. Reduced total cost</b>	The company seeks to reduce the total costs of its business.
<b>28. Reduced manufacturing cost</b>	The company seeks to reduce the total manufacturing costs, which includes raw material, labor and energy components.
<b>29. Reduced raw material cost</b>	The company seeks to reduce its raw material cost component of manufacturing cost.
<b>30. Reduced labor cost</b>	The company seeks to reduce the labor cost component of the manufacturing cost.
<b>31. Reduced energy cost</b>	The company seeks to reduce the energy cost component of the manufacturing cost.
<b>32. Reduced transportation cost</b>	The company seeks to reduce its transportation costs.
<b>33. Reduced overhead cost</b>	The company seeks to reduce the overhead costs which have been overlooked during the offshoring process.
<b>34. Reduced coordination cost</b>	The company seeks to reduce its coordination costs in long supply chains.
<b>35. Reduced transaction cost</b>	The company seeks to reduce its transaction costs through efficient communication.
<b>36. Reduced monitoring cost</b>	The company seeks to reduce the monitoring costs.
<b>37. Improved exchange rate</b>	The company seeks to take advantage of a better exchange rate.
<b>38. Reduced delivery lead-time</b>	The company seeks to reduce delivery lead-time as a result of shorter distances and efficient transportation infrastructure.
<b>39. Reduced time-to-market</b>	The company seeks to reduce the time-to-market during new product development.
<b>40. Reduced supply chain disruption</b>	The company seeks to reduce the negative effect of unexpected disruptive events in its global supply chain.
<b>41. Reduced cultural distance</b>	The company seeks to reduce cultural distance and miscommunication.

### 3.3. Connection between reshoring drivers and operations capabilities

The connection between the identified reshoring drivers and operations capabilities is shown in Table 4. It can be observed that most of the reshoring drivers are related to small set of operations capabilities, which are mostly belonging to the same dimension or to dimensions which are related to each others.

**Table 4.** Connection between operations capabilities and reshoring drivers

Driver no.	Cost efficiency	Resource efficiency	Process efficiency	Product quality	Service quality	Process quality	Delivery dependability	Brand quality	Supplier dependability	Delivery time	Time to market	Product flexibility	Product line flexibility	Volume flexibility	Production mix flexibility	Labor flexibility	Delivery flexibility	Supplier flexibility	Product innovation	Service innovation	Process innovation	Technology innovation	Market innovation	Supply chain innovation	Product sustainability	Process sustainability	Supply chain sustainability
1	•																										
2	•	•																									
3		•	•		•																•	•				•	
4							•		•	•	•						•										
5		•	•	•	•							•	•	•	•						•	•				•	
6	•	•	•		•								•	•	•	•	•									•	
7		•			•														•	•	•	•		•			
8					•	•				•	•								•	•	•	•		•			
9							•		•																		
10																			•	•	•	•	•	•			
11				•	•	•		•																			
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21				•		•		•																	•	•	
22	•	•										•	•	•	•	•											
23	•	•	•													•											
24									•			•	•	•	•			•	•	•	•	•	•	•		•	
25				•	•	•						•							•	•	•	•	•	•	•	•	
26	•	•			•	•		•										•									





This research paper can be considered as a starting point for building a framework for operations capabilities and reshoring drivers through a literature review. Hence, future research can strengthen the links and develop the framework further by applying it to an empirical setting, either through in-depth case studies to develop the matching more closely, or through a larger survey.

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