

Strategic site reasons re-visited, digging deeper in the rationale of global manufacturing networks: An empirical study from a headquarters perspective

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Abstract

The site role concept developed by Ferdows and empirically tested by Vereecke et al. discusses the specific advantages of globally distributed manufacturing plants. It conceptualizes the primary reasons for manufacturing sites to exist—the strategic site reasons. This article presents the results of a multiple case study further examining the reasons to establish a site, the sites' main advantage today, and related contingency factors. The findings show that the main reasons to establish or acquire a manufacturing site are access to low-cost labor, new technologies, and reliable transportation. The most stable reason over time is access to skills and know-how.

Keywords: International manufacturing network (IMN), strategic site reasons, empirical research

Introduction

In the past decades, international trade and foreign direct investments have increased significantly (Cheng et al., 2015). Managing the resulting globally dispersed plant networks has become a critical task for the future performance of manufacturing companies. Therefore, global operations managers need to systematically analyze the strategic contribution of each site to the overall network performance (Colotla et al., 2003; Friedli et al., 2021). Ferdows's conceptual model of strategic site roles (Ferdows, 1989, 1997) is appropriate for a systemized initial understanding of these respective contributions. Building on Ferdows's model, Vereecke and van Dierdonck (2002) provide the most comprehensive overview of strategic site reasons; i.e., the primary driver why manufacturing companies establish or exploit a plant abroad. However, these findings are based on limited empirical evidence (59 plants) from more than 20 years ago. Moreover, the authors do not investigate the interrelation between site reasons and broader contingency factors such as the geographical location of the plant. Therefore, the purpose of this paper is to confirm Vereecke and van Dierdonck's findings by increasing the empirical base as well as investigating the interrelation of selected contingency factors with site reasons. In doing so, we follow Pagell's call for more replication studies to address the scarcity of such studies in the operations management literature (Pagell, 2021).

Related Literature

The discussion about strategic site roles has its origin in the literature about multinational corporations that consider foreign subsidiaries as the unit of analysis (see e.g., Bartlett and Ghoshal, 1986, 1989; Marcati, 1989; Jarillo and Martínez, 1990). As one dimension of his site role framework, Ferdows is the first researcher to explicitly discuss strategic site reasons for manufacturing entities (Ferdows, 1989, 1997). He distinguishes between the three main reasons (1) *Access to low-cost production*, (2) *Access to skills and knowledge*, and (3) *Proximity to market* (Ferdows, 1997). In earlier publications, Ferdows mentions two more site reasons: (4) *Control and amortization of technological assets*, and (5) *Pre-emption of competition*. However, he states that the first three are more prevalent than the latter two (Ferdows, 1992). Most of the subsequent articles use the same site reasons as proposed by Ferdows (1997) (Paulo Fusco and Spring, 2003; Meijboom and Voordijk, 2003; Maritan et al., 2004; Feldmann and Olhager, 2013). Vereecke and van Dierdonck (2002) tested Ferdows's model using data from 37 interviews at plant and network level. As a result, they derive 25 site reasons, clustered in the following eight categories: (1) *Proximity to suppliers*, (2) *Availability of labor*, (3) *Availability of skills and know-how*, (4) *Proximity to market*, (5) *Socio-political*, (6) *Competition*, (7) *Energy*, and (8) *Other*. Another research stream is concerned with locational factors for manufacturing plants and provides advantages such as political and economic factors (Badri et al., 1995; MacCarthy and Atthirawong, 2003; Bhatnagar and Sohal, 2005; Partovi, 2006; Gothwal, S., & Saha, R., 2015; Chatzoglou et al., 2018). While these authors discuss the locational factors to select a country or region, our article focuses on reasons to establish or exploit a manufacturing entity.

Since Vereecke and van Dierdonck's (2002) article provides the most comprehensive overview of site reasons within the IMN literature, we use their list as a basis to operationalize our measures of strategic site reasons. With that, we aim at confirming their list by applying them to a wider empirical base. We furthermore want to explore which site reasons are of major importance, which are not of importance anymore, and if there are additional reasons. Hence, we derive the following research question:

RQ1: *Which strategic site reasons are chosen by multinational companies to establish/acquire and run their manufacturing sites?*

Previously, we outlined that sites have strategic reasons at a certain point in time, i.e., when they are acquired/established and today. However, this rather static view does not take into account that the sites of an IMN and their respective roles evolve over time. For instance, Ferdows (1992) observed in the example of eight multinational companies that factories start with lower strategic roles. After several years, they become competence centers for certain systems, products, etc. Cheng et al. (2011) conclude that the evolution of one site within an IMN has effects on the other sites in the network. The authors identify the following dynamics as primary drivers for the evolution of site reasons or change of site role: (1) *product/process/knowledge*, (2) *plant capability*, (3) *location advantages*, and (4) *network strategy*. Besides the rather broad case-based findings, there is little evidence in IMN literature about how site reasons change over time. Looking at the difference between the primary site reasons when establishing/acquiring the plant and today, Vereecke and van Dierdonck (2002) find that market proximity is the most stable site reason, followed by access to labor and skills. Socio-political or competition-related site reasons with a “once-only” character (e.g., tax breaks, financial incentives, preventing competition from acquiring, etc.) change most often into other

reasons. Besides asking the experts about the initial and today's site reasons, we used open-ended questions to identify patterns of site reasons that stay the same or turn into different ones over the lifecycle of a site. The resulting research question is formulated as follows:

RQ2: *How do strategic site reasons evolve over time?*

Multinational companies have globalized their manufacturing networks to profit from factors such as access to new markets or thriftiness ability (Shi and Gregory, 1998). The strategic reasons for establishing or acquiring a site are thus linked to the exploitation of the aforementioned factors. Colotla et al. (2003) further stress that site- and network-related factors are highly interdependent. In consequence, the choice of site reasons from a headquarters perspective must be consistent with site-related factors—the site contingency factors. In IMN literature, little is known about the relationship between the choice of the initial site reasons and site contingency factors.

Cheng et al. (2021) propose that specific geographical regions are chosen by multinational companies for specific site reasons. The authors distinguish between (1) *innovation hubs* (USA, European Union, Japan, Korea, and China), (2) *markets* (USA, European Union, Japan, Korea, and China) as well as (3) *production bases* (Mexico, Eastern Europe, China, and Vietnam).

Further site contingency factors that might affect the choice of the initial site reasons are the following: (1) *duration, the site belongs to the company* (i.e., sites start in low strategic positions and then move toward higher competencies, see (Ferdows, 1992)), (2) *how the site is set up* (e.g., greenfield sites may be dedicated to access specific labor skills whereas acquired sites may serve to increase a specific product portfolio), (3) *site center organization* (e.g., sites with primary reason “access to low-cost labor” are given less autonomy than other ones). Besides these factors, we also used open-ended questions to answer our last research question:

RQ3: *How is the choice of initial site reasons dependent on site contingency factors?*

The interplay of the three derived research questions is visualized in Figure 1.

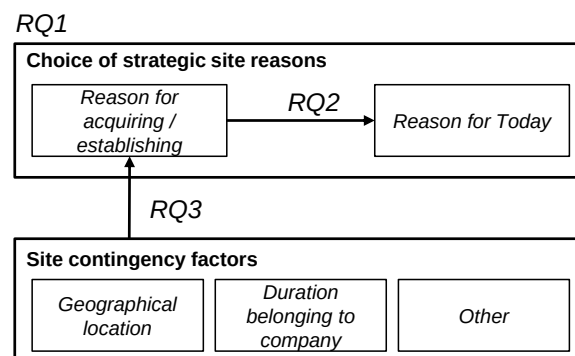


Figure 1 – Research Framework

Methodology

To address our research topic, we used data from a series of nine semi-structured interviews and additional data to conduct a comparative multiple-case study (Yin, 2014). This approach allowed us to get a deeper insight into the research topic than a purely quantitative study would. In particular, we were able to discuss the list of strategic site reasons proposed by Vereecke and

van Dierdonck (2002) with the interviewees from various perspectives. Moreover, we asked both closed and open-ended questions. This enabled us to extend Vereecke and van Dierdonck's (2002) framework and directly elicit the expert's opinion about the evolvement of site reasons (RQ2) and what contingency factors they depend on (RQ3).

Following Patton's criterion-based sampling logic, we included only experts who met the following criteria: (1) responsibility for a minimum of five sites that are globally dispersed; (2) several years of professional experience in global operations (Patton, 2014; Miles et al., 2014). We paid particular attention to the diversity of the cases, i.e., we interviewed experts from various industries and different company sizes (Yin, 2014).

Interviewees have mainly been identified by contacting global operations experts that have a long-term engagement with our research institute. We gathered the data about the manufacturing networks of our interviewees in two phases: First, we asked the experts to provide us with an overview of their global manufacturing network including all sites and their respective date of establishment or acquisition. Second, we conducted 60 to 120 mins semi-structured interviews to discuss the sites' strategic reasons for establishing (RQ1), their evolvement over time (RQ2), and related contingency factors (RQ3).

In total, we investigated the networks of nine multinational companies, eight of them headquartered in Western Europe, one of them in the US. We covered various industries: Medical devices (three companies), Automotive (one company), Optoelectronics (one company), Pharmaceuticals (one company), Electrical engineering (one company), Machine engineering (one company), and Agricultural machine manufacturing (one company). The case companies have between 8 and 54 manufacturing plants. We included plant data only when the interviewees felt comfortable stating their expert opinion about the plant.

Table 1 shows an overview of all included plants and their characteristics. Our sample includes manufacturing sites from all major regions of the world. The highest share of sites (36%) is located in West European countries with 27 out of 59 in Germany. The majority of the sites are managed as a cost center (79%). The sample is nearly balanced concerning greenfield and acquired sites. All levels of customer-specific production processes are represented, with the majority of the plants operating on the make-to-stock or engineer-to-order principles. Lastly, most of the plants have been acquired or established after 2000; around a third between 2001 and 2010. Overall, the sample contains a broad variety of plant types.

Table 1: Plant characteristics (N=163)

Characteristic	Number	Distribution
Geographic Region		
North America	21	13%
South and Middle America	21	13%
West Europe	59	36%
East Europe	18	11%
Africa	3	2%
India	8	5%
Asia (excl. India, China, and Japan)	12	7%
China	18	11%
Japan	2	1%
Australia and New Zealand	1	1%
Center Organization (Friedli et al., 2014; Abele et al., 2008)		
Cost Center	129	79%
Profit Center	24	15%
Strategic Business Unit	10	6%
Site setup (Ferdows, 2018; Abele et al., 2008)		
Greenfield	88	54%
Outsourced/Licensed	1	1%
Joint Venture	10	6%
Acquisition	64	39%
Order decoupling point (Wiendahl, 2010)		
Make-to-Stock	64	39%
Assemble-to-Order	4	2%
Make-to-Order	35	21%
Engineer-to-Order	60	37%
Date of acquisition or establishment		
before 1990	30	18%
1991-2000	24	15%
2001-2010	53	33%
2011-2020	45	28%
after 2020	11	7%

Preliminary Results and Discussion

Choice of strategic site reasons (RQ1)

Table 2 summarizes the results of our first research question. In line with the results of Vereecke and van Dierdonck (2002), *proximity to market* (49) is the most frequently mentioned initial reason to establish or acquire a manufacturing site. The second most frequently mentioned initial reason is the *availability of labor* (41), followed by *innovation* (32). The latter reason was newly added compared to Vereecke and van Dierdonck (2002). Many interviewees stated that the reason for the location was the acquisition of new technologies and products. These acquisitions were mostly detached from the *competition*, which is why the existing categories had to be expanded. Our study also shows that locations were built to *profit from image factors such as "made in..."* (4.4). For example, an agricultural machine manufacturer built two plants in Eastern Europe to take advantage of such a factor.

Table 2: Primary reasons initially, today, and their change (*added categories)¹

Category	Primary site reason initially		Primary site reason today		Change of initial site reason	
	No.	%	No.	%	No.	%
1. Proximity to suppliers	1	1%	1	1%	0	0%
1.1 to benefit from rapid/reliable delivery from suppliers and low transport costs	0	0%	0	0%	0	0%
1.2 to be close to low-cost suppliers	0	0%	0	0%	0	0%
1.3 to facilitate cooperation with suppliers in product design, planning, etc.	0	0%	0	0%	0	0%
1.4 to have access to source of raw materials	1	1%	1	1%	0	0%
2. Availability of labor	41	21%	39	23%	10	24%
2.1 to take advantage of low-cost labor	39	20%	38	22%	8	21%
2.2 to take advantage of the availability of workers	2	1%	1	1%	2	100%
2.3 to take advantage of favorable social climate	0	0%	0	0%	0	0%
3. Availability of skills and know-how	31	16%	50	29%	6	19%
3.1 to take advantage of highly qualified workers	8	4%	13	8%	1	13%
3.2 to take advantage of skilled engineers	16	8%	26	15%	3	19%
3.3 to take advantage of managerial/organizational skills	2	1%	3	2%	0	0%
3.4 to be close to source of technological know-how	5	3%	8	5%	2	40%
4. Proximity to market	49	25%	40	23%	19	39%
4.1 to provide rapid/reliable delivery to customers at low transportation costs	34	17%	24	14%	15	44%
4.2 to adapt products to local taste and/or to facilitate co-operation with customers in product design, etc.	8	4%	10	6%	1	13%
4.3 to provide fast service or technical support to customers	1	1%	2	1%	0	0%
4.4 to benefit from image factors such as "made in ..."	6	3%	4	2%	3	50%
5. Socio-political	17	9%	13	8%	7	41%
5.1 to benefit from tax breaks and/or investment incentives	11	6%	5	3%	7	64%
5.2 to overcome trade barriers	6	3%	8	5%	0	0%
5.3 to benefit from favorable or less stringent environmental regulations	0	0%	0	0%	0	0%
5.4 to reduce the impact of exchange rate fluctuations	0	0%	0	0%	0	0%
6. Competition	18	9%	10	6%	14	78%
6.1 to be close to major competitors	0	0%	0	0%	0	0%
6.2 to prevent major competitors from establishing a manu. facility in the area	0	0%	0	0%	0	0%
6.3 to capture/maintain market share	18	9%	10	6%	14	72%
7. Innovation*	32	16%	14	8%	18	56%
7.1 to extend/maintain product portfolio with new/certain technologies*	32	16%	14	8%	18	56%
8. Energy	0	0%	0	0%	0	0%
8.1 to take advantage of low-cost energy	0	0%	0	0%	0	0%
9. Other	11	6%	5	3%	8	73%
9.1 to take advantage of highly qualitative environment	1	1%	2	1%	0	0%
9.2 to create a high quality of life for employees	1	1%	1	1%	0	0%
9.3 the place of residence of the owner	8	4%	2	1%	7	88%
9.4 to seize a provided opportunity	1	1%	0	0%	1	100%

Here, too, the categories of Vereecke and van Dierdonck (2002) had to be complemented, since a *reliable delivery* (4.1), the *adaptation of products to local conditions* (4.2), or a *fast service* (4.3) were not the reason for the manufacturer to establish the plants. Further often mentioned initial reasons for establishment were the *availability of skills and know-how* (31), *competition* (18), and *socio-political reasons* (17). Solely *energy* was not listed by any interviewee. This breakdown of initial reasons is thus very similar to the 20-year-old study by Vereecke and van Dierdonck (2002).

Furthermore, our results show that the reasons for continuing to operate the sites today have changed. As opposed to the results of Vereecke and van Dierdonck (2002), we identified *access to skills and know-how* (49) as the primary reason, followed by *proximity to market* (40) and *availability of labor* (39). This can be explained by the fact that many companies today have established globally distributed manufacturing networks. *Access to markets* may therefore be no longer decisive. Rather, access to qualified workers, engineers, and managers is gaining importance. Vereecke and van Dierdonck's (2002) 20-year-old findings, on the other hand, show access to markets as the most important factor in keeping a site open. As in their results, also our study shows, that *innovation* (14), *socio-political reasons* (13), *competition* (11), or further reasons only play a minor role for operating a site. Again, no interviewee named *energy*.

Evolution of strategic site reasons (RQ2)

The last column of Table 2 indicates that the clusters *availability of skills and know-how* (19%), *availability of labor* (24%), *proximity to market* (39%), and *social-political* (41%) are the most stable site reasons. This is mainly in line with Vereecke and van Dierdonck's (2002) findings. In contrast to them, we found the *social-political* category also being a stable site reason. This may be explained by the fact that many plants of that category are located in developing Eastern European countries, that heavily subsidize their industries to attract foreign investments. Our interviewees agreed that the political landscape incl. free trade agreements or tax reforms can be both: either stable for a long time or quickly changing. One reason for the high stability of *proximity to market* (4) could be that most companies operate in a market-oriented manner. According to one interviewee, market access is the decisive reason even if, e.g., labor availability is poor. If *proximity to market* or rather the provision of a *reliable delivery* (4.1) changed, then into a variety of different reasons such as the *availability of low-cost labor* (2.1, e.g., Brazilian plants) or the *availability of qualified workers* (3.1, e.g., German plants).

Looking at the most unstable site reasons, our research fully confirms Vereecke and van Dierdonck's (2002) finding that reasons with once-only character tend to change over time. In the cluster *competition*, 14 out of 18 initial site reasons to *capture/maintain market share* (6.3) became obsolete today. The majority of the plants in this category are acquisitions or joint ventures (13 out of 18). Similarly, only 14 out of 32 plants in our newly introduced category *innovation* kept their initial site reason to *extend/maintain the product portfolio with new/certain technologies* (7.1). For these plants, the product portfolio is rather unique for the overall company. According to one interviewee, the reason *place of the residence of the owner* (9.3) most often changed into *access to skills and know-how* or *proximity to market* due to the headquarters' location in West Europe.

¹ In total 200 reasons for establishment and 172 reasons for ongoing exploitation were provided. The number of sites (163) is exceeded, because the interviewees were able to name two primary reasons, if both have been considered to be equally important. The same holds true for Table 3 and Table 4.

Dependency of strategic reasons (RQ3)

In Table 3, the relationship between the nine clusters of the initial site reasons² and the geographical location of the sites is depicted.

Table 3: Relationship between the choice of site reasons and geographical location

	North America (N= 21)	South and Middle America (N= 21)	West Europe (N= 59)	East Europe (N= 18)	Africa (N= 3)	India (N= 8)	Asia (excl. India, China, and Japan) (N= 12)	China (N= 18)	Japan (N= 2)	Australia and New Zealand (N= 1)
1. Proximity to suppliers	0	1	0	0	0	0	0	0	0	0
2. Availability of labor	0	11	3	10	1	3	6	7	0	0
3. Availability of skills and know-how	6	2	21	1	0	0	0	1	0	0
4. Proximity to market	10	4	13	4	0	7	5	3	2	1
5. Socio-political	0	6	4	5	0	0	1	1	0	0
6. Competition	0	0	7	2	2	0	3	4	0	0
7. Innovation	8	2	17	0	0	0	0	5	0	0
8. Energy	0	0	0	0	0	0	0	0	0	0
9. Other	0	0	10	0	0	0	0	1	0	0

For North America, our results yield *proximity to market* (10) as the main reason to establish/acquire a plant, closely followed by *innovation*. For South and Middle America as well as Eastern Europe, the *availability of labor* (11) is the main reason to establish/acquire a plant. Our results are more diverse for West Europe. *access to skills* (21), *innovation* (17), and *proximity to market* (13) each account for about a third of the reasons. This may be explained by the fact that most case companies have their headquarter in Europe with good skill access and rather focus on new technologies or preventing competitors from higher market shares. The picture is even more diverse for China and Asia. Depending on the region within China our experts named *overcoming trade barriers*, *low-cost labor*, or the *proximity to the market*. One interviewee stated that the labor-cost in Shanghai is highly increasing, whereas they are still low in other parts of the country.

Table 4 shows the relationship between the clusters and the site setup. The results show that companies preferably built *greenfield* sites at specific low-cost locations (31) or to access certain markets (31). Half of the *joint ventures* are built to benefit from tax breaks or new technologies. Combined 48 percent, the case companies used *acquisitions* to capture/maintain market share (12) or extend/maintain their product portfolio (26).

Besides the geographical region and the site setup, we also analyzed the relationship of the site

² We chose the initial reasons because of two issues: (1) Our analysis does not reveal major differences regarding the contingency factors between the initial and today's site reasons. (2) Consistency of the tables—for the analysis of the site setup, the initial reason must be used.

reasons to the *type of center organization*, *order decoupling point*, and *date of acquisition*. However, we were not able to draw any discussable findings from the results.

Table 4: Relationship between the choice of site reasons and site setup

	Greenfield (N=88)	Outsourced/ Licensed (N=1)	Joint Venture (N=10)	Acquisition (N=64)
1. Proximity to suppliers	0	0	0	1
2. Availability of labor	31	0	1	9
3. Availability of skills and know-how	19	0	0	12
4. Proximity to market	31	1	3	14
5. Socio-political	7	0	4	6
6. Competition	5	0	1	12
7. Innovation	2	0	4	26
8. Energy	0	0	0	0
9. Other	11	0	0	0

Lastly, we asked the experts for further contingency factors that may have an impact on the choice of strategic site reasons. On a network level, the overall *risk mitigation* in the manufacturing network (e.g., geographical risks, climate change, etc.), the *industry* (e.g., consumer goods vs. capital goods may have a difference for the “made in” label) and the *size* of the manufacturing network have been named. On a site level, *market growth potential* (e.g., China or Brazil) and whether the site is a *shared* or a *focused factory* (e.g., number of product lines in the sites) have been mentioned.

Concluding Remarks

In summary, the results of our study are threefold: (1) Based on large empirical evidence, we examined the initial reasons to establish a site, primarily access to markets or labor. (2) We show that the availability of skills and know-how as well as favorable labor costs are stable, while sites acquired based on the product portfolio take on a new role over time. (3) We identified certain patterns between the strategic site reasons and the geographic location as well as the site setup. With that, we can confirm and extend the findings of Vereecke and van Dierdonck (2002). We contribute to the operations management literature using replication methodology; we tested and enhanced the robustness of the concept of strategic site reasons in IMN literature. Potentials for extension of our research exist in an enlargement of the empiricism with further companies and industries. Future research may also address the dependency of strategic site reasons/roles and site-specific factors.

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