Off to which shore?
Explaining the strategic factors behind near- and farshoring

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Abstract

This paper investigates the differences and commonalities in locational advantages driving near- and farshoring. For this, we study the features of 4766 production sites, using company-level data from *Uniworld Online* and location-level data from the *World Economic Forum* and the *World Bank*. We use multilevel logistic regression to test hypotheses derived from nearshoring cases listed in the *European Reshoring Monitor*. Our results elucidate an important managerial trade-off for European companies. On average, they either access greater strategic assets nearshore – such as shorter export lead times, higher know-how or technological readiness –, or larger markets farshore, capitalising on greater trade-cost-jumping gains.

Keywords: Global Operations, Offshoring, Nearshoring

Introduction

One of the questions at the centre of the debate on near- and reshoring is, whether more production will take place closer to company's headquarters (cf. Brennan et al., 2015). This could be either due to the relocation of farshore production to closer sites (e.g. Panova and Hilletofth, 2017) or due to future location decisions being made in favour of closer locations. So, off to which shore will the future of production set its sails to – nearshore or farshore?

A crucial part of the answer to this lays in understanding what factors drive companies to produce in different locations. Therefore, this paper will investigate the research question "What are the differences and commonalities in the locational advantages of near- and farshore production sites that European and US companies choose?". First insights from perceptional data suggest similarities between near- and farshoring motives but also hint at existing differences (Caniato et al., 2011). Using a large set of location data of production subsidiaries, our paper expands the existing evidence on the question above from a locational perspective (cf. Ketokivi et al., 2017). This way, our study helps to elucidate the trade-off mangers face between nearshore and farshore locations. Eventually, our results will give an insight into whether the location factors accessed farshore are exchangeable with those accessed nearshore.

For this purpose, we investigate a large data set of 4766 production subsidiary locations of 558 European and US firms. We prepared this data set using company-level data from *Uniworld Online* and location-level data from the World Economic Forum's

Global Competitiveness Report as well as the World Bank's *Doing Business* and *Worldwide Governance Indicators* data bases. We analyse it using a multilevel logistic regression – a statistical method that allows for explanations of choices at different explanatory levels. This way, we can study locational variables, such as market size and labour cost, while simultaneously controlling for company-level features that may affect companies' production footprint choices. Our main finding is that the strategic location factors of firms' chosen near- and farshore locations differ distinctly, suggesting that near- and farshoring are not driven by the same motives.

In the section to follow, we present the hypotheses we test in our study. After developing our hypotheses, we describe our data sets and the methodology we employ, before presenting our statistical findings which we discuss thereafter. Summing up our insights, we revisit our hypotheses and evaluate them against the backdrop of our evidence. We conclude with a discussion of our results and their managerial implications.

Hypothesis Development

As Ferdows (2018) notes, research on global operations often struggles with an "arduous list of independent variables to consider" (p. 5). To narrow down our selection of independent variables to a core set of relevant features we will consult existing case evidence to empirically ground our hypotheses. As we are interested in variables that distinguish firms' nearshore from their farshore locations, we will focus on cases of companies that relocated their manufacturing from a farshore to nearshore site. On the theoretical side, our hypothesis development is guided by both, recent operation management literature on 'bringing production back' and Dunning's eclectic paradigm for the study of foreign direct investment (Dunning, 1977).

The case collection we analyse is the full 2015-2018 set of farshore-to-nearshore manufacturing relocation cases from the *European Reshoring Monitor* (URL: https://reshoring.eurofound.europa.eu/). The Reshoring Monitor is a collaboration project between the European Commission's Eurofound and four Italian universities (Udine, Bologna, Catania and L'Aquila), academically directed by Guido Nassimbeni. Though the case collection focusses on *back*shoring also cases of nearshoring are included. We can single these out by dropping all cases in which the headquarter country equals the country of relocation. Furthermore, we only consider manufacturing related cases in which production was moved from farshore to nearshore.

Resulting is the below reported list of cases. The cited reasons for nearshoring are listed in the rightmost column, most of which are directly or indirectly related to location advantages. The reasons that do *not* correspond to a location advantage, but e.g. to a company's unspecified reorganisation efforts, are listed in round parenthesis. We grouped the remaining factors into five distinct categories (see italic numbers in the table), each of which relates to a specific location advantage. Some quoted reasons can relate to more than one location factor. The identified grouping categories are cost of production [1], lead times and market access [2], know-how [3], technological capacity [4] and macroeconomic environment [5].

Table 1: Nearshoring Cases from the European Reshoring Monitor

Head-quarter*	**Nearshored from, to***	**Reasons for relocating to nearshore location** *(quoted from the European Reshoring Monitor)*
DK	CN → PL	Automation of production process *[4]*, Customer vicinity *[2]*, Delivery time *[2]*, Increased production costs in the host country *[1]*
AT	CN → NO	Automation of production process *[4]*, Know-how […] *[3]*
IT	CN → RO	Change in total costs of sourcing *[1]*, Poor quality of offshored production *[3, 4]*

CH	US → EE	Economic crisis *[5]*, (Firm's global reorganization), Streamlining of supply chain *[2]*, (Untapped production capacity at home)
CH	US → IT	Economic crisis *[5]*, (Firm's global reorganization), Streamlining of supply chain *[2]*, (Untapped production capacity at home)
ES	IN → IT	Delivery time *[2]*, Proximity to customers *[2]*
ES	CN → PT	Delivery time *[2]*, Improve customer service *[2, 3]*, (Need for greater organizational flexibility), Proximity to customers *[2]*
DE	CN → HU	Economic crisis *[5]*, (Firm's global reorganization), Implementation of strategies based on product/process innovation *[3, 4]*, Know-how […] *[3]*
SE	AU → PL	Change in total costs of sourcing *[1]*, (Firm's global reorganization), Labour costs *[1]*

**Country Names abbreviated to 2-letter ISO abbreviations*

Having empirically identified five groups of potential advantages of nearshoring, as compared to farshoring, we will now, one by one, discuss them with help of relevant literature to form our hypotheses. As the above identified nearshoring reasons overlap with drivers of 'bringing production back' (Stentoft et al., 2016) we will primarily utilise the adjacent reshoring literature. Secondarily, we will also draw on Dunning's eclectic paradigm to derive additional theoretical arguments. Among others, our eventual list of independent variables includes all location factors considered by Caniato et al. (2011) who study differences in offshoring motives based on a sample of 65 IMSS respondents that have both near- and farshored.

Hypotheses

Regarding cost of production, a generally eroding cost advantage of farshore locations has been stated as a cause of bringing production back (Bailey and De Propris, 2014; Fratocchi et al., 2016). We focus on three dominant sources of cost. Firstly, labour cost, whose rising in farshore locations, such as China, is said to increase the attractiveness of closer locations (Tate et al., 2014). Secondly, business taxes – a variable which was found to drive reshoring (Sarder et al., 2014). Lastly, we consider access to natural resources, a factor identified as a barrier of bringing back manufacturing (Wiesmann et al., 2017). Hence, we formulate the hypotheses below.

H1: *The nearshore locations firms choose…*

a) *…have no significantly greater labour costs than their farshore locations.*
b) *…have a locational advantage in business taxes, compared to their farshore locations.*
c) *…have a locational disadvantage in access to natural resources, compared to their farshore locations.*

Support for Hypothesis *H1a* and *H1c* would be in line with the findings of Caniato et al. (2011) who suggest that competitive labour costs are equally important for near- and farshore production and resource access to be a driver of farshoring.

Shorter lead times have been a main focus of the literature on drivers of reshoring (e.g. Kinkel and Maloca, 2009; Stentoft and Mikkelsen, 2014). From a locational perspective, customers could be served more quickly in two ways. Either lead times are reduced by producing in the market of the customer or by exporting the product to him or her more quickly. If nearshoring would aim to reduce lead times also in the former way, nearshore production would likely be market-seeking and hence be correlated with greater market size. However, market access is a point of disagreement in the reshoring literature. It has

been mentioned as both, a driver of reshoring (e.g. Canham and Hamilton, 2013), yet also as a barrier (Wiesmann et al., 2017).

We resolve this discord by means of a theoretical argument derived from the eclectic paradigm. The literature argues that a plant in a foreign market would provide the firm a so-called "trade-cost-jumping-gain" (Neary, 2008). This gain would be greater the more otherwise incurred trade costs are saved by producing on the spot. As farshore locations are, by definition, further away from a firm's home production, exporting to them would be associated with higher trade costs. Farshoring would then grant higher trade-cost-jumping gains due to greater savings.

H2: *The nearshore locations firms choose…*

a) *…have a smaller market size than their farshore locations.*
b) *…have shorter export lead times, compared to their farshore locations.*

Also the remaining location advantages that may drive nearshore production have been ventilated in the reshoring literature. Both, know-how (Kinkel, 2014) and technology (Stentoft et al., 2015) are deemed to be reshoring drivers. Indeed, also economic crisis has been discussed as a driver of reshoring (Kinkel, 2012). Moreover, several related factors of macroeconomic stability are thought to be influential, such as stability of exchange rates (Wiesmann et al., 2017). Accordingly, we will test the following hypotheses.

H3: *The nearshore locations firms choose have more know-how than their farshore locations.*

H4: *The nearshore locations firms choose have a higher technological readiness than their farshore locations.*

H5: *The nearshore locations firms choose have a more favourable macroeconomic environment than their farshore locations.*

Data and Methodology

To evaluate the hypotheses formulated above, we fit a multilevel logistic regression to a set of 4766 location decisions of 558 manufacturing MNEs. We estimate our model group wise, splitting our sample in subsidiary locations of European and US companies. We will first discuss our statistical model, its underlying intuition and details. Then, we will elaborate on our data sources and the proxies we used. All econometric calculations have been carried out with StataSE 15. Prior to this, the data sets have been merged and prepared with Python 3.6.

Our method builds on the following intuition. Each foreign production subsidiary is either in a nearshore or in a farshore location. Hence we assign a dummy to each of our observations which assumes the value 1 if the subsidiary location is nearshore and 0 otherwise. We then predict the likelihood of a subsidiary to be located nearshore (dummy = 1), based on the features of its location as well as company-level variables.

Location features which serve as significant predictors constitute average differences between nearshore and farshore locations. The meaning of this difference is indicated by the sign of the coefficient. For instance, a positive sign for a significant predictor indicates that high values of the variable are, on average, more prevalent in the nearshore locations companies have chosen than in their farshore locations.

The interpretation of significant firm-level variables differs. A firm-level variable that exhibits significance tells us that, on average, firms which exhibit more of a specific

feature have more nearshore subsidiaries (resp. less, in case of a negative sign). That is, they affect company's baseline probabilities of nearshoring.

To account for general differences in company's production footprints which exist beyond the scope of our introduced control variables, we fit a multilevel model (Rabe-Hesketh and Skrondal, 2008). This way, a group intercept is fitted to each of the 558 companies in our sample. We ascertain our choice of a multi-level approach in two ways. Firstly, we fit a one-way ANOVA-model that explains our nearshoring dummy solely based on companies. This way, we learn that overall 23% of the variance in our dependant variable is attributable to which company owns the subsidiary in question. To graphically illustrate this structure, we cluster companies by their relative number of nearshore, farshore and domestic production sites, using k-means clustering (Hartigan, 1975), revealing company's distinct production footprints.

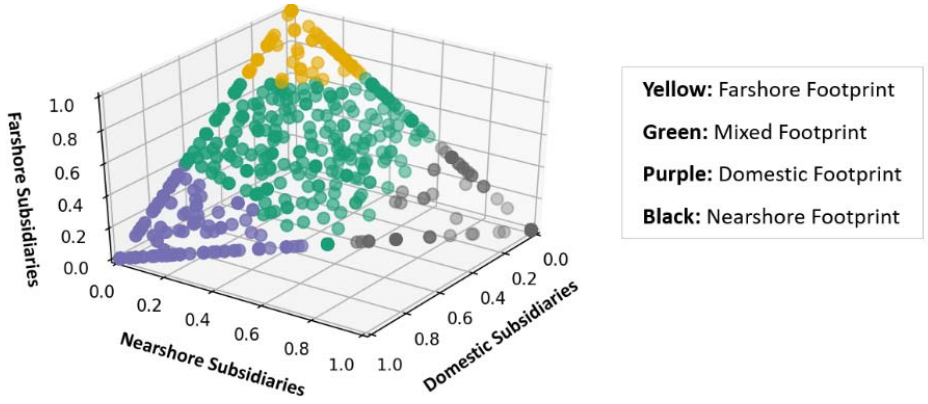

Figure 1: K-Means Clustering showing distinct production location preferences of firms

Data and Proxies

We derive the subsidiary location and company-level data underlying our analysis from the December 2017 Uniworld dataset of global multinational enterprises and their foreign and domestic subsidiaries. Our country-level data was obtained from two different World Bank data sets as well as the Global Competitiveness Report of the World Economic Forum.

We exclusively consider foreign subsidiaries of manufacturing MNEs, i.e. those whose two-digit NAICS-Codes are either 31, 32 or 33. Furthermore, we only focus on foreign subsidiaries that are labelled as production plants, manufacturing facilities or joint ventures. The former two types of subsidiaries are merged in one category, while the latter is controlled for in our model. We exclude all other subsidiary types; i.e. sales, retail or branch offices, R&D or service centres. Furthermore, we only consider subsidiaries of companies with headquarters in either the USA or the highly industrialised countries in Western, Middle or Northern Europe. Lastly, all subsidiaries listed in countries not recognised by the United Nations are dropped. This ensures availability of relevant location-level data.

Next, we construct the dependent variable – a binary dummy that assumes the value 1 if a subsidiary is located nearshore, and 0 if the subsidiary is located farshore. The nearshore-farshore distinction is based on the geographic distance from the company headquarters to the respective subsidiary. To approximate this parameter, we calculate the haversine distance (great-circle distance) between the capital of the headquarter country and that of the host country. Production subsidiaries located outside of a 4000 kilometre radius around the headquarters are considered farshore, within this radius nearshore.

The table below gives an overview of the descriptive statistics, proxies and data source of the location-level variables we consider. The values of our location variables presented below are average values of the past ten years (or maximum number of years available if < 10) of the used proxy. This is due to several reasons. Firstly, we aim to smoothen out disturbances. Secondly, we cannot pinpoint the year in which a subsidiary has been established. Therefore choosing a specific year whose values might have caused the location decision is unfeasible. Lastly, not all states collect all statistics yearly. Averaging allows to still compare country statistics without systematically dropping states with lesser statistical capacity.

Table 2: Location-Level Variables

Variable	Proxy	Mean	Std.	Data Set
(1) Labour Cost	GDP/capita (constant 2010 US-Dollar)	27531.73	19954.98	Worldwide Governance Indicators, World Bank
(2) Market Size	Total GDP (constant 2010 US Dollars)	3.56e+12	4.44e+12	Worldwide Governance Indicators, World Bank
(3) Natural Resources	Total natural resources rents (% of GDP)	3.231948	4.61	Worldwide Governance Indicators, World Bank,
(4) Know-How	Higher Education and Training	4.86	0.68	Global Competitiveness Report, World Economic Forum (WEF)
(5) Technological Readiness	Technological Readiness Index	4.57	0.99	Global Competitiveness Report, WEF
(6) Business Taxes	Profit tax (% of commercial profits)	17.74	7.57	Worldwide Governance Indicators, World Bank,
(7) Export Lead Times	Time to Export	26.55	32.16	Doing Business, Word Bank
(8) Macroeconomic Environment	Macroeconomic Environment Index	5.06	0.66	Global Competitiveness Report, WEF
(9) Subsidiary Ownership	Subsidiary location is joint venture (dummy)	0.05	-	Uniworld Online
(10) Foreign Direct Investment Inflow	FDI, net inflows (BoP, current US Dollars)	8.96e+10	9.92e+10	Worldwide Governance Indicators, World Bank,

Below, we listed our firm-level control variables. Variables one, two and four were directly obtained from the Uniworld Online data set. Variables three, five, six and seven were created through additional steps of calculation or data processing.

Table 3: Firm-Level Controls

Variable	Proxy	Mean	Std.	Data Set
(1) Firm size	Number of employees	31391.01	60129.55	Uniworld Online
(2) Sales	Dollar value of sales	8827.91	15772.31	Uniworld Online
(3) Productivity	Employees/Sales	0.42	2.63	Uniworld Online
(4) Governance, Dummy	0 = Private, 1 Public	0.56	-	Uniworld Online
(5) Business Scope	Number of listed 5-digit NAIC-Codes	5.28	4.44	Uniworld Online
(6) Industry	2-digit NAIC-Code	-	-	Uniworld Online
(7) Network Size	Number of foreign subsidiaries	54.94	63.08	Uniworld Online

Statistical Results

The following table summarises the statistical findings of our analysis. As we standardised all of our continuous variables, their coefficients represent the effect of a one standard deviation change.

Table 4: Statistical Results

	Model 1 (Controls only)		**Model 2 (Full Model)**	
Sample Size	N=2900	N=1866	N=2883	N=1856
Region	Europe	US	Europe	US
Firm size	-0.38*	0.83	-0.27	0.53
Sales	0.15	-0.40	0.17	-0.38
Productivity	-0.08	-0.30	-0.16	-0.50
Governance, Dummy	0.26	-0.55	0.18	-0.42
Joint Venture, Dummy	-0.99**	-1.63**	-0.79**	-1.49**
Business Scope	0.31	0.20	0.14	0.13
Network Size	*col.*	*col.*	*col.*	*col.*
Industry, Factor Variable				
Consumer Goods	*default*	*default*	*default*	*default*
Non-Metal Goods	0.44	0.25	0.60	0.85
Machinery, Electronics and Metal Goods	0.40	0.88	0.61	0.19
Labour Cost			0.31	1.51***
Market Size			-2.53***	-0.90*
Natural Resources			-0.12	0.06
Know-How			0.51*	-0.40
Technological Readiness			0.87**	-1.62**
Business Taxes			-0.59***	0.06
Export Lead Times			-0.57***	-0.48***
Macroeconomic Environment			-1.22***	0.25
FDI Inflows	-1.43***	-1.41***	-0.05	-0.80**
Common Intercept	-0.68	-3.07	4.51***	-3.85**
Var(Firm Intercept)	1.48	3.30	1.67	2.63
Intra Group Correlation	0.31	0.50	0.33	0.44
Nr. Groups (Firms)	303	255	302	255

Hypotheses of Location Advantages

Our results show a range of notable differences between the location features of company's chosen near- and farshore production sites, suggesting near- and farshoring to be driven by different motives. Below, we will review our hypotheses chronologically.

Regarding production costs, we considered labour costs, business taxes and resources access. For European companies, we find no significant difference in labour costs which supports *H1a* (no significant labour cost difference). In turn, business taxes are more favourable in the nearshore locations chosen by European firms than they are in their farshore locations which is evidence in line with *H1b* (more favourable business taxes, nearshore). For US companies the picture looks different. We find that the nearshore locations chosen by US companies have, on average, higher labour costs than the farshore locations chosen by them. Concerning resources, we find no evidence for significant differences in availability between chosen near- and farshore locations. Hence *H1c* finds no support. Overall, our results render plausible that producing in farshore locations does, on average, not provide a cost benefit for European companies.

Most notably, we find, for both European and US companies, that production in farshore locations is correlated with access to larger markets, which is in line with *H2a* (larger markets, farshore). This suggests a market seeking motive behind farshoring. In turn, we that the nearshore locations chosen by European companies have shorter export lead times, which is support for *H2b*. We find the same result for US companies.

For firms headquarter in Europe, we also find evidence for *H3* (more accessible know-how, nearshore) and *H4* (higher technological readiness, nearshore). For US companies

chosen near- and farshore locations, we find no significant difference in terms of know-how and, contrary to *H4*, lower technological readiness nearshore. Our last hypothesis, *H5,* supposed that the macroeconomic environment of nearshore locations chosen by firms would be more favourable than of their farshore locations. Based on our findings, we reject this hypothesis for both, European and US companies. For nearshore locations of European companies, we find the opposite of the expected results. For US companies, we find no significant difference between the macroeconomic environment of chosen near- or farshore locations.

Company Level Effects and Controls

Though our company-level controls are not significant, we find that a noteworthy share of the answer to the question whether to near- or farshore is explained by company-specific preferences. This is suggested by the variation in the company-specific intercepts. The so-called intra-class correlation gives an intuitive measure of the variance explained on the group-level. For European companies, this share is 33%, for US companies 44%.

We also considered two control variables at the location-level, namely the ownership of the production location and foreign direct investment inflows. The first variable is a dummy variable that indicates whether the location in question is that of a joint-venture or a wholly-owned subsidiary. The latter one captures mimetic behaviour, that is, whether, controlling for other effects, the extent of foreign direct investment inflow from other companies in the country is correlated with either near- or farshoring decisions. With respect to ownership, we find the intuitive result that joint-ventures are more likely to be found farshore. Interestingly, our location-level control for mimetic effects – past FDI inflows – is negatively correlated with nearshoring of US companies. This means that, after accounting for other influences, nearshoring is somewhat of a "counter trend" phenomenon for US companies. In our controls-only model (Model 1) for European companies, we find a similar result, however not after including additional location-level covariates.

Discussion

We analysed the relative location advantages and disadvantages of nearshore production sites chosen by European and US companies, as compared to their farshore production. We unearthed evidence that suggests that significant differences do exist, also after controlling for a range of location and company level variables. This suggests that near- and farshoring has distinctly different merits and demerits and is likely to be driven by different motives.

Our results show that, on average, farshore production locations of both, European and US companies, have larger markets. This suggests that accessing markets is a dominant motive of farshore production. The literature around the eclectic paradigm terms this the "horizontal motive" (Neary, 2008), as typically key manufacturing operations are duplicated in a foreign country to directly produce for its market. The conclusion that farshoring is primarily market-seeking is plausible (cf. Ferdows, 1997) as manufacturing in further distant locations is likely to result in higher trade-cost-jumping-gains. Research building on our findings could investigate whether the horizontal motivation behind farshore production can be confirmed by a smaller degree of vertical disintegration of farshore manufacturing operations.

At the same time, labour costs appear to, on average, not differ between companies' chosen near- and farshore production locations. This is in line with the survey based finding of Caniato et al. (2011) that labour costs are an equally important consideration

for near- and farshoring of Western European companies. This also provides evidence that the erstwhile cost advantage of farshore locations is, as it has been supposed (e.g. Bailey and De Propris, 2014), indeed eroding.

While we find evidence in favour of one conclusion of Caniato et al. (2011), our results do not support their finding that farshoring is motivated by access to resources. We find no significant difference in resource availability for either European or US companies' farshore production. This is plausible as European companies' find both the Maghreb states as well as Russia in their nearshore sphere, states with significant resources.

Furthermore, our results suggest the conclusion that manufacturing nearshore provides European companies, on average, better access to what Dunning terms "strategic assets" (Dunning, 1998). Assets like these allow a firm to advance its competitive advantage. In particular, we find evidence for more favourable access to shorter export lead times, higher technological readiness and greater know how. This is in line with the case evidence from the *Reshoring Monitor* as well as the literature on the drivers of reshoring (cf. Stentoft et al., 2016) which our study backs with quantitative evidence.

Interestingly, we do not find a characteristic set of location advantages of American nearshore production sites. On average, labour costs appear higher nearshore and we find export lead times and technological readiness to be lower. Yet, it may be that, despite higher export lead times, products manufactured nearshore are still easier to import to the US market, due to the smaller geographic distance. We suggest future research to investigate the detailed advantages of US companies producing in the Americas by means of exploratory case research.

Conclusion and Managerial Implications

This paper investigated the communalities and differences in the locational drivers of near- and farshoring. The result of this inquiry contributes to the literature in three main ways. Firstly, we provided a locational perspective on the question of whether near- and farshoring are driven by different motives. Though our findings differ in detail from those of Caniato et al.'s (2011) study of perceptional data, our results likewise suggest distinct differences between the motives of near- and farshoring, especially for European companies. Secondly, this paper has provided quantitative evidence adding to the literature on the drivers of reshoring and nearshoring. Thirdly, the findings of our paper highlighted the importance of the distinction between nearshoring and farshoring when studying offshore production. A limitation of our study has been that our statistical analysis of location factors relies on proxies and cannot account for detailed decision making processes. For this, we suggest further survey and case research to specifically inquire into the strategic factors driving near- and farshoring.

Managerial implications

At the outset of this paper, we have pondered the question, off to which shore the future of production may set its sails to – nearshore or farshore? Based on our results it seems unlikely that a major switch of European firms from producing farshore to producing nearshore will take place as both modes of offshoring offer distinctly different locational advantages that cannot necessarily replace one another.

The core trade-off appears to exists between the trade-cost-jumping gains offered by farshore production and the competitive advantages offered by the better access to important strategic assets in nearshore locations. Against the backdrop of the above, the emergence of new, large markets (BRIC, Next eleven, etc.) would lead to farshore production. However, the trade-cost-jumping gains from producing farshore would decrease with logistics innovations. On the other hand, nearshoring may become

increasingly attractive for European companies in a scenario where customer demands and future production technology requires manufacturers to increasingly draw on strategic assets. For instance, the need for small production runs may require quicker export lead times. Equally, the use of next-generation production technology may demand greater know-how and technological readiness. Summing up, near- and farshoring appear to be driven by different, only limitedly substitutable locational advantages.

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