Implementing reshoring: insights and principles from a longitudinal case study in the e-bike industry

IMPLEMENTING RESHORING: INSIGHTS AND PRINCIPLES FROM A LONGITUDINAL CASE STUDY IN THE E-BIKE INDUSTRY

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ABSTRACT

In spite of the growing body of literature available on the revision of prior production offshoring decisions, how reshoring is actually implemented remains largely unexplored. This paper responds to this gap by analysing the case of FIVE, an Italian electric bike (e-bike) company that has insourced and relocated to the home country the production activities it had originally outsourced to a Chinese manufacturer. The research combines a design science approach with a longitudinal, single case study method to gather both theoretical insights and practical managerial advice on how to conduct the reshoring implementation. The study captures the dynamic nature of the implementation process, showing how its elements evolve over time. Organizational learning emerges as a driving factor of reshoring, and each of the implementation stages seems to be characterized by the development of a specific organizational process, which provides the know-how required for the tasks to be performed at that particular stage. From a practical perspective, the study develops five reshoring implementation principles and a three-stage implementation process that offer valuable guidelines especially to managers of SMEs who wish to undertake the reshoring decision.

KEYWORDS: offshoring, reshoring, implementation, organizational learning, design principles

CONFLICT-OF-INTEREST STATEMENT

The authors of this article declare that:

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- All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript;
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ABSTRACT

Despite the growing body of literature on firms revising their production offshoring decisions, there is scarce research on how reshoring is actually implemented. This paper responds to this gap by analysing the case of FIVE, an Italian electric bike (e-bike) company that has insourced and relocated its production activities – originally outsourced to a Chinese manufacturer – to its home country. The research combines a design science approach with a longitudinal single case study method to gather both theoretical insights and practical managerial advice on how to conduct the reshoring implementation. The study captures the dynamic nature of the implementation process, showing how its elements evolve over time. Organisational learning emerges as a driving factor of reshoring. Each of the implementation stages is characterised by the development of a specific organisational process, which provides the know-how required for performing tasks at that particular stage. From a practical perspective, the study develops five reshoring implementation principles and a three-stage implementation process, thereby offering valuable guidelines for managers of SMEs who wish to undertake the reshoring decision.

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1. INTRODUCTION

One of the most debated topics in both the Operations & Supply Chain Management and International Business literatures is simply where to locate manufacturing and sourcing activities (Benito 2015; Brennan et al. 2015). Firms have spent decades expanding their supply chains internationally, but recent years have given rise to criticism about whether this strategy has really paid off and is sustainable to keep pursuing (Larsen et al. 2013; Shih 2014). On the one hand, the increasing awareness of offshoring's hidden costs and complexities – raised by, e.g., difficult long-distance coordination, underrated quality and service issues, or vulnerability of the extended supply chain – has revealed the fallacy of several offshoring decisions (Boffelli et al. 2021; Gray et al. 2017; Kinkel and Maloca 2009). On the other hand, the appeal of offshoring factors has been diminished by factors such as reductions in the cost gap (e.g., labour costs) between advanced and developing economies, increasing transportation costs, and a new wave of policies aimed at protecting local businesses (Barbieri et al. 2022a; Elia et al. 2021; Martinez-Mora and Merino 2014; Vignoli et al. 2022).

Accordingly, a growing body of literature has started to examine the "reshoring" (or "backshoring") phenomenon, i.e., the "voluntary corporate strategy regarding the home-country partial or total relocation of (in-sourced or out-sourced) production to serve local, regional, or global demands" (Fratocchi et al. 2014, p. 56). As shown by Moradlou et al. (2021), this relocation can also concern manufacturing and/or sourcing activities that were initially established offshore (i.e., "born offshored") and never performed in the firm's home country. Thus, this paper uses the term "reshoring" to identify the relocation of an activity from an offshore location to the firm's home country, regardless of the activity's origin.

The reshoring literature has mostly focused on the motivations for the decision (Barbieri et al. 2019; Fratocchi et al. 2016), but has recently begun to examine the decision-making process itself (Boffelli et al. 2020; Gray et al. 2017; Joubioux and Vanpoucke 2016). As a result, far less attention has been devoted to implementation aspects (Boffelli and Johansson 2020). Of course, scholars have noted that "moving back to the home country is not an easy journey" (Boffelli et al. 2021, p. 1) and that an appropriate implementation is crucial for successful reshoring (Boffelli et al. 2021). In order to support executives through the transition, scholars can examine firms' choices when undertaking reshoring and understanding the challenges posed by the process (Benstead et al. 2017).

To this end, extant studies have developed conceptual frameworks for implementation (Bals et al. 2016; Benstead et al. 2017; Boffelli and Johansson 2020), which have helped with identifying the main aspects of the process. Some of these have been considered by the few empirical papers that have analysed reshoring cases (e.g., Baraldi et al. 2018; Boffelli et al. 2020; Boffelli at al. 2021; Nujen et al. 2018). Yet, we are not aware of any past contributions that have undertaken an explicit and prolonged focus on the implementation process. Thus, the field lacks an extensive and dynamic view of how reshoring is operated, how it evolves over time, and which factors drive (or at least influence) its evolution.

This paper responds to this gap by longitudinally examining a reshoring implementation case from FIVE, an Italian electric bike (e-bike) manufacturer. FIVE initially established an offshore outsourced production in China, but has gradually relocated (and partially insourced) that production back to Italy. Despite the fact that the reshoring process started in 2014, the firm is still engaged with the implementation process, especially regarding the relocation of strategic components. More importantly, the case shows how the firm's approach and priorities have evolved over time. Thus, it illustrates the importance of considering a wider time horizon when trying to understand a reshoring

implementation. In short, we applied a design science research to a longitudinal case study in order to translate the main emerging insights into practical reshoring implementation principles.

This research offers both theoretical and practical contributions. Theoretically, it elucidates the key mechanisms of reshoring implementation, particularly by highlighting the driving role of organisational learning. Practically, it proposes actionable managerial insights in the form of five reshoring implementation principles and a three-stage implementation process.

The rest of the paper is organised as follows: Section 2 reviews the relevant offshoring and reshoring literature, with a specific focus on the implementation aspects of the latter. Section 3 presents the research methodology. Section 4 illustrates the case narrative, while section 5 presents the main findings regarding implementation alongside the set of implementation principles. Section 6 discusses the research outcomes and contributions, while section 7 ends with concluding remarks and an overview of future research avenues.

2. LITERATURE REVIEW

2.1 Offshoring and reshoring

For several years, offshoring (i.e., the relocation of operations from the home nation to a foreign location where the same company activities are performed under either the Multinational (MNC)'s subsidiary, or allocated to a foreign contract vendor (Contractor et al. 2010)) has been one of the most debated trends in the world economy (Barbieri et al. 2022b; Manning et al. 2014; Mudambi and Venzin 2010). Offshoring differs from the traditional internationalization process by forcing two salient changes in the firm's strategy: (a) the range of the activities affected by the geographical relocation is not solely limited to labour-intensive activities, but also includes knowledge-intensive ones (Contractor et al. 2010; Jahns et al. 2006); (b) the degree of activity disaggregation is much higher, as firms seek to optimise the level of dispersion of fine-sliced processes (Contractor et al. 2010; Jensen et al. 2013). The offshoring phenomenon has been driven by both macro-contextual factors: The first is policy changes, such as the liberalization of Foreign Direct Investments (FDI) regimes (UNCTAD, 2009), and substantial developments in the ICT systems and global infrastructure that facilitate long-distance communication and interaction (Levy, 2005). The second is the intensifying competition in many industries, which has pushed firms to explore new opportunities for cost reduction beyond their more familiar strategies (Dossani and Kenney 2007).

Conceptually, offshoring has traditionally been regarded as an organisational reconfiguration that follows a three-stage process of disintegration, relocation, and reintegration (Jensen et al. 2013; Mudambi and Venzin 2010). Each of these steps requires the firm to undertake specific decisions that respectively relate to the choices of: (a) the discrete organisational activities that will be despatched from the domestic organisation; (b) the host location where they will be relocated; and (c) the governance mode, as well as the coordination and control processes, through which the foreign-relocated activities will be reintegrated with the remaining organisational activities (Jensen et al. 2013; Schmeisser 2013). Of course, these decisions are typically interdependent: For example, Schmeisser (2013) noted that "significant evidence exists that the interplay between activity and location characteristics affects firms' formulation of offshoring strategies" (p. 395), while Mudambi and Venzin (2010) illustrated the various types of interdependencies among offshoring and outsourcing decisions.

Offshoring studies have typically reserved most of their attention for large corporations, due to the assumption that offshoring can (and typically does) require a vast amount of resources, i.e., those not

accessible to Small and Medium Enterprises (SMEs) (Di Gregorio et al. 2009). Studies have shown that SMEs are less experienced and less advanced in their offshoring ventures than large companies (e.g., Kinkel and Maloca 2009; Waehrens et al. 2015). Thus, they tend to see exportation as the prominent, low-cost and low-risk entry mode of internationalization (Morais and Ferreira 2020). However, Roza et al. (2011) observed that SMEs are increasingly becoming important actors in the internationalization process: Through a reliance on outsource offshoring, they can more easily circumvent the set-up costs of captive offshoring (Narula, 2004). Moreover, Roza et al. (2011) illustrated that firm size is associated with differences in the offshoring drivers and activities, hinting that the specificity of SMEs should be accounted for when studying their offshoring processes.

The literature reports that firms are increasingly aware of the complexity and challenges of offshoring (Jensen et al. 2013; Manning et al. 2014). On the one hand, the disaggregation of activities into many sub-processes significantly raises the number of interdependencies among them, which in turn increases the complexity in their coordination. On the other hand, the processes of coordination and control, as well as knowledge transfer, are further hampered in the offshoring scenario by physical, cultural, and institutional distances between relevant actors at various locations (Jensen et al. 2013). This can eventually result in unforeseen costs (Dibbern et al. 2008; Holweg et al. 2011; Larsen et al. 2013) that undercut the anticipated benefits while producing service quality issues and a lack of operational efficiency (Jensen et al. 2013).

These problems in operating offshoring – coupled with ongoing changes in the world economy (e.g., rising costs in several offshore locations, especially China; increasing transportation costs and logistics complexity; new tariff and trade barriers) – have led companies to more critically assess their past offshoring decisions (Boffelli et al. 2021). Some have even questioned the real effectiveness and utility of a globally dispersed supply chain (The Economist, 2013). In some cases, these firms have modified their prior location choices, typically by bringing (partially or fully) the previously offshored activities back to their home countries – giving rise to "reshoring" (Bailey and De Propris 2014; Fratocchi et al. 2014a,b). Although available empirical data do not yet support the view that reshoring is a massive trend (De Backer et al. 2016; Dachs et al. 2019; Eurofound 2019), the phenomenon has certainly gained momentum. Thanks to a substantial increase in the number of related publications across recent years (Barbieri et al. 2018; Wiesmann et al. 2017), the topic is more salient among governments, institutions and societies (Barbieri et al. 2022a; Barbieri et al. 2020; Dosi et al. 2021; Vignoli et al. 2022). This literature has provided a detailed characterisation of reshoring, particularly in terms of the relocation geographical trends, the profiles of reshoring firms (e.g., size, industry, labour- vs. capital-intensive production processes, etc.), and their motivations (Barbieri et al. 2018; Fratocchi et al. 2016; Kinkel and Maloca 2009). Ancarani et al. (2015) showed that SMEs' offshoring ventures have a generally shorter duration, which suggests that these companies struggle more with the associated burdens and complexities.
In short, a growing number of contributions are illuminating the management of the reshoring process itself, and especially the decision-making stage (Boffelli et al. 2020; Ciabuschi et al. 2019; Gray et al. 2017; Gylling et al. 2015). That said, there is a largely unexplored question of "how to reshore" (Barbieri et al. 2018; Benstead et al. 2017).

2.2 Reshoring implementation

The most recent literature on reshoring has started to recognise the importance of investigating both the motivational and execution aspects of the process (Benstead et al. 2017; Boffelli and Johansson 2020; Boffelli et al. 2021). As noted by Benstead et al. (2017), the extant reshoring literature "typically focuses on a snapshot in time and on an ex-post analysis of what drove a firm to repatriate" (p. 85): By treating the reshoring decision as a discrete event, it "does not support a firm through the

transition by providing a structure for the entire reshoring process". On this point, Boffelli et al. (2021) offered empirical evidence for the importance of the implementation phase by showing that the success (or failure) of a reshoring initiative seems to be driven more by its correct (or incorrect) execution than by making the right (or wrong) decision.

This research stream has led to the development of conceptual frameworks that segment the implementation process into either sequential phases (Bals et al. 2016) or a set of elements that characterise its main choices and operational modes (Benstead et al. 2017; Boffelli and Johansson 2020). Bals et al. (2016) applied the three steps of Jensen et al.'s (2013) offshoring model to the reverse process. They also provided a comprehensive characterisation of the location trajectories and ownership decisions in reversing offshoring. By examining cases from the business press, they revealed preferential patterns of reshoring: for example, the most drastic movement from offshore-outsource to domestic-insource. Finally, they suggested that organisational learning may play a pivotal role in the implementation stage of the reshoring process – since successful past implementations are likely to provide a positive feedback loop for future initiatives.

Benstead et al. (2017) usefully operationalised the key choices and modes of reshoring implementation, thus providing a practical tool for investigating this topic. Their structured reshoring framework encompasses not only the implementation aspects, but also the drivers of the phenomenon and the relevant contingency factors. Implementation involves two types of elements: namely, "location, ownership and timing" and "operations and supply chain development" factors. The former includes the adopted governance mode, the degree of reshoring (i.e., partial vs. full), and the way the process is developed in time (incremental vs. instantaneous), among others. The latter refers mostly to in-house training, improving relationships and information-sharing with suppliers, and global supply chain development. Boffelli and Johansson (2020) further refined Benstead et al.'s (2017) work by (a) extending it to offshoring as well, so as to capture the inherent linkage among the two phenomena; and (b) introducing the novel element of "preparation to implementation", which reflects both assessments of organisational readiness (e.g., level of capabilities) for reshoring and specific actions (e.g., freeing capacity; training programs) that the firm may (or should) undertake in order to execute the relocation decision.

While undoubtedly useful, these frameworks remain mostly descriptive and static in nature; as such, they offer limited help in understanding (a) what drives the specific choice made for each of the elements and (b) how the implementation process evolves over time.

Thus, the implementation of reshoring remains largely unexplored from an empirical perspective (Boffelli and Johansson 2020), although a few extant studies have addressed some peripheral issues. As mentioned above, Boffelli et al. (2021) examined the impact of "mistakes" in offshoring and reshoring on the outcomes of the location initiatives; as such, they reported evidence of "what can go wrong" while implementing reshoring (e.g., failed coordination between the reshored activities and those that remained offshore; wrong pricing and marketing decisions regarding the reshored products). Nujen et al. (2018) particularly focused on the knowledge aspects in reshoring implementation. Their case studies suggest that a longer offshoring experience increases the atrophy of the requisite knowledge base and makes its re-integration difficult; however, managers have levers to hinder this effect. For instance, they can proactively identify the missing and available knowledge, as well as initiate the creation of knowledge-sharing programs that can positively influence the re-integration effort. In other words, it is important to assess backshoring readiness (Nujen et al. 2019) – particularly in terms of intangible, technological, and supplier resources – before implementing the reversal of offshore activities. The intangible resources include embedded knowledge, competence,

employees' ability to share knowledge, employees' capacity to change, and the firm's management capabilities. Technology resources consist of existing technology infrastructure, new investments in technology, and employees' ability to embrace new technology. Supplier/partner resources include new local/regional suppliers and/or existing networks (Nujen et al. 2019).

In another study, Baraldi et al. (2018) applied the IMP (Industrial Marketing and Purchasing) perspective to analyse a reshoring case. The authors illustrated how the focal firm's localised networks (at both the host and home countries) can either facilitate or hinder the relocation process. Specifically, the reshoring firm's implementation approach – in terms of the activities, resources, and actors involved – is likely to cause, or require, some type of network change, which can result in either supporting or resisting behaviours from the network's actors. For example, the firm's decision to apply a "selective reshoring" – wherein it only repatriated particular value-adding activities – mitigated resistance from the domestic cluster by constraining capacity, while favouring the firm's re-embeddedness in the home context. Finally, Boffelli et al. (2020) examined the nature of the reshoring decision-making process under different degrees of complexity. Thus, their study investigated the sequence between decision-making and implementation, producing some insights regarding time, governance modes, and supplier relationships.

3. METHODOLOGY

For our research strategy, we combined a design science approach with a longitudinal case study. Design science methodologists (e.g., Romme and Edenburg 2006) highlight the difference among description-driven research (representing the classical management research approach) and prescription-driven research (with a design science approach). Design science has been used in all types of domains, including accounting (Bertolotti el al. 2019), innovation management (Cocchi et al. 2021), and organisation development (Romme and Damen 2007). It aims to develop artefacts such as tools (e.g., Balboni et al. 2021), methods (e.g., Dosi et al. 2021; Kriesi et al. 2015) or conceptual principles (e.g., Vignoli et al. 2019; de Vasconcelos Gomes et al. 2022). A seminal paper from Holmstrong et al. (2009) calls for such research in operations management: "In operations management (OM) research, recognizing and building on this complementarity is especially crucial, because problem-solving–oriented research produces the very artifacts (e.g., technologies) that empirical OM research subsequently evaluates in an attempt to build explanatory theory. It is indeed the practitioner – not the academic scientist – who engages in basic research in OM" (p. 65).

As a methodology, design science fills the gap between theory and practice in order to produce novel theoretical insights with practical relevance. To this end, scholars applying the methodology usually contribute to their field of study by developing artefacts (tools, principles, methods) that are straightforward and applicable to the field. A classical output is represented by principles (or technological rules) that usually state: "if you want to achieve Y in situation Z, then perform action X" (Van Aken 2004, p. 227) – thereby linking an intervention to an outcome. We built on design science research to extract the design principles behind a reshoring implementation. When the literature is insufficiently developed to support theory-driven design principles, they can be extracted from the field (e.g., Van Burg et al. 2008). Inspired by the framework of Van Burg et al. (2012) – which applied a design science approach to a multiple case study – we took a similar tact with a longitudinal case study in order to identify the design principles and phases for a reshoring implementation.

A longitudinal case study is particularly useful when first investigating a topic, especially when studying the processes of change and development in organisations (Ahlstrom and Karlsson 2009). Accordingly, it is well suited to the case of reshoring implementation – a recent, widely understudied phenomenon that arguably implies an organisational transition and reconfiguration over time (Benstead et al. 2017). According to Yin (2003), a single case study is most appropriate when it is revelatory, i.e., it gives the investigator an opportunity to observe and analyse a phenomenon that was previously inaccessible to scientific investigation. We are not aware of any past study that has looked at reshoring implementation in a real-time, longitudinal manner[1].

3.1 Data collection

We collected data from the case company for more than six years, from 2015 until 2022. The research team had its first contact with FIVE in 2015. At that time, the team was researching reshoring experiences undertaken by local businesses of the Emilia-Romagna Region (one of the most developed Regions in Europe), as part of a broader research project supported by the local Regional Administration about the emerging reshoring phenomenon in its territory. The researchers identified some articles from the popular and economic press that reported the recent case of FIVE, a company that had begun to relocate its production to Italy a few months prior. Mr. Giorgio Giatti, FIVE's owner and CEO at the time, was available for an interview (held in late 2015), which revolved around the motivations behind the relocation decision, as well as how FIVE was managing the reshoring process at that time. One member of the research team visited the company and had an opportunity to observe the company's "handcrafted" assembly process. It was clear that the company was still at a very preliminary stage of development, which offered the potential for a real-time observation of how reshoring can evolve, encouraging the team to continue monitoring it.

The second round of interviews took place in 2018, after FIVE had moved its operations to a new and much larger plant. Both the former and the new CEO (Mr. Fabio Giatti, Giorgio's son) were interviewed. Compared to the first interview, which was mostly based on open-ended questions, the second one used a semi-structured protocol, following newer publications (e.g., Benstead et al. 2017) that provided some guidelines for investigating the implementation aspects of reshoring. A final round of interviews was held in late 2021-early 2022, which involved not only the CEO, but also the Sales Director and the Purchasing & Product Development Director. Given that the company's executive team expanded in parallel with its growth, we thought adding these two informants would help ensure higher information reliability and accuracy. Moreover, for triangulation purposes, we also interviewed the CEO of the wheel system supplier (one of FIVE's most important vendors). Overall, we conducted ten interviews during the three rounds; all of them were tape-recorded and transcribed (see Table 1 for more details). In addition to the interview data and the plant visits, we collected further information from the company's catalogues, internal reports, press releases, and articles from the popular and specialised press.

3.2 Data analysis

We analysed the data through a three-stage process. Following Langley (1999), we first drew up a case narrative that served as a data organisation and validation device. The description was reported back to the key informants, who confirmed the accuracy and comprehensiveness of its contents. Then, all the members of the research team actively participated in data analysis following the procedure

[1] Benstead et al. (2017) analysed a case of reshoring implementation, though in a retrospective way. Baraldi et al. (2018) adopted a retrospective longitudinal case study, but their work was not specifically focused on reshoring implementation, although it included some aspects of this process.

proposed by Miles et al. (2013), which consists of (a) data reduction, (b) data display, and (c) drawing conclusions. Finally, in stage three, the research team applied a temporal bracketing strategy (Langley 1999): a method that helps to structure process analysis and sensemaking by splitting process data into a series of more discrete but connected blocks (Bertolotti et al. 2022; Langley 1999). In our case, we identified coherence within each phase and discontinuity between phases over three fundamental aspects: 1) the company's central goal; 2) the company's primary internal processes and how they are managed; 3) the company's supply chain approach, in terms of both supply relocation decisions and supplier relationship management.

In line with the recommendations by Yin (2003) and Meredith (1998), we adopted various measures to ensure research rigour, particularly: (a) utilising multiple data sources and researchers, as well as having key informants review the case study reports, to overcome potential researcher bias and enhance construct validity; and (b) adopting a clear case study protocol and gradually developing a case study database to ensure reliability.

After we identified principles and phases, we tested their generalization with two independent panels: one involving four operations scholars and one attended by four senior operations managers. The aim of the panels was to test the clarity and relevance of the reshoring implementation principles and phases, to check for their internal coherence (among principles/phase description and quotes) and relationships among the principles themselves, and to evaluate their validity beyond the research setting.

The panelists were selected using a competence-based criteria. Scholarly panelists were selected based on their proven competences related to reshoring or the global supply chain. They all came from international universities, were tenured, and had at least 10 years of experience in their field. Corporate panelists were senior supply chain directors or operations directors from companies that had previous significant experience in offshoring and reshoring initiatives. These panelists played a central role in the decision-making process within their firms.

Each panel lasted about 60 minutes; all conversations were recorded and transcribed. In each panel, respondents answered an initial structured questionnaire featuring either open or closed questions. In the final roundtable, participants openly discussed the clarity, relevance and internal validity of the principles. Then, the authors and the panelist had a final discussion regarding contingencies: how far we the principles can be translated to other settings.

Feedback from the panelists helped to sharpen and refine our implementation principles and phases. For example, Principle 3 was initially less focused on customer-centered value; instead, it simply related the component's value to its costs. However, the panelists' observations helped us to elaborate on the principle's content. The final set of principles was shared with the FIVE main informants, who confirmed that their experience resonated with the proposed principles and phases.

4. CASE DESCRIPTION

This section illustrates the case evidence, with a particular emphasis on the reshoring implementation. Following the temporal bracketing strategy (Langley 1999) discussed in the previous section, we first present the offshoring stage of the "born offshored" (Moradlou et al. 2021) case company; we then describe its reshoring journey, which is divided into three distinct stages. Table 2 synthesises the discontinuities between these stages, describing the three fundamental aspects that drove the splitting of the time scale into a series of discrete periods.

The case company belongs to the electric bicycle industry – a rapidly growing business that offers solutions in response to both trasportation and recreational needs (Fishman and Cherry 2016). Although China is the world's largest consumer and producer of electric bicycles (People's Daily Online 2021), the European market is also experiencing fast growth: more than 5 ml. unit were sold in 2021 (an all-time record), +12% higher than 2020 (Conebi 2022). Remarkably, more than 80% of these e-bikes were produced in Europe, showing the growth of the local manufacturing industry. It is worth noting that the European production of cycle parts and accessories for both traditional and electric bicycles also increased in 2021, reaching a value of EUR 3.6 billion (from EUR 3 billion in 2020). Moreover, this is an industry where – as the case company's Sales Director explains –"*the OEM typically focuses on the final assembly and quality controls, and it purchases most of the components (e.g., brakes, frames, engine, etc.) from specialized suppliers, many of which are traditionally located in the Far East*." Thus, the data suggest that the growth of the e-bike European sector is expanding beyond the OEM level to include other tiers of the supply chain.

Firm's origin and born offshore operations (2007-2014)

FIVE (acronym for 'Fabbrica Italiana Veicoli Elettrici', i.e., Italian Electric Vehicle Factory) is an Italian SME that produces e-bikes. This company was founded in 2007 as part of an operation to diversify the eco-friendly mobility sector initiated by Termal Group – an Italian company that has been active since the 1980s producing air conditioning units with a low environmental impact (e.g., heat pumps). In recent years, FIVE has progressively achieved higher volumes and revenue, moving from a little less than €1 million in 2015 to over €5 million in 2020 (see Table 3 for the company's annual revenue, production, and employees since 2018). This phenomenon is in line with the current trend regarding this sector's expansion within both the domestic and the broader continental market. FIVE's product is classified as medium-high range, and while they focus on design and aesthetic details, they also pay attention to the quality and reliability of the electrical components. Their product line covers three primary market segments of the e-bike sector: urban mobility segment, foldable segment (compact products that are suitable for commuting and holidays since they are easy to transport), and the sport-trekking segment.

Over the years, the CEO of Termal Group, Giorgio Giatti, had developed close ties with Asian companies in the air-conditioning sector, which led to an exclusive distribution of their products in the Italian market. Due to his frequent travels in Asia (especially in China), he noticed that in the early 2000s, e-bikes had become rapidly widespread throughout the cities of that region, while in Italy, that was still an absolutely niche market. Mr. Giatti was intrigued by that phenomenon and investigated the production process for that sector. He learned of the existence of numerous small- and medium-sized companies in China that were often gathered in clusters, the largest of which was in Shanghai. These clusters consisted of companies in charge of the production and assembly processes, as well as companies specialised in producing the components. Subsequently, Mr. Giatti started considering the idea of expanding his company to the e-bike sector, which despite being very specific, was in tune with the core business of Termal due to its objective of eco-sustainability. In 2007, the new company, FIVE, was inaugurated and organised according to the following operational model: While the company focused on the design of the product, its outsourced its production and assembly processes to a Chinese company. The reason behind this approach was that they needed a design that was more suitable for the Italian market (and the western markets in general), but they also needed an affordable production cost. The Chinese company was not only able to offer cheaper manpower, but also boasted a fairly consolidated production process with a production scale that topped the volumes of FIVE. Furthermore, since the Chinese firm had already been working with a large number of suppliers, they were able to find the components for the e-bikes. Nevertheless, FIVE

and the Chinese partner jointly discussed and approved suppliers for the most important components. With a design document in place, FIVE and the partner company cooperated on the creation of a prototype that, once approved, would become the basis for the series. Since the very first models, FIVE valued the aesthetic features of the Italian design, pairing them with technical solutions that were innovative compared to most of those available at the time. For instance, rather than a standard chain, FIVE employed a cardan shaft, which was better at preserving the cleanliness of the cyclist's trousers and was therefore more suitable for the urban environment. Additionally, FIVE abandoned fixed lead-acid batteries in favor of lithium batteries, which are removable and thus easier to recharge.

As the company progressively managed to increase its product lines, some models found good success. For instance, the "Shopping Utility Vehicle" is still part of FIVE's product line ten years after its launch. Nonetheless, the company was not satisfied with the organisational side of the business for various reasons. As Mr. Giorgio Giatti reported (first interview, 2015), "*First of all, the production costs substantially increased due to the higher wages Chinese workers obtained. Furthermore, we encountered many instances of qualitative issues especially when it came to the painting and the batteries. Batteries comprised a particularly critical issue as they heavily influence the performance of the e-bike. The frequent flaws and complaints were leading to higher customer service costs, but more importantly they threatened to negatively influence the reputation of the company. Moreover, the establishment of a global supply chain created the need for a more careful inspection of the quality of the finished products (which was undertaken in Italy)*." All of this meant a substantial increase in the coordination costs. Mr. Giatti decided the company had to assume direct control of the production process, especially for the most critical components. "*I was aware that it was a delicate step for FIVE since we would have had to take over processes that we had never managed before. Yet I clearly felt that the way we were operating our business was becoming obsolete both in terms of economic sustainability and development opportunities*." Hence, in 2013, FIVE announced its intention to move the production process to Italy and started work on the housing facility a year later in 2014.

Phase 1: Replication (2014-2017)

The reshoring operation happened gradually. However, while the production's successful move eventually led FIVE to dismiss the Chinese assembler, the company is still exploring reconfigurations of its supply chain.

Originally, the reshoring operation was meant to allow the company to internally handle three processes that were considered fundamental for not only their value proposition, but their core strategy as envisioned by Mr. Giatti: "*My idea is that assembling the e-bike, and producing both the engine and the battery, are activities we have to perform in house*" (first interview, 2015). During the first phase of the reshoring operation, the company established a small-scale pilot assembly line inside an 'atelier' at the Termal facility. The firm hired an initial slate of workers, one of whom already had experience in assembling traditional bikes, and began work on assembling the e-bike. By testing the sequences for the different operations, they were able to create specific assembly sheets. The process became more efficient by partitioning the different activities in various stations of the assembly line; they further increased the speed by handling pre-assembly activities outside the line.

The production process started by employing most of the same components that had previously been used in China, which were now being shipped to Italy. At the same time, the offshore production was still in place, as it was needed to fulfil the market demand. However, FIVE began employing local suppliers and making the first attempts to restyle the core product that previously had been made in

China. In fact, this first stage of the reshoring operation progressively involved the component side of the business. FIVE investigated traditional bikes in both the Italian and European supply market, as they sought to determine if such components were viable for their e-bike. When they approached the most consolidated sectors, such as the seats sector, they were able to find new and affordable suppliers that were comparable to the ones they had been working with in Asia. In the case of some products, such as wheels – which are cumbersome and need to be assembled before shipping – a local supplier meant a more efficient transportation process, which further favoured this transition. In the meantime, the supply chain was subject to a further modification. Due to either economic reasons or a lack of suppliers, some components (gearshifts, brakes, forks) were not obtainable through European suppliers. Hence, FIVE acquired them from Asian suppliers, but this time the company took charge of the process without any intermediary. All the scouting and control activities related to these products were carried out by the same FIVE's executive who had been previously in charge for managing the relationship with the Chinese assembler. At the same time, the Italian buyer oversaw the negotiations and handled all the orders. During the first years of its activity in Italy, FIVE internally attempted to develop an engine that aligned with their initial strategy. Nevertheless, as Mr. Giorgio Giatti explained (second interview, 2018), "*The project immediately presented some economic and technical difficulties, and others related to the rapid evolution of the market, especially for the central engine – a more complex and costly solution compared to the traditional drive wheel, but also noticeably more powerful. Based on these factors, we decided to abandon that project.*"

Phase 2: Consolidation (2017-2020)

In May 2017, about two years after beginning the shift to Italian activity, the new FIVE production plant was inaugurated. This facility – equipped with a single rotary system that connected the assembly stations and the storage points for the raw materials – allowed for substantially increased production volumes. Within a few months, FIVE stopped acquiring the finished product from the Chinese assembler. Moreover, they started employing water-based painting, which allowed them to insource this fundamental part of the overall production process. As Mr. Giorgio Giatti observed (second interview, 2018): "*Having direct control over the painting process – coupled with fewer issues that used to be caused by the transportation of the not-yet-painted components – has led to fewer qualitative problems. Additionally, this brought a more developed understanding of the graphic design of the product, which we are further enhancing through collaborations with suppliers specialized in that sector (e.g., varnishes and decals).*" Such collaborations were instrumental to achieving a broader selection of colours, as well as learning the proper application of decals. If carefully executed, the latter process could lead to more aesthetically appealing e-bike models. Over this period, FIVE better understood the key importance of the frame in the design and assembly process. At that time, they were acquiring that component from an Asian supplier that could offer competitive prices while boasting solid technical experience and reliable service. However, the long distance impaired their ability to both devise new styles and directly analyse the tridimensional prototypes created during the design phase; such issues were only partially addressed through 3D design software. In general, FIVE understood that the frame was the core element around which each model was developed. Since the early stages of the design process, they had to consider how the frame could be assembled with other components (for instance, the size and position of the holes). Such matters were critical to the creation of prototypes and were often addressed during the development of the project. Thus, they had to frequently interface with the supplier while also scheduling long-distance tests, followed by the shipments of samples using costly air freight service. It was clear that all these issues could be more easily handled by working with a geographically closer supplier. Nevertheless, the Italian and European markets did not present many solutions for this

component. There were few frame suppliers and none of them offered prices as competitive as those of the Asian producers. This meant it was impossible to start a process of reshoring for the frames.

The following year, Mr. Giorgio Giatti stepped down from his position and his son, Fabio, became the new CEO of the company. Fabio Giatti had previously curated the distribution network of FIVE. At this time, the company took another fundamental step in developing its own operational model: They started their internal production line of batteries, as initially planned. The new CEO explained the importance of this project (first interview, 2018): "*This line was established by a Taiwanese company that aided FIVE with an intense training programme lasting several weeks. This action we undertook is already having, and will continue to have, great impact on the company. The battery's substantial economic value – its cost comprised about one third of the cost of the final product – can be now partially kept inside (thus increasing the company's profit), and second, it significantly contributed to achieve the "made in Italy" certification for our products.*" Furthermore, this new operational model permitted FIVE to open the "black box" (this component had been regarded as such until that point), which led to some critical implications. On the one hand, FIVE was now directly in charge of the control process for all the components of their batteries and the respective assembly processes, which allowed them to avoid several defects. On the other hand, the company gained fame and experience regarding a process that influenced the performance of the e-bike, which empowered them to start considering ways to upgrade their product.

Regarding the supply of components, Phase 2 was characterised by a decreasing rate in reshoring: FIVE continued its scouting activity of local supply markets and, from time to time, managed to strike deals with new partners that replaced the Asian suppliers with local ones (for components such as the chain ring and crank arm). However, this process was not as extensive as it had been in the early stages, in terms of both the number of replaced components and their value. Instead, supplier relationship management changed significantly in this period as FIVE became more technically competent about its product. They started to be more proactive and analytical in discussing the subcomponents' choice with suppliers instead of simply adopting the latter's proposals. They also became more meticulous in defining their specifications and quality requirements (while establishing new, ad hoc quality controls), which led to cases of supplier replacement. The supplier relationships became more structured thanks in part to better planning – both in terms of volumes and new products – which granted the company more influence when negotiating.

Phase 3: Value creation (2020-now)

The new managerial structure that FIVE achieved after the various steps of the reshoring process demonstrated that the firm could handle higher volumes, create products for higher market segments, and achieve fewer defects. At this stage, the operational model was particularly consolidated, especially for those activities that were carried out internally. At the same time, the company started exploring new opportunities for its supply management – even considering novel opportunities for reshoring that could be achieved through different approaches. Some cases are particularly telling of this evolution: For instance, regarding the batteries, FIVE started a new collaboration with a local company specialised in electrical devices to develop a new customizable BMS[2] (the core element that controls the system), which had considerably higher performance compared to previous models. FIVE's maturity in managing the batteries' internal assembly gave them the confidence to start this new operation. This was also an evolutionary step for the supplier, which was applying its technical expertise to an e-bike product for the first time.

[2] Battery Management System.

In the meantime, FIVE pursued a new strategy for another key component: the engine. As noted by the Purchasing & Product Development Director, "*First, we have started to acquire more customized engines from the Asian supplier. Besides, recently we also initiated a new relationship with a local company. The latter is "work-in-progress" but it has already reached an advanced stage for the development of a powerful engine with further increases in customized specifications compared to the actual product range.*" The Sales Director added, "*I think this approach follows our upgrade strategy, that aims to achieve more customized, higher performing products.*" In both instances, FIVE saw the opportunity to increase the value generated by new components, which was pursued in spite of the inevitable higher costs. The supplier's closer proximity had been an instrumental factor in the new approach to battery and engine supplies. FIVE's CEO, who was deeply involved in the BMS project, believed that "*frequent interactions and common language and understanding were crucial (a) to overcome the complexity of the more sophisticated product concepts, and (b) to timely arrange the several tests required by the solutions the companies were jointly developing*" (second interview, 2021).

Importantly, changes in the supply management of these key components can extend to other components or subcomponents. For instance, regarding the batteries, the separated purchase of the BMS freed FIVE from the need to buy the entire battery assembly kit (which had previously been their operational method). This has enabled new reshoring opportunities for other subcomponents, such as the wirings and the holders, for which scouting operations are already in place. Similar considerations apply to engine-related components (e.g., the display), which are currently sourced from Asia as part of the "electric power unit" kit, but might be bought separately in the future. The firm is currently in the midst of scouting activities on the display.

While this novel, value-focused approach has revamped opportunities for components' reshoring, it has not consistently translated into relocation all the time. For instance, although the frame is still the target of intense scouting operations and talks regarding possible alternatives, it continues to be supplied by an Asian company whose affordable costs and solid performance obviate the need for reshoring.

5. FINDINGS ON IMPLEMENTATION

In the following, we illustrate the findings related to the implementation of reshoring. First, in section 5.1, we summarise the main evidence on the reshoring implementation that emerged from the longitudinal observation. Such evidence is described in relation to the main elements of extant theoretical frameworks on reshoring implementation (e.g., Benstead et al. 2017; Boffelli and Johansson 2020). Importantly, the research design employed herein allows us to highlight the evolution of these elements over time – an aspect that past empirical studies have neglected. Then, in sections 5.2 and 5.3, we present the design phases and principles, respectively. The phases represent temporal stages for the gradual implementation process and illustrate the different reshoring approaches that a manager should take. The principles represent rules that orient behaviours in the practical implementation of reshoring. These findings – which are coherent with a design science prescriptive approach – represent a synthesis of the longitudinal case study, our developed process of abduction, and a validation phase developed with two panels of four experts each (and its related iteration).

5.1 Evidence on reshoring implementation

In the case of FIVE, the exit (governance) mode exhibited a modification of the governance coupled with the location change. While reversing offshoring, the company internalised the assembly process,

which had previously been carried out by a Chinese company. FIVE's exit mode did not follow a 'one shot' strategy because the governance model continued to evolve alongside the reshoring process. This was paired with the further insourcing of activities that used to be carried out by Chinese suppliers (i.e., painting; battery assembly). For other components, FIVE maintained the same governance mode from the offshoring stage (i.e., outsourcing), but they started sourcing such components from Italian and European suppliers in replacement of, or in addition to, the Asian ones. Overall, the process of reshoring happened gradually, with part of the time spent in a transitional state where the production process occurred in both locations. Table 4 summarises the timing of the different relocation steps of the main components and production phases.

As for the degree of reshoring, we distinguish between the relocation of the final product (the more usual object of degree for reshoring) and the relocation of component supplies (an object that has rarely been considered by past studies). The former followed a dynamic evolution, as it remained 'partial' during the first stage and turned to 'full' early in stage 2, when FIVE ceased the relationship with the Chinese assembler. The latter can be considered 'partial' at all stages, although it also evolved dynamically as activities and components (and ultimately, value) progressively transferred to Italy and Europe.

Notably, we observed that the logic behind the choice of relocating the components changed over time. During the initial phase, FIVE started replacing suppliers based on their "obtainability" and "economic competitiveness" in the new location. FIVE turned mainly to suppliers of components for the traditional bicycle that were located in Italy and Europe. They considered if it was possible to employ these components on their e-bike and how much the cost differed from the one offered by Asian suppliers. Finally, they concluded this transition only if it was feasible and economically advantageous, or at least not penalizing for them. Their approach was focused mainly on components that had a higher price and possibly required complex logistical arrangements. Furthermore, this approach dominated the initial phase of the reshoring process. During the following phases, they tried to achieve a similar result for components of lesser economic value, but the reshoring process slowed down. During the most recent phase (i.e., value creation), however, the company has begun placing greater importance on the component's 'value'– both in terms of performance and customization – when considering a reshoring opportunity, even if that usually means higher costs.

Finally, regarding the development of supplier relationships, we observed that FIVE cultivated a keener awareness during the reshoring process, which led to more structured relationships with the suppliers (e.g., better planning activities, more complex contracts, etc.). This also led to new supply collaborations, which were initially focused on improving some operational aspects (such as the graphic design), but later evolved to also encompass the product's technical development (as happened for the BMS and the engine).

Table 5 summarises the elements of the implementation over the three phases of the process.

5.2 Implementation phases

Table 6 represents the three implementation phases that longitudinally show the different relocation approaches. The three phases are named "Relocation as Replication", "Relocation as Consolidation" and "Relocation as Value Creation". In terms of learning objectives, the first stage deals with learning 'how to make the product', the second stage with 'how to make the product better' and the last phase with 'how to make a better product'. As a practitioner panelist said, "*I'll say that those phases help me in re-thinking my experience of reshoring with the lens of the company's organisational and cultural maturation for the process. The awareness that you gain in each phase allows you to face*

the following phases that require more complex steps." One scholar panelist highlighted that "*the phases' structure mirrors the learning construct*" while another added: "*In the end, this is a story of learning: phases are outcomes of previous phases, as they build on previous learning with different objectives.*"

It is important to note that different phases are driven by different managerial intentions - labelled with the word 'motto' by interviewees and authors during the interviews with FIVE managers. Moreover, different mottos relate to different operational choices, i.e., specific types of components that managers decided to relocate. The 'Relocation as Replication' phase focused on components that provide greater learning opportunities (the company needs to 'learn the basics' of making and thus looks for learning chances); the 'Relocation as Consolidation' phase wants to 'reach full control', which entails that managers decide to relocate components that improve efficiency and impact process control; the 'Relocation as Value Creation' phase wants to 'lead the future' by encouraging managers to relocate components that create value for customers.

5.3 Implementation Principles

We identified five principles that drive reshoring implementation. All the principles aim at supporting the decision-maker in the reshoring process; together, they suggest 'how to reshore'. Principles 1 to 4 are focused on the decision-making process of implementation, while Principle 5 describes how the reshoring implementation impacts decision-making (through the relevant role of organisational learning). In particular, Principles 1 and 4 specify the level of analysis that decision-makers should apply relative to time, while Principles 2 and 3 relate to the relocation assessment for each of those levels. Which level of analysis should a manager take into account to evaluate a reshoring decision? Is it the whole product, the single product component, or a cluster of them? Principle 1 suggests focusing on the component level and – only later – does Principle 4 suggest focusing on connected (sub)components. Principle 2 and 3, meanwhile, specify how the decision-maker for reshoring should run the relocation assessment: namely by considering factors that are both internal (e.g., costs, process control needs, marketing, logistics, sustainability, and so on; Principle 2) and external (costumer value; Principle 3) to the company.

Principle #1: Start by focusing on components.

In the choices of relocalization of production, the strategies are centered on the components, which is the strategical level of analysis. If a decision-maker is investigating how to reshore a product, this principle tells her to focus on the product's main components and identify the main strategic reasons for why reshoring is important to each component. By component, we refer to either a part of the final product (e.g., frames or engine) or a production process (e.g., painting or assembly).

In the interviews, decision-makers reported a component-based rationale (e.g., battery, engine, frame, saddle, wheels, assembly, etc.) The following excerpts from the interviews to the first CEO and the Purchasing & Product Development Director illustrate how the different reshoring choices happened at the component level: "*We were certain that the trestle was available in Italy, because there is a very large supplier that practically serves the entire bicycle industry with its 'Made in Italy' trestles [..]. As for wheels, they can be sourced either from Italy and China. However, we rapidly switched to a local supplier, since transporting wheels is a complicated matter, because they are delicate objects. Besides, wheels are light yet bulky, so their transportation from far-away places is not very efficient." [..]. As for the frame, it would definitely make sense to buy it from a closer supplier, but that is not possible yet because the cost gap does not justify the 'Made in Italy' choice, at least in our category of bicycles. [...] Those are the dynamics of decision-making.*"

In sum, at which level of the bill-of-material should the decision-maker draw the line and start analysing the convenience of reshoring? This principle suggests starting from components.

Principle #2. Use a multi-dimensional criterion to evaluate component relocation.

Several factors drive the relocation assessment (e.g., costs, process control needs, marketing, logistics, sustainability, and so on). When evaluating whether to relocate the component, firms need to evaluate the different drivers for each component. To do so, they can use a *'strategic relocation table'*, which presents the drivers in rows and the components in columns. Each cell indicates how relevant that driver is to a strategic relocation rationale for the component in question.
FIVE's multi-dimensional approach was apparent in e.g., the relocation choice of the battery, which is a key and complex component of the final product. The company based its decision on various considerations, spanning from value acquisition (through insourcing) to quality issues and the transportation complexities of the offshore production. As Mr. F. Giatti explained (third interview, 2022): "*The battery has a very important value on the whole bicycle, so taking that value home, in fact, means taking home just under 1/3 of the total value, which we thought it could help to increase our margin. […] We used to have serious quality problems as long as we were purchasing the fully assembled batteries. Batteries comprise different cells, and the bad charging performance of even just one of these cells compromises the functioning of the entire battery. Now that we assemble the batteries in house starting from the components' kit, we can perform several quality controls over the cells themselves and the entire assembly process. Besides, our automated welding further reduces the risk of failures, and the battery, once assembled, undergoes a charging stress-test to ensure that the real performance equals the nominal one.*" With respect to the logistics aspects, the Purchasing & Product Development Director added: "*Transporting batteries is a real mess. They are dangerous goods and therefore subject to a series of specific regulations that change very often. Instead, if I assemble batteries here, I transport cells, which is much easier.*"

Principle #3. Consider customer-value in component relocation evaluations.

Alongside the drivers from Principle #2, firms should consider the value that a component relocation generates for the customer. This approach may even prompt new customer functions related to the reshored component – as was the case for the BMS, a subcomponent of the battery. In the words of Mr. F. Giatti (second interview, 2021): "*In evaluating the start-up of the new BMS production with the local supplier, we considered the impacts on the end user. We realized that several new functions could be added by connecting the BMS to other devices. For example, we can manage to lock the battery with some sort of bicycle lock, which – in case of theft – it holds the battery in a not working state, even from a distance. […] We can connect it to an app that sends a notification when the battery gets low (e.g., below 10%), and it automatically activates a low power mode… It opens up a world of communication with the final user. To develop such a customer-centred function, we needed a very direct and intense relationship with the BMS supplier. All this done with an Asian company would have been much more difficult, if not impossible, to do. That's why we decided to reshore the BMS.*" The interviewee went on to explain these difficulties: language issues raised by the significant technical complications of the BMS, as well as the types of interaction needed, which require frequent interactions around artefacts and prototypes. To define value from a customer perspective, leverage on value analysis.

Principle #4. Extend the focus and the assessment to groups of interconnected components.

Once firms have evaluated the relocation of a specific component, they then need to evaluate the relocation of connected components. Essentially, reshoring one component opens an opportunity to evaluate connected components. This principle holds for connections between different components and for connections among sub-components. As the Purchasing & Product Development Director explained, "*Now that the project for bringing the engine back is well advanced, we have started considering what the ideal location of other components of the power unit should be. Should we keep*

sourcing the display from an Asian supplier? That's probably not necessary. In fact, we have already started to look for local suppliers for this component."

Interestingly, the relocation of a specific component can either impede or advance the reshoring of other connected (sub)components. This was apparent in the battery case: Here, the reshoring of the BMS accelerated the reconsideration to reshore other battery components. If, on the one hand, the reshoring option seemed viable for the wiring harness, on the other hand it was not so for the battery case. In fact, the latter is strictly connected to the bike frame; this interconnectedness currently holds back the reshoring of the case. The Purchasing & Product Development Director explained the rationale for this: "*At the moment, the more expensive the e-bike, the more the battery-case is fully integrated into the frame. So when I choose the battery, I choose its case and the connected frame and the tube that contains it, since these two things are closely interconnected [...] Chinese frame builders are already in touch with battery case builders. All I have to do is to tell my frame-maker: 'the battery model number is this', [...] and he knows exactly what to do for the frame production. It's a well-functioning supply chain. So at the moment it will be difficult to think of bringing the case to Italy.*" In short, the rationales that move the evaluation from one component to the connected ones are driven by potential costs generated or eliminated by the change in the production location, as well as by other aspects such as operations, quality and lead time.

This principle reinforces rather than conflicts with Principle 1: After a decision-maker has decided to reshore a component, she should then evaluate how this decision may influence the relocation of connected components. Principles 2 and 3 can help with such an assessment.

Principle #5. Let your implementation be driven by your learning.

Relocation choices are dynamic and guided by learning. FIVE's decision-makers faced reshoring decisions with an explorative, learning-driven approach. The choices made at any given moment depend on the current level of organisational knowledge and therefore change over time. Reshoring implementation is likely to increase organisational knowledge, which will then impact new reshoring choices. In retracing how the company's approach to batteries evolved over time, Mr. F. Giatti (third interview, 2022) relayed that learning more about the battery revealed new reshoring opportunities: "*We started assembling some battery models here and, in parallel, continued to buy the others from China for some time, until we reached a point when we could assemble all the batteries in-house. Assembling the battery components gave us visibility over its overall architecture and its various components (e.g., cells, case, cables, etc.) and led us think about the possible reshoring of some of them. In fact, we have eventually decided to jointly design and produce a new BMS, together with a local supplier. So there will be a moment, hopefully, when all our batteries will have a 'Made in Italy' BMS. And in this wake, we will analyse whether we can bring back here some other components of the battery.*"

6. DISCUSSION

The implementation phase of reshoring is one of the least researched aspects of this phenomenon (Bals et al. 2016; Boffelli and Johansson 2020), yet one of the most critical for the success of a relocation initiative (Boffelli et al. 2021). Our research contributes to this nascent literature by enhancing the conceptual understanding of the topic, as well as providing managers with practical advice for conducting the process.

By adopting a longitudinal case study approach, this research underscored the relevance of time in the reshoring implementation process (Benstead et al. 2017; Boffelli and Johansson 2020). Our findings not only show the dynamic nature of the elements that constitute the implementation, but also suggest that organisational learning plays a pivotal role in shaping this process (Principle 5).

Nujen et al. (2019) already alluded to the dynamic linkage between reshoring implementation and organisational learning. Specifically, they observed that "readiness and willingness to implement backshoring requires an overview of the firm's accumulated knowledge and an update of its capabilities" (p. 176). Dynamic capabilities describe firms' ability to proactively respond to change by acquiring and utilising external knowledge. Such capabilities can be broken down into three distinct organisational processes: learning, integrating and reconfiguring capabilities (Teece 2007). Organisational learning seems to constitute the fundamental factor in this evolution, as it drives how organisational experience interacts with the context to produce knowledge (Argote and Miron-Spektor 2011).

By further exploring the link between reshoring implementation and organisational learning, our study showed how those three organisational processes develop along the three fundamental stages of the reshoring journey. Particularly, each stage seems to be characterised by the development of one specific process, which provides the know-how required for performing the tasks in said stage.

In the Replication Phase, the integration of knowledge with a specific set of activities, equipment, or technologies enhances the firm's ability to learn (Hsu and Wang 2012). Because this capability is the first to develop when performing reshoring, firms should emphasise basic learning opportunities. In our case, this was embodied by the inshoring of the assembly process, which was a crucial step in learning how to make an e-bike. In the Consolidation phase, learning and knowledge accumulation are dynamic contributors to the integration process, which involves modifying the operating routines in both the acquired and acquiring unit (Zollo and Winter 2002). Therefore, absorbing external knowledge from suppliers creates opportunities to develop capabilities that are essential for the integration of reshored activities. In this phase, our case company focused on: (a) strengthening the relationship with suppliers to improve the overall quality for its customers; (b) integrating the battery assembly activities by jointly working with the equipment supplier; and (c) integrating the painting process in order to improve the graphic features, better control the interaction with the decals, and enhance the product's overall quality. In the Value Creation phase, knowledge accumulation and utilization are significantly associated with seizing opportunities as soon as they arise, which can enhance the firm's ability to reconfigure its resources (Singh and Rao 2016). Organisations need to increase their knowledge capacity by innovating on components that can create value for their customers and reconfiguring their processes accordingly. During this phase, the case company became confident enough to begin changing the product – and by extension, its production process and strategic supplier partnerships. Particularly, it decided to innovate the BMS to capitalise on a new opportunity in the e-bike market—one focused on better power control and customised engine performance.

Considering these elements in unison, it seems that reshoring implementation requires an organisation to develop dynamic capability through organisational learning. In fact, reflecting upon past experiences can generate knowledge that enables a firm to better reconfigure its resources in light of external changes (Farzaneh et al. 2020). Our results indicate that dynamic capabilities help to explain how the reshoring implementation process evolves alongside knowledge accumulation and articulation, which then broaden the criteria for choosing components for reshoring. Thus, our paper responds to the call from Bals et al. (2016, p. 112) to investigate the role of learning in reshoring and insourcing.

Interestingly, we also noticed that each of the three reshoring readiness factors proposed by Nujen et al. (2019) – intangible, technology and supplier/partner resources – enfolded with a different degree of priority in each of the three phases of the implementation process. In the Replication phase, the

company focused on internally replicating the activities that define the production process. Thus, it developed *intangible resources* in terms of knowledge acquisition, hiring human resources, and developing new capabilities. In the Consolidation phase, the company focused on stabilising the *supplier network resources* and reaching full control over the production process. In this phase, it invested in more structured supplier relationships, which entailed an increase in contractual elaboration and improved planning of component types, time-to-market, and volumes. Finally, in the Value Creation phase, the company focused on the development of the *technology resources* needed to generate higher customer value. Specifically, it increased its know-how on core components and improved its R&D skills to create more value. These findings (a) extend the relevance of the readiness model factors (Nujen et al. 2019) to the actual execution of reshoring, and (b) hint at the specific factor that serves as the strategic priority in each phase of this process.

As another theoretical contribution, our study elaborates on the concept of "degree of reshoring" (Benstead et al. 2017; Boffelli and Johansson 2020) in two ways. First, past research (e.g., Benstead et al. 2017; Gylling et al. 2015; Martinez-Mora and Merino 2014) applied it to the company's product lines: Specifically, these works distinguished between "full" vs. "partial" reshoring, which respectively represent scenarios of "complete product line relocation" vs. "maintenance of some offshore production". Our study extends the analysis by also considering the components' degree of reshoring – that is, we examined how sourcing relocation decisions are influenced by the choice of leaving the host country. Second, our study illustrates that the firm's degree of reshoring for supply follows a "selective reshoring" logic (Baraldi et al. 2018), driven by the firm's strategy and contingent on the existing network structure across both the host and home country. This study further refines the logic itself, showing that interconnectedness can exist in the relocation decisions of components (or subcomponents), while the re-entry of one of them represents a chance to re-evaluate the location decision of other, related sub-components.

Finally, the panels helped to identify two main contingencies to the principles' validity. Both are related to the company characteristics. First, the company size: As panelists noted, the first principle ('start by focusing on components') acts as a reference point for all the others. However, the academic panelists suggested that the component-level fits SMEs especially well, while it might be too narrow for big enterprises, which might want to center their relocation strategies on the whole product (given their vast product portfolios). The second contingency relates to company ownership. One practitioner panelist highlighted how, in her reshoring experience, her flexibility in decision-making significantly changed when her company moved from a family business to a publicly owned company quoted on the London Stock Exchange. From that moment, decisions could not follow 'experimental' and courageous trials, but had to ensure a clear revenue for shareholders.

7. CONCLUSIONS AND FUTURE RESEARCH

Research on reshoring implementation is still in its infancy. Thus, present work represents a starting point for future efforts. In particular, when our case company decided to reverse offshoring, it had no experience with in-house manufacturing processes and low specific knowledge of e-bikes in its surrounding area. Quite literally, it had to start from scratch. While our panelists confirmed that the implementation principles are applicable to other contexts as well, future studies should investigate their relevance to cases where companies bring back offshored activities that they had previously performed at home. From a theoretical point of view, it might be interesting to explore whether our case's pattern of readiness factors (Nujen et al. 2019) and their relevance across the different phases possess general validity, and if this pattern is conceptually linked to the observed processes of organisational learning.

Our study has practical relevance, especially for SMEs. Indeed, our proposed framework of five principles and a three-stage process, while preliminary, can help guide the implementation of reshoring decisions. By focusing on organisational learning and identifying the organisational processes and reshoring factors that are specific to each phase, decision-makers can better design the reshoring implementation projects for their specific firms. Policymakers could also reflect on the opportunity to delineate reshoring support policies, offering SMEs more time and a component focus, while providing larger enterprises with more support and a product focus.

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TABLE 1 – Summary of informants and interviews

Informant	Number of interviews (Duration)	Timing
FIVE's Founder and 1st CEO (Mr. Giorgio Giatti)	3 (2h; 2h; 1h30min)	November 2015; June 2018; February 2022
FIVE's 2nd CEO (Mr. Fabio Giatti)	3 (1h30min; 2h30min; 1h30min)	September 2018; December 2021; March 2022
FIVE's Purchasing & Product Development Director	2 (2h40min; 1h20min)	December 2021; March 2022
FIVE's Sales Director	1 (1h30min)	January 2022
Wheel supplier's CEO	1 (2h30min)	February 2022

TABLE 2 – Peculiar characteristics of the implementation stages

	Phase 1: Replication	**Phase 2: Consolidation**	**Phase 3: Value Creation**
Goal	Acquire the basics of the production	Reach full control over operations	Create new value through innovation
Approach to internal processes	Training and setting up for experiential learning (e.g., on the assembly process)	Extending control to processes that can strongly impact the final product (e.g., improve the aesthetic quality, enhance the quality of the batteries)	Increasing the know-how and improving R&D skills to create more value for the customers (e.g., improve the functionalities of key components, such as the engine and the BMS, for better customer experience)
Supply Chain approach	Return what is locally available and cost-effective (e.g., wheels and seats), and establish direct relationships with local and international suppliers	Reinforce and improve the supply chain relationships (e.g., better planning; more structured contracts)	Return more critical and complex components, especially through collaboration with local suppliers (e.g., BMS; engine; lights)

TABLE 3 – Data on FIVE's revenue, production, employees (2018-2022)

Year	Revenue (*1,000 euro)	e-bikes produced	Employees
2018	1680	1500	10
2019	2187	2800	19
2020	5523	3400	30
2021	4900	6100	33
2022 (projected)	6600	6300	33

TABLE 4 – Chronological overview of the firm's incremental approach to reshoring

Reshoring process phase	**Time**	**Reshored production phase/component**	**Type of reshoring**
1 and 2	2014-2017	Bicyle assembly	Insourcing
1	2015	Seats; wheels; bicycle stands	Outsourced
1	2015	Packaging	Outsourced
1	2016	Fenders; crankcases; bicycle racks	Outsourced
2	2017	Painting	Insourcing
2	2017	Decals	Outsourced
2	2017-2018	Battery assembly	Insourcing
2	2018	Chain rings	Outsourced
2	2019	Crank arms	Outsourced
3	2020-in progress	BMS	Outsourced (partial reshoring)
3	2020-in progress	Engine; Display	Outsourced (partial reshoring)
3	2020	Grips	Outsourced
3	2021	Lights; Frame locks	Outsourced

TABLE 5 – Summary of the reshoring implementation elements

Elements of Implementation	**Phase 1: Replication**	**Phase 2: Consolidation**	**Phase 3: Value Creation**
Process	Incremental – Co-existence of insourced domestic and offshore outsourced production in Phase 1 and in the early stage of Phase 2		
Exit (governance) mode	Insourcing of assembly; outsourcing maintained for reversed-offshored components	Insourcing of painting and battery assembly; outsourcing maintained for reversed-offshored components	Outsourcing maintained for reversed-offshored components
Degree of final product reversed offshoring	Partial	Changes early from partial to full	Full
Degree of component supplies reversed offshoring	Partial – Reversed offshoring of numerous components, based on obtainability and economic competitiveness considerations Examples of components reversed-offshored in this phase: wheels, seats, fenders, crankcases	Partial – Decreasing rate of components' reversed offshoring, and lower average economic value of the reversed offshored components. Examples of components reversed-offshored in this phase: chain rings, crank arms	Partial – Reversed-offshoring of more noble components, following a higher price-higher value approach Examples: BMS; engine (in progress) The new approach is also applied to less critical components, when opportunities for value increase are identified Example: lights
In-house training	Assembly	Painting; Graphics; Battery assembly; Product development	Battery assembly (cont.); Quality management
Building relationships with suppliers/Improving information sharing	Simple procurement agreements, typically on spot/small lot basis Technical specifications are generally proposed by the suppliers, that tend to lead this task	Relationships become more structured: improved planning of component types, time-to-market, and volumes; increase of contractual elaboration Operational collaboration established with the paint and decal suppliers aimed at improving the execution of the production process. FIVE's higher proactiveness in subcomponents' choice and technical specifications	Development of more advanced technical collaborations on more complex components, for collaborative product development, including customised specifications (e.g., BMS; engine) Search for higher-quality suppliers; increased adoption of dual sourcing

Market movement	Replicas and restyling of the offshored production	Extension of product range; increased product quality	Higher-end segments are targeted through increased performance and customised product features
Global supply chain development	Start of direct procurement from international suppliers	Extension of the components' range: components are picked from a broader set of alternatives in the supplier's portfolio	Search for alternative sources, especially for the components with longer lead times

TABLE 6 - Implementation phases

Phase	Relocation as Replication	Relocation as Consolidation	Relocation as Value Creation
Learning objectives	Learn how to make the product	Learn how to make the product better	Learn how to make a better product
Motto	Learn the basics	Reach full control	Lead the future
Relocation Focus	Focus on components that provide greater learning opportunities	Focus on components that improve efficiency and impact process control	Focus on components that can create value for your customers