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Relational links for insertion in non-mass global value chains: Opportunities for middle-income countries

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Abstract

This paper describes two Argentine case studies of firm's integration in global value chains (GVCs) that target non-mass market segments in developed countries. The cases involve a manufacturer of high-end footwear and a manufacturer of customized automotive parts. Based on the common findings in these two cases, we build a conceptual framework that emphasizes relational links as an opportunity of GVC insertion for middle-income countries that cannot buttress their international competitiveness on low wages. We call these modes of insertion manufacturing with co-design.

KEYWORDS

design, GVC, middle-income countries, nonmass goods, relational links

JEL CLASSIFICATION

F14; O25; L23

1 | INTRODUCTION

The growing possibility to internationally coordinate the fragmented execution of stages in the value chain has been widely acknowledged as an opportunity for developing countries' international integration and economic growth (Feenstra, 1998; OECD, 2013). Even if a country is unable to perform many of the operations involved in these "global value chains" (GVCs), it can still participate in some of their stages. Several developing countries have increased their exports by engaging in GVCs that serve mass markets in developed countries. This engagement has been documented by several case studies on GVC insertion—many not only in East and

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Southeast Asia but also in other regions around the world, including South Asia, Africa, and Central America.[1] In most cases, the initial GVC engagement took advantage of low wages in unskilled labor-intensive operations like the assembly and manufacture of goods following designs elaborated in developed countries. In some cases, but not always, this type of initial involvement later led to more sophisticated tasks (Humphrey & Schmitz, 2002).

In South America, however, firms' engagement in GVCs has been quite more limited, largely involving integration in GVCs focusing on natural resource-intensive goods (Blyde, 2014; Giuliani et al., 2005).[2] Given its natural-resource abundance, it is not surprising that this type of GVC insertion prevails in the region. Neither is it surprising that, as a result of higher wages (partly supported by this abundance), GVC insertion based on unskilled labor-intensive operations proves less viable. Then, the question remains about South America's export development opportunities based on other types of GVC insertion that do no hinge on natural resources but are compatible with higher wages.

We argue in this study that these opportunities exist in GVCs catering to developed countries' nonmass market segments (henceforth, non-mass GVCs). Non-mass GVCs are characterized by a greater differentiation of the products they involve, for example, high-end consumer goods and customized intermediate goods. The greater differentiation of products in non-mass GVCs implies that their design, usually created in developed countries, features a variety of non–standard components and attributes that are harder to codify. This limited codifiability is the key to the opportunities for insertion in this type of GVC.

In a non-mass GVC, a developing-country firm needs to be able to adequately interpret the tacit (uncodified) attributes of a product design so that its manufacturing implementation preserves the product's effectiveness to meet potential buyers' functional and symbolic needs. This capability is also required from the firm to suggest design changes that preserve those tacit attributes when, due to the product's non-standard nature, they do not accommodate local production conditions. Although in every GVC the manufacturing implementation of a design–operation known as product development—requires interpreting tacit attributes, this task becomes more critical in non-mass GVCs due to the significance and prevalence of tacit attributes in the product design. As a result, product development requires thicker interactions with designers—located in developed countries—based on a shared understanding of how design features affect a product's market performance. This is why we use the term "manufacturing with co-design" to refer to this type of GVC engagement. Manufacturing with co-design involves more skill-intensive activities typically associated with higher wages. However, as these goods compete on differentiation rather than on price, higher wages are not a disqualifying factor.

To interpret design attributes that cannot be codified and suggest adjustments that preserve their functional and symbolic values, firms need stronger production capabilities and the ability to understand the intricacies of demand in destination markets. Although firms in developing countries usually lack these capabilities, firms in middle-income countries that exhibit a long-standing track record of production and consumption of highly differentiated products had a chance to acquire them. Thus, they are well positioned to seize the opportunities to join non-mass GVCs. Particularly, being exposed to a more sophisticated demand allowed them to acquire the ability to understand consumers' symbolic and functional needs as well as to build the production capabilities to meet them with products featuring highly differentiated quality and design.

We study two Argentine firms' international insertion experiences in non-mass GVCs, where they carry out manufacturing with co-design based on relational links with firms located in developed countries. These firms are Tosone, a producer of high-quality, design-intensive footwear, and Basso, a manufacturer of customized engine valves. Despite their significant differences, the

cases display key similarities. First, as these firms produce goods that feature a variety of non-standard, uncodified attributes, they have a relevant involvement in the products' final specification. Second, in both cases, the ability to perform this task in the chain stems from a history of producing and consuming similar goods in Argentina. Finally, both cases take place in industries where the country has no evident comparative advantage. We describe the two insertion experiences analyzing in depth the interactions firms establish with other participants in the chain.

This study contributes to an understudied area in the GVC literature. Most studies in this field explore GVCs that supply the mass market with highly codified goods, where local manufacturers in developing countries and global buyers in developed countries feature contract manufacturing relationships (Bair & Gereffi, 2001; Gereffi, 1999; Kaplinsky et al., 2002; Sturgeon, 2003). Instead, manufacturing with co-design in non-mass GVCs implies stronger capabilities and a deeper involvement in the design process than is needed to deliver on manufacturing contracts.

The GVC literature has highlighted goods' codifiability as a critical determinant of a chains' governance structure. In particular, in GVCs producing hard-to-codify goods, the relationship between local producers and global buyers is characterized by the prevalence of fluent information and tacit knowledge exchanges (Antras, 2020; Gereffi et al., 2005). Although several case studies document this type of relationship, the empirical literature is still in need of cases that describe and discuss some of their aspects in more detail. For example, Sturgeon et al. (2008) highlight the interpersonal interactions that direct the flow of tacit information between automobile plants and auto part makers despite the former's efforts to codify part designs. However, they do not characterize the content of the information exchanges or the capabilities that this type of exchanges demands from auto part makers. Similarly, Amighini and Rabellotti (2006) analyze high-end footwear (non-mass) GVCs supplied by Italian manufacturers, where the products' main attributes are often uncodified. However, their analysis does not focus on the characterization of the designs' tacit attributes or the knowledge required for interpreting them. We attempt to fill this gap by focusing on the identification of the uncodified attributes of designs, the information exchanges between producers and buyers, the specific capabilities required from manufacturers to interpret and adjust designs, and the role that the production and consumption history of the producing country has played in the acquisition of those capabilities.

The GVC literature also discusses product, process, and functional upgrading opportunities in GVCs (Humphrey & Schmitz, 2002). Although there are examples of firms and sectors that have managed to upgrade along these three areas (Bair & Gereffi, 2001; Gereffi, 1999; Kawakami, 2011), other GVC insertion experiences show that the resulting upgrade is limited to products or processes, with no functional upgrading toward design, brand management, or marketing operations (Amighini & Rabellotti, 2006; Bazan & Navas Alemán, 2004; Schmitz & Knorringa, 2000). The non-mass GVC insertion cases explored here suggest a more optimistic view of functional upgrading opportunities as firms are involved from the start in design activities that generate learning channels that help accomplish this type of upgrading.

This paper also contributes to the analysis of international integration opportunities for middle-income countries by viewing insertion in GVCs as a way out from the "middle-income trap" (Doner & Schneider, 2017; Felipe et al., 2012) or "premature industrialization" (Rodrik, 2016). One of our key messages is that these opportunities do not necessarily depend on the industry but rather by the market segment the GVC targets. For instance, according to the classification of sectors in the exhaustive study by Giuliani et al. (2005) on Latin American clusters' GVC upgrading, our high-end footwear and engine valve cases would fall, respectively, under the categories of "traditional manufacturing" and "complex products." However, these categories would not capture the common determinants of insertion and upgrading stemming in our cases from their

common orientation to non-mass market segments. Although each of these segments represents a small fraction of their individual markets, jointly they provide ample opportunities for escalating GVC participation.

Several documented cases of South American firms' insertion in GVCs in nontraditional industries may fit in with the general type of non-mass GVC insertion discussed here.[3] Unfortunately, based on the information provided in those case studies, it is not always possible to accurately determine the market segment the GVCs target or the design codifiability of the products they supply. We hope this study encourages future research efforts to highlight these aspects of GVC insertion experiences.

The paper is organized as follows. Section 2 outlines the conceptual framework. Section 3 describes the methodology. Section 4 describes the cases studies. Section 5 discusses the common findings in the cases and how they relate to the conceptual framework. Section 6 concludes.

2 | CONCEPTUAL FRAMEWORK

Based on the common findings between the cases (outlined in Section 5), this section discusses foundations of middle-income countries' potential for insertion in non-mass GVCs. We term "non-mass GVC" to a GVC catering to non-mass market segments in developed countries. Although non-mass market segments are hard to delimit with precision, we associate them with niche segments that cut across industries, may involve (but not necessarily do) customized products, tend to use specialty stores rather than chain stores as retail outlets, and are produced in relatively smaller batches.[4]

Goods supplied to non-mass market segments are characterized by a high degree of differentiation and the possession of non-standard attributes. This study concentrates on two such segments. The first involves high-end consumer products, featuring superior quality and design intensity—like high-end leather footwear for women. These products seek to meet consumers' functional and emotional needs with designs that display differentiating aesthetical, functional, and symbolic non-standard attributes valued by consumers.[5] The second segment comprises customized demands of intermediate goods—like competition and high-performance engine valves. Unlike high-end goods, these products' main goal is to satisfy functional needs associated with specific performance goals. Thus, their design consists of non-standard combinations of materials, shapes, and production techniques aimed at providing the desired functionality subject to specific restrictions imposed by the setting where the product will perform.

Although there is no consensus on how to divide and define the operations involved in a product's design process (British Design Council, 2007; Ulrich, 1995), for our analytical purposes we divide this process into three stages: *conception, specification, and development*. Conception involves the generation of the idea about the product's essential characteristics and the needs it seeks to satisfy. Specification consists on selecting the combination of specific attributes that will characterize the product, including, for example, shape, materials, performance, and the technologies required for its manufacture. Product development materializes the product's conception and specification, researching and testing inputs and manufacturing processes, selecting suppliers and manufacturers, and assessing samples.

Each of these stages involves specific actors whose characteristics depend on the type of the good to be produced. For example, for high-end goods, conception is typically carried out by professional designers hired by renowned brands, while product development is largely entrusted to professionals and technical specialists hired by manufacturers. The type of interactions these

actors mutually establish is largely determined by the product's degree of standardization. Goods intended for the mass market tend to feature codifiable standard attributes. As a result, coordination in GVCs supplying these goods (henceforth, mass GVCs) does not require intense interactions between those who specify the product and those in charge of developing it whose impact on the product's final features is limited. This explains why the academic literature, which has largely looked at insertion experiences in mass GVCs, does not view product development as part of the design process (Bair & Gereffi, 2001; Schmitz, 2006).

Instead, in non-mass GVCs the greater prevalence of non-standard attributes makes designs harder to codify. Thus, more interaction and mutual understanding underlies the relationship between actors involved across the different stages in the design process so that implementation at the product development stage does not jeopardize the product's ability to meet consumers' functional and symbolic needs. Mutual understanding is buttressed by quality conventions (Ponte & Gibbon, 2005; Ponte & Sturgeon, 2014). In particular, inspirational conventions are a system of reciprocal expectations about partner behavior based on common interpretations about the products' spirit and originality. They provide a framework for understanding their specificity and can only develop when the parts establish relational links that allow for intense interactions. As we argue below, these requirements for non-mass GVC insertion provide opportunities for middle-income countries due to their ability to participate, albeit partially, in some of the design stages. To emphasize this participation, we call this mode of GVC insertion "manufacturing with co-design."

2.1 | Manufacturing with co-design in high-end products

For products targeting high-end segments, conception and specification are intimately related creative activities. These activities are usually conducted by professional designers located in developed countries based on complex, tacit information about tastes, aspirations, and behavior of potential consumers in those countries. They require creativity and understanding of demand so that these insights can be translated into ideas for products that can meet functional and symbolic consumer needs. Acquiring this knowledge often proves challenging for firms in developing countries due to its tacit nature and to the disparity of demand characteristics between developed and developing countries (Artopoulos et al., 2013).

As a result of the conception and specification stages, designers craft a datasheet specifying all the product's attributes that can be codified. However, unlike in mass-oriented goods, the design of a non-mass good is full of tacit elements that cannot be included in a datasheet. These are generally differentiating attributes designed to meet consumers' emotional needs or specifications about production techniques that generate those attributes. For instance, the datasheet for a high-end footwear style to be marketed in Sweden may accurately describe the type of leather required—in terms of thickness and texture—but it may fail to codify the "worn" texture which generates the vintage look favored by female consumers in that market.

As the Tosone case shows, firms from middle-income countries can seize opportunities to join high-end consumer product GVCs at the product development stage. To this end, they need to be able to interpret the tacit attributes of a product design and plan their materialization recognizing the implications these attributes have in the product's ability to satisfy functional and symbolic needs. In turn, as designs involve non-standard inputs, shapes, or production processes, their materialization often calls for changes or adjustments to their original conception, which need to preserve the product's functional and symbolic appeal. To perform this role at the product

development stage, manufacturers must establish links that allow for frequent exchanges of complex information with the product designers to jointly solve the various implementation issues that arise. These exchanges can only be fruitful when they are buttressed on a common understanding of consumers' needs, tastes, and aspirations and about how the product's attributes meet them.

2.2 | Manufacturing with co-design in customized intermediate goods

In the case of customized intermediate goods, clients themselves conceive the product based on the specific needs they wish to satisfy. This task involves establishing specific parameters for the product's shape, dimensions and materials to obtain the desired functionality. Clients differ in the extent to which they codify product attributes. Some outline the general characteristics of the product in technical datasheets or functional blueprints. Others just verbally convey their ideas about the functionality and performance issues they want to solve to manufacturers, who then take care of the specification and product development stages.

Firms from middle-income countries can seize opportunities to join customized intermediate–good GVCs at the product development stage and even at the specification stage. To this end, they need to be able to establish fluent interactions with clients so that, through these technical exchanges, they can fully understand their needs and provide the customized solutions they seek. To be able to perform this task, their tacit knowledge proves critical. On the one hand, they need to share with their clients a common understanding of the final demand, for this serves as a guide to weigh every functionality and performance attribute, as well as their implications for potential risks. On the other hand, they must have the technological knowledge to find the best solution for their clients' performance needs.

2.3 | Capabilities acquired as a result of a country's production and consumption history

The opportunities for insertion in non-mass GVCs available to middle-income countries largely reside on capabilities acquired as a result of their production and consumption histories. For decades, countries like Argentina, other South American countries, and even Eastern European ones have enjoyed a higher per capita income than most other developing countries, which fostered more sophisticated consumption patterns and the emergence of local firms that catered to it. The track record of local production enabled these firms to accumulate knowledge and to acquire the technological capabilities required to perform more complex tasks. In the first place, technological knowledge accumulation favored the gradual acquisition of innovation capabilities for product development, as it allowed firms to plan different product materializations, leveraging the possibilities offered by raw materials and production processes (Bell & Albu, 1999; Bell & Pavitt, 1995). In the second place, the history of domestic consumption allowed firms to build the ability to understand and meet the intricacies of symbolic and aspirational consumer needs in developed countries. This understanding has been shown to be a critical constraint for the international success of firms located in developing countries (Artopoulos et al., 2013; Easterly & Reshef, 2016; Mion & Opromolla, 2014; Sutton & Kellow, 2010). Although other features of the organizations (e.g. absorptive capacities), personal characteristics of their leaders

(e.g. professionalism, motivation), and the ecosystem around the firm (e.g. specialized technological services) are certainly important determinants of insertion as well, we focus here on the capabilities acquired as a result of a country's production and consumption history because this is the distinguishing feature that provides these middle income countries with a unique opportunity for international integration.

3 | METHODOLOGY

We performed two case studies of Argentine firms participating in non-mass GVCs. For each case, we interviewed firm owners and managers, design professionals, and heads or managers of sector institutions. We gathered multiple perspectives on the type of links local firms established with global buyers as well as their performance in production and design activities. Comparing both cases, we identified their common elements, which served as a basis to develop a conceptual framework about the role and required capabilities of manufacturers in the design process of non-mass GVCs.

The selection of cases used theoretical sampling (Eisenhardt, 1989; Yin, 1994) intended to encompass non-mass GVCs for high-end and customized products, respectively, which we believe Argentine firms and companies from similar middle-income countries have a greater potential to join. To analyze insertion in GVCs producing high-end goods, we studied Tosone, an Argentine footwear manufacturer. This firm was chosen for its domestic market reputation as a leading high-end, high-quality footwear producer and because it is one of the few local firms that joined a GVC supplying developed markets. To analyze insertion in GVCs for customized goods, we studied Basso, an Argentine firm that produces valves for internal combustion engines. Basso was chosen for its remarkable success as an exporter to developed countries and for its leadership in the domestic auto part industry in an environment dominated by multinational affiliates.

We used multiple qualitative research techniques to collect information, including interviews, assistance to industry conferences, international and domestic trade fairs, and the review of secondary sources. Overall, we conducted 35 interviews—30 in March–December 2011, and the remaining 5 in 2014 and 2015. Interviews were semistructured and lasted, on average, an hour and a half. Factory managers were interviewed at production facilities, which enabled direct observation of activities, operations, and production processes. All interviews were conducted in Spanish and recorded on digital media. The interviews are not publicly available but may be shared upon request.

4 | TWO CASES OF NON-MASS GLOBAL VALUE CHAIN INSERTION

4.1 | Case I: Tosone's insertion in high-end, design-intensive segments

4.1.1 | The footwear industry

The footwear industry has undergone a dramatic process of global production relocation. Currently, a large share of the world output is produced in countries such as China, Vietnam, and Indonesia (Bazan & Navas Alemán, 2004; Hsing, 1999; Schmitz, 1995). In the high-end segment,

however, developed countries continue to be the leading manufacturers and exporters, with Italy concentrating 50% of global exports, followed by Portugal, France, and Spain (Amighini & Rabellotti, 2006). This segment includes international luxury brands such as Hèrmes, LVMH, and Christian Louboutin, and specialized footwear brands with lower scale and geographic scope but recognized in their homelands for their design quality and originality.

Design and marketing operations are handled by brand owners, whereas production is usually outsourced. For increasingly globalized consumers, brands represent specific quality and wellbeing images associated with a lifestyle to which they aspire. As these representations are carefully built and maintained, brands need to control the definition of products and the compliance with quality standards throughout the production process (Schmitz, 2006). Thus far, this need has prevented massive production relocation to developing countries (Amighini & Rabellotti, 2006).

The Argentine footwear industry has a long track record that rests on a great availability of high-quality leather and the technical expertise brought by Italian immigrants in the early 20th century. Although Argentina currently stands as one of the world's top-20 leather footwear manufacturers, the industry's international competitiveness is weak. As a result of its counter-seasonal location with respect to the fashion trend-setting countries in the Northern Hemisphere, most manufacturers choose not to design their own models but to copy them from European collections already showcased at leading fashion centers or to adapt them to the preferences of domestic consumers and local production conditions. Although this widespread practice led Argentine firms to acquire demand-understanding and adaptive-design capabilities, it has also discouraged the development of original-design capabilities. In turn, product quality has been closely tied to the lower demands of local consumers, who have traditionally accepted manufacturing flaws that are unacceptable in developed countries. As a result of lacking original design and quality compared with international standards, the international insertion of this industry has been limited to other Latin American countries. In addition, this resilient strategy has been supported by the trade protection policies against import competition that have been in place, with varying intensity, over recent decades. In 2018, high-end footwear exports barely totaled US$ 1 million, accounting for 16% of the industry's overall exports.

4.1.2 | Tosone's corporate background

Tosone is a manufacturer of high-end leather footwear for women. This family-owned business is renowned in Argentina's domestic market for the high quality of its products. The firm is owned by Oscar Tosone and two of his sons. It has 33 employees and produces approximately 27,000 shoe pairs every year.

Tosone markets its products domestically with its own brand as well as with third-party brands, particularly reputable domestic apparel brands that include footwear in their offerings. Tosone's designs consist in general of adaptations from foreign models. One of the partners travels to European fashion centers—like London or Milan—to learn about new fashion trends and choose the models to be adapted, which need to preserve the brand's elegant, classic style. Increasingly, however, they are creating their own original designs. When Tosone manufactures for apparel fashion brands, it is them that define the design specifications. During the GVC experience described here, Tosone's exports reached its maximum volume, US$ 300,000, accounting for 20% of its total revenues.

4.1.3 | Manufacturing with co-design in Sweden's high-end market

In 2005, Tosone embarked on an international GVC insertion experience as a result of an agreement made with an Argentine entrepreneur based in Sweden (henceforth, AR) who approached the firm with a plan to manufacture footwear for Swedish fashion brands. Until then, Tosone had only sporadically exported its products to specialized footwear retailers in South America.

AR was an Argentine fashion designer specialized in footwear who lived in Sweden. She provided footwear design and development services to prestigious designers and renowned brands in the Swedish fashion, footwear and leather goods industries. Its clients, including Hope, Rodebjer, and Whyred, were well-known brands in Norway, Sweden, and Denmark on account of the originality of their designs. These medium-sized brands had successfully expanded internationally, marketing their collections in multibrand fashion stores across the United States and several countries in Europe and Asia.

Tosone's insertion experience in this GVC involved three actors: Tosone, AR, and a number of Swedish brands. The latter handled the conception and specification of product designs, establishing collection themes and product specifications. AR was in charge of development activities, including the selection of manufacturers and their oversight during production. Tosone manufactured the footwear, participating as well in design activities associated with product development.

The brands trusted AR's ability to understand their design and quality demands. As a result of her direct exposure to the Swedish market and her professional training, AR knew how the brands operated in the market. She understood what they wanted to convey with their collections and the type of consumers they targeted, simultaneously decoding the products' technical and symbolic aspects. AR also was familiar with these brands' product quality standards and with Swedish consumers' quality requirements, as well as how important it was for the brands to meet both.

Interactions between AR and these brands included exchanges of codified information as well as exchanges of noncodified information at frequent meetings and conversations. At the start of a collection, the brands held meetings with AR to show her the new collection themes and explain their product designs in general terms. They also sent AR their designs in product datasheets along with material samples and photos of footwear or parts of other products that had served as inspiration. Datasheets included basic specifications, such as the materials and color for every shoe and its parts. For example, a datasheet would indicate whether the vamp of a shoe had to be made with standard, bonded or patent leather, and whether the sole had to be made with leather, rubber, or polyurethane. It would also include specifications such as binding techniques (seaming or gluing) and shoe measurements (size, heel height). Photos of other products or material samples were used to convey other attributes not included in datasheets. Once at the product development stage, brands monitored AR's work to ensure the desired progress, rigorously assessing delivered samples and frequently meeting and communicating with her.

To conduct product development operations, AR needed to hire manufacturers with the capability to meet the strong demands of high-end footwear. A key requirement was that they could comply with the professionalism and quality standards that prevailed in Sweden. Another was that she could forge a relationship with them that allowed for continual information exchanges about everything involved in a design regarding meeting consumers' expectations as well as brands' demands of quality and design. Due to her previous professional activity as a footwear

design specialist in Argentina, she had built personal relationships with several footwear producers in Argentina. Thus, she decided to seek among them those she would outsource footwear from.

AR was familiar with Oscar Tosone's professionalism and thought he would be able to interpret designs and guarantee output quality. Nevertheless, she needed to ensure ongoing production oversight to control quality standards and the possibility to timely intervene throughout the development process to ensure compliance with the style's tacit design attributes not included in the datasheets. While Oscar Tosone had the skills required to oversee these tasks, his executive duties prevented him from getting fully involved in them. Thus, AR hired a footwear manufacture technician (henceforth, 'the specialist') she had worked with in Argentina. The specialist had professional consulting and training experience in footwear design and manufacturing, as well as in quality assurance. Tosone made an office available to her at the plant.

Product development unfolded in three stages. The first stage involved the interpretation of model designs. Once AR received them from brands, she communicated extensively with the specialist to share all relevant features with her. She also forwarded the datasheet of every product as well as advertising materials, fashion-show video footage, photos of other products and of client brands' store windows. The specialist used these materials to interpret the designs she had received. Next, she suggested to AR changes in inputs or production methods, providing photos, reports, and samples of suggested materials. She worked in this task with Oscar Tosone, who played a critical role at this stage.[6]

The second stage involved the detailed specification by the specialist of all the features not included in the datasheets, including techniques and quality controls. The specialist also identified issues that might cause manufacturing problems and reported them to AR, who communicated them to the brands to solicit their decisions. This stage also included training Tosone's production workers when a novel production technique was introduced or to correct earlier execution mistakes. Finally, the third stage involved making samples, which occasionally required input or production method adjustments to remedy implementation problems. Daily technical information exchanges between the specialist and Oscar made it possible for the team to send suggestions based on a quick search for solutions that preserved the spirit of the original design.

Tosone's relationship with AR concluded in 2008. The Argentine peso was undergoing a gradual real appreciation process that increased Tosone's production costs, eroding the firm's international competitiveness. Eventually, this joint venture became unprofitable. Both parties decided to end their engagement despite their mutual satisfaction with their work together. Tosone and AR decided they would work together again once external conditions changed.[7] Although Tosone has since not engaged in a similar GVC venture, this experience let the firm become aware of its ability to supply markets with high design originality and quality standards. In the words of Virginia Tosone, one of Oscar's daughters, their experience providing Swedish brands "was a paradigm changer" as it helped the firm gain knowledge and confidence in their own design capabilities. The experience also influenced their current use of datasheets in the communication with clients and the implementation of quality control systems and tighter delivery standards with their suppliers. After the peso devaluation in April 2018, Tosone has resumed its export activity, primarily to Japan, but also to Chile and the United States. Tosone is also working in an incipient product development project back with AR, who since then has performed her footwear development in Portugal and Spain.

4.2 | Case II: Basso's insertion in customized segments

4.2.1 | The auto part industry

The Argentine automobile market grew quickly in the early 20th century. Argentina featured a high per capita income at the time, which fueled a sustained demand for motor vehicles. In addition, a large availability of qualified metal-mechanic workers stemming from the massive Italian immigration and training at the local railway workshops provided the technical expertise required for assembly and repair operations. By the 1960s, major international players, including Chrysler, Citroën, Fiat, Ford, General Motors, Daimler Benz, Peugeot, Renault, and Volkswagen, had set up motor vehicle production plants in Argentina.

As the Argentine automotive industry grew, so did car racing, which became one of the most important sports in the country. A strong sign of Argentina's international prestige in car racing was the decision made by the United States Auto Club to host in Rafaela (an Argentina city 300 miles from Buenos Aires) the first Indy 300 scored race outside the U.S. or Canada. Across the country, a large variety of car racing competitions, with different automobile and engine specifications, favored the early development of the mechanical skills for racing cars. Some manufacturers, like Ford and IKA, even built a team of technicians and engineers specialized in racing car engines.

The Argentine automotive industry grew under an import substitution regime that fostered the creation of car making plants exclusively focused on the domestic market. These plants operated with significant vertical integration and limited, inefficient production scales. Models designed by multinational headquarters were adjusted according to local demand idiosyncrasies and utilization conditions. These adaptation efforts prompted the development of local engineering capabilities to design and adjust models and production processes both at automobile and auto part plants.

In response to the partial opening of the market to international competition in the 1990s, car factories in Argentina drew closer to the international technological frontier and became more demanding with their auto part suppliers, calling for better quality and costs (Corredoira & McDermott, 2014). As many suppliers failed to comply with these new demands, the parts they produced were replaced with imported products. Among the surviving suppliers, Basso was one of the only few that achieved a relevant international insertion.

4.2.2 | The Basso group

Basso produces valves for internal combustion engines in the city of Rafaela. Managed by José Luis Basso, the son of one the company's founders, since the 1980s, the group employs 790 people and manufactures 18 million valves a year, with 2500 different models. Basso exports 86% of its output, primarily to Brazil, the United States, Mexico, and France. It has received numerous local and international awards and recognitions for its product and service quality.

Basso sells its valves in several market segments: original equipment, aftermarket, competition, and high performance. In the original equipment market, it serves as a supplier for engine manufacturers –usually, automotive companies or their affiliates. Its primary client in this segment is Peugeot Citroën, but its client list also includes Fiat, General Motors, and Ford. It is also an exclusive supplier for Ferrari's and McLaren's street car lines. In addition, Basso provides valves to heavy machinery engine manufacturers (Mercedes Benz and John Deere), motorcycles

(Harley Davidson), and low-displacement engines. In the aftermarket segment, Basso supplies valves to a large range of distributors, engine rectifiers, and even original equipment manufacturers for their official offering of spare parts. The original equipment and aftermarket segments jointly account for 90% of Basso's unit output.

In the competition market, Basso is a supplier of racing-car engine-preparation specialists. Its client base includes the competition departments of car manufacturers, such as Ford Racing, Toyota Development, and Peugeot Sport, as well as other competition vehicle preparation firms. The competition market poses multiple challenges and opportunities for auto part suppliers due to the world's large array of professional competitions—each one featuring its own set of rules for vehicle types, engines, fuels, chassis, and tires, among other specifications. Basso offers technological solutions for all of them, flexibly meeting their respective performance and innovation needs with small, fast-development production batches.

In the high-performance market, Basso's clients include part and kit distributors supplying motor builders specializing in tuning services. Tuning services are used to modify original car engines to enhance their power. The demand for enhanced engines is fueled by car racing enthusiasts, some of whom regularly race their cars, whereas others occasionally participate in amateur car-racing competitions.[8] Unlike the competition segment, this market operates with larger production scales. Typically, distributors in this market are large firms with their own R&D departments. When a new engine is launched, they invest efforts and resources to find adjustments that can enhance the engine's performance. Once they succeed, they draw a number of technical documents specifying the engine's working conditions and key parameters for its components that serve as basis for joint work with part suppliers in engine development.

Although only 10% of Basso's valves go to the competition and high-performance markets, these segments provide the greatest profit margins. In fact, two of Basso's industrial plants specialize in customized valve manufacturing. We focus on Basso's experience in these two markets because the company's engagement in valve design proves more interesting for the purposes of this research study.

4.2.3 | Valves for internal combustion engines

A valve is a small yet key component in an internal combustion engine as it largely determines its power and performance by regulating the inflow (admission valves) and outflow (escape valves) of gases produced by combustion in the cylinder. Valves vary by type of engine (e.g. conventional or turbo engines), fuel (e.g. gas, gases, and alcohols), working conditions (e.g. temperature, combustion gas pressure) and performance needs. The key decision in the design of a valve is the combination of materials and thermal treatments for every valve part, which jointly determine the risk of breakage or wear issues that may lead to power loss or engine breakdown.

The definition of materials and thermal treatments takes into account, for every potential choice, performance expectations in specific working conditions, associated risks, and the balance between maximizing performance and minimizing risks. Competition and high-performance engines are prepared to operate at their maximum limit, resisting greater demands and pressures than street car engines. Thus, they are built with more sophisticated materials and thermal treatments. For instance, although street-car engine valves are typically made out of common steel, valves for competition and high-performance engines use stainless steel, nimonic alloys, or inconel, titanium. In addition, specific thermal treatments are used to reinforce the cover of strained

parts, like shanks, seats, keyways, and ends. Basso does R&D on new products, testing different valve types as well as nonconventional materials and thermal treatments.

4.2.4 | Manufacturing with co-design for the competition and high-performance markets

Basso's insertion in a competition market GVC started in 1986 when an American engine rectifier (henceforth, ER) that José Luis Basso had ties with approached him to produce valves for a number of regional car racing categories in the United States. Until then, Basso primarily supplied the Argentine aftermarket as well as neighboring countries. Nonetheless, José Luis had travelled extensively to the United States to learn more about the American aftermarket to glean insights on potential clients' demands. These efforts were starting to pay off with a fledgling export business. José Luis had managed to forge ties with several clients, keeping in frequent touch with them on technical and commercial matters.

This insertion experience involved several actors: Basso, ER, and the engine builder (the client) in each case. The latter conceived the valves, specifying their working conditions. Basso was responsible for valve specification and development as well as manufacture. ER served as an intermediary, facilitating the relationship between Basso and engine builders by conveying their technical needs and concerns to José Luis. ER was also in charge of the distribution of valves and the maintenance of business relationships.

ER was a young Los Angeles–based entrepreneur, whose primary business was the rectification of cylinder heads for street-car engines. He also distributed aftermarket valves and had firms that prepared engines for competition vehicles as clients. ER was familiarized with the car racing world and the engine requirements in every category. He understood the needs of high-performance engine builders and their performance expectations for valves. Interactions between ER and engine builders consisted on the exchange of non-codified information. At meetings, engine builders would convey their performance expectations for every engine, underscoring the risks to be avoided. ER then transmitted this information to Basso.

Throughout their business relationship, Basso had proven to ER that he could manufacture high quality valves and address design requirements with swift, effective solutions. ER had also forged a professional and personal relationship with José Luis, which provided the foundation of their mutual personal and technical trust. ER relied on Basso's ability and flexibility to quickly address the engine demanding requirements of every competition, properly balancing valve performance and risks. Basso's former experience in exporting to regional aftermarkets had been critical to the acquisition of this capability. Typically, car engines marketed in neighboring countries had been adjusted—as they had been in Argentina as well—to suit local conditions. This had entailed reverse engineering and material development challenges for Basso, forcing the company to explore new materials and treatments for its valves.

In 6 months, José Luis built a plant solely dedicated to the production of customized valves. José Luis relied on his professional training and expertise to start this new venture. After graduating with honors as an engineer in Argentina, he worked in France for 7 months at Aubert and Duval, a steel company, and then for an additional 5 months at Renault's valves and assembly plants in France. Back in Argentina, he served as engine division head at Renault Argentina for 2 years. Those jobs enabled him to acquire international expertise and updated knowledge on valve and engine production materials and technologies. He also learned the business practices of leading international firms concerning organization and relations with suppliers and clients.

After these experiences, he joined the family business, where he soon led a process of technological upgrading and a search for new markets.

José Luis was able to understand the performance demands of engine builders. As a result of his professional experience, technical training and car racing enthusiasm, he could "speak the same language" with them. In his trips to the United States, he exchanged technical and market information with ER and engine builders. These face-to-face interactions helped him gain a better understanding of his clients' needs.

A significant information exchange unfolded when engine builders sent Basso valves in different conditions (new, broken, worn down or dismantled). Using these parts as benchmarks, they specified the size and performance changes they needed. José Luis and the engineers at Basso discussed the possible causes of the valve performance and the improvements that could be introduced, which they later shared with their clients. The car racing culture shared by Basso, ER and engine builders provided a mutual understanding framework for these exchanges. Occasionally, Basso's engineers would visit engine builders in the United States to gain a fuller, more accurate understanding of their expectations for valve and engine performance.

Basso's ties with ER proved successful and profitable. Its valves were marketed across a large share of the United States. Basso, in turn, acquired the ability to serve as a supplier for demanding customized valve markets and to maintain long-term relationships with clients. Eventually, Basso terminated its arrangement with ER and continued to expand on its own in this market. Currently, Basso designs and manufactures valves for competition car engines used in a number of racing categories, including Indy Car, Nascar, Euro F3000 series, World Rally Car, and South America's Formula 3. Basso exports 90% of its competition market valve output, with the United States as its primary export destination.

In addition to the competition market, Basso is also involved in GVCs serving the high-performance market. As a prominent case for this type of GVC engagement, we describe the relationship Basso has built with a U.S.-based engine part manufacturer and distributor (PD) over the past 25 years. PD manufactures engine parts and kits, and markets them to engine builders who provide tuning services for engines. Basso supplies valves for PD's cylinder head production. At this GVC, PD handles the conception of valves and part of their specification, establishing the operating conditions for engines. Basso manufactures the valves and participates in their design process by completing specifications and handling product development.

PD's clients are engine builders that enhance street cars, particularly those intended for amateur drag races, a type of short race (300 to 400 m) widely spread in the United States. PD works with part manufacturers who can interpret and address its performance and risk-tolerance needs by offering effective technological solutions. Unlike what happens in the competition market, PD specifies a number of valve features in technical documents known as "functional blueprints." These blueprints specify basic parameters (e.g. shapes, sizes) for the valves and surrounding parts as well as the working condition for the modified engine. The larger size of the high-performance market justifies greater codification efforts. Interactions through functional blueprints require more technical knowledge but enable a more accurate information exchange between the technical teams of all parties involved. In any case, José Luis and the members of the engineering team at Basso often travel abroad to visit clients to guarantee a more thorough understanding of their needs.

Basso's role in valve design involves finding the optimal combination of materials and processes for each part based on the client's performance needs. In this market, Basso works with longer delivery terms as compared to those of the competition market. Thus, they can run more tests and lab analyses on materials, broadening the range of options offered to PD. When Basso

makes suggestions for product changes, face-to-face communications prove critical as these suggestions often imply that PD will need to adjust peripheral parts.

Basso's arrangement with PD has enabled the Argentine company to learn about the American high-performance market and about the design capabilities required to cater to it effectively. In turn, its interaction with a client that boasts greater technological knowledge on valves has allowed Basso to benefit from the mutual takeaways that characterize peer interactions. This relationship has also presented Basso with an opportunity to join a type of GVC that involves greater communication with the client through technical documents. Currently, Basso supplies its products to large distributors serving the U.S. high performance market, including Edelbrock, Perfect Circle, and Milodon.

5 | DISCUSSION

Despite their notable differences, the Tosone and Basso cases exhibit common elements, which explain these firms' participation in the design process of non-mass GVCs. We discuss next these common elements, which are the basis upon which we have built the conceptual framework of Section 2.

5.1 | Participation in the design process

Both Tosone and Basso display a substantially more active involvement in the design process than is usually observed in mass GVC manufacturing arrangements. Tosone was in charge of product development, materializing tacit attributes of the designs specified by the Swedish brands and suggesting changes to materials and production techniques. Basso handled product development and played a key role in design specification, determining the combination of materials and thermal treatments for every valve.

5.2 | Low design codifiability

Both Tosone and Basso were expected to interpret tacit features in the clients' designs. Although Swedish brands' designs were partially codified in datasheets, Tosone was challenged to interpret the tacit attributes that provided them the ability to meet consumers' aspirational and symbolic demands. Basso was also challenged to interpret tacit attributes of valve designs in the competition market, in this case allowing the valves to provide a technical solution to clients' functional needs. Instead, in the high-performance market, Basso received functional blueprints with codified specifications. But even in that case, they still had to interpret expected performance requirements and assess risks associated with every choice of material and treatment combination.

5.3 | The need of thick interactions

Low design codifiability called for close ties with designers. Frequent interactions ensured a correct interpretation of designs as well as an accurate translation of design attributes into product manufacturing. In Tosone's case, AR held regular meetings with designers while she regularly

talked to the specialist, and occasionally to Oscar, about how to ensure that the shoes' symbolic and quality attributes where preserved at the manufacturing stage. The professionalism, technical expertise, and quality focus shared by Tosone and the specialist provided a common understanding framework for their interactions with AR. In Basso's case, ER continually discussed with José Luis his conversations with clients about the performance of valves. José Luis also held direct interactions with engine builders and part distributors promoting the creation of close ties between them and the engineering team at Basso. These ties enabled the company to learn more about the clients' needs and expectations, while also providing an opportunity for technical and market information exchanges.

To engage in these relationships, it proved crucial that Argentine companies could 'speak the same language' with designers. However, while both Tosone's and Basso's background served as a solid basis for appropriate design interpretation and implementation, they still tapped on the complementary skills and credibility of intermediaries. In Tosone's case, not only AR was a crucial intermediary ensuring that shoes' symbolic and quality attributes where preserved in manufacturing but also an external specialist was further required to secure fluid interactions with Oscar and the production team. In Basso's case, ER was initially crucial as a local presence in the United States who could understand clients' problems and needs and could translate them to the Basso team.

5.4 | Previous production and consumption experience

In both cases, the domestic background in non-mass production and consumption served as a foundation for these firms' capabilities to perform design and manufacturing tasks at GVCs. Tosone's experience as a manufacturer for renowned brands in the Argentine high-end domestic market enabled the company to appreciate how relevant it was to interpret every design based on the images and symbolic notions that Swedish brands wanted to convey with their footwear styles. Additionally, Tosone's zeal for quality favored its willingness to work with a specialist to ensure compliance with quality requirements. Basso's production experience in the local market enabled it to access the Argentine competition market and to learn about the requirements and needs of this highly competitive segment. Basso's ongoing chemical and metal research efforts applied to the developments of materials and the treatment of valves provided the technical foundation for innovations on products with high-performance requirements.

5.5 | Upgrading opportunities

Participation in design activities at non-mass GVCs enabled both firms to learn about foreign demand and how to meet their requirements from the early design stage. Basso's direct exposure to customized client needs and the relationship forged with them enabled the company to strengthen its design capabilities. Basso initially relied on the guidance of an intermediary but eventually the company no longer needed his involvement. Basso's international expansion in the competition and high-performance markets proves this learning. In some markets, Basso has even managed to successfully position its own brand, a feat often viewed as the ultimate expression of functional upgrading. Tosone's GCV insertion experience enabled the company to acquire new design capabilities that may be leveraged under a new macroeconomic environment in Argentina. Specifically, Tosone's interaction with AR and Swedish brands allowed the company to acquire knowledge about a more sophisticated market, challenging it to find ways to meet its requirements with

symbolic resources in product design. The company also acquired more professional design methods like the use of product datasheets in their communication with clients. Although the literature often questions the possibilities for functional upgrading (Amighini & Rabellotti, 2006; Bazan & Navas Alemán, 2004; Schmitz & Knorringa, 2000), the cases studied here suggest that functional upgrading may be more easily achieved in non-mass GVCs.

There is a strong consensus around the notion that GVC insertion often paves the way to product and process upgrading. This type of upgrading is present in our cases as well. For instance, Basso adopted quality practices that involved crafting technical specification manuals for products and processes as well as implementing just-in-time methods to ensure compliance with delivery terms. Tosone, in turn, developed more sophisticated products for its own collections and adopted new quality controls as well as instruments to document its designs.

6 | CONCLUSION

Based on two Argentine firms' insertion experiences in GVCs for high-end and customized intermediate goods, this work analyzes the determinants of insertion in non-mass GVCs for companies from middle-income countries. In the cases we study, we find that the design process necessarily engages manufacturers in product development, and even product specification, due to the relevance of accurate interpretation of non-standard design attributes. Previous possession of manufacturing and demand understanding capabilities enables local producers to adequately interpret the tacit features of designs received from international buyers.

These case studies suggest that integration in non-mass GVCs offers export development opportunities for countries with relatively high wages, as the engagement of local firms in design operations requires higher skills enabling payment of higher wages without losing international competitiveness.

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DATA AVAILABILITY STATEMENT

The interviews are not publicly available but may be shared upon request.

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ENDNOTES

[1] Examples of GVC insertion include industries such as garment (Gereffi, 1999), footwear (Schmitz & Knorringa, 2000), electronic devices (Sturgeon & Kawakami, 2010), soccer balls (Xue & Chan, 2013), and surgical instruments (Nadvi & Halder, 2005) in East and Southeast Asia; apparel (Gibbon, 2008), auto parts (Kaplinsky, 2000), furniture (Kaplinsky et al., 2002) and vegetables (Dolan & Humphrey, 2000) in Africa; and apparel in Central America (Bair & Peters, 2006).

[2] Examples of this type of GVC insertion include Chile's salmon and wine industries (Agosin & Bravo-Ortega, 2012; Maggi Campos, 2006); coffee and nuts in Brazil (Cafaggi et al., 2012; Gomes, 2006); flowers, peppers and fruit pulp in Colombia (Arbeláez et al., 2012; Meléndez & Uribe, 2012), and cranberries, dairy products and poultry in Argentina (Navas Alemán et al., 2014; Sánchez et al., 2012).

[3] See, for example, Brazil's engagement in GVCs in the automotive industry (Lall et al., 2004; Quadros & Consoni, 2008); aircraft industry (Cafaggi et al., 2012), and electrical devices (Lall et al., 2004); or Argentina's involvement in light vessel GVCs (Artopoulos et al., 2013).

[4] We especially distinguish non-mass market segments from the type of segmentation described as 'mass customization' in the marketing literature (Pine II, 1993).

[5] Lash and Urry (1998) develop the notion of a product's 'design intensity', stressing firms' need to acquire the capability to process symbols. Marketing studies (Chitturi et al., 2007; Voss et al., 2003) highlight the growing relevance of emotional benefits in consumers' purchasing decisions. Silverstein and Fiske (2003) point to the significance of the so-called 'new luxury goods', which are high quality products differentiated in the market by their ability to relate to consumers' emotions and aspirations, making them willing to pay a premium price for them.

[6] It was often hard to find local suppliers who were able and willing to produce the differentiated inputs required by the models. For instance, for shoe bases, the specialist looked for alternative suppliers in Brazil.

[7] A steady process of currency appreciation increased the multilateral real value of the peso by 70% from the first quarter of 2005 to the first quarter of 2018. This process has partially reversed after the currency crisis that erupted in April 2018.

[8] American laws allow for adjustments in private cars' original engines without need for legal approval. This is not the case in many other countries.

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