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RESEARCH NOTE

Horizontal subcontracting and the global factory

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Abstract
The focus of this article is the examination of the factors that trigger the addition of horizontal subcontracting to the structure of global factories. Horizontal subcontracting takes place when one firm is contracted to produce a given item, fills as much of the order as they are able to based on their available capacity, and subsequently subcontracts the remainder to a qualitatively identical firm. We find that similar entrepreneurial backgrounds of contract manufacturers lead to strong business ties in the same industry and stage of production; low-cost, used production machinery and inexpensive factory rent lead to low barriers to entry; tightening labor markets, limited capital access and lumpy or uncertain demand lead to the need to avoid underused internal capacity, and the widespread use of digital sourcing platforms by buyers enables contract manufacturers to receive orders both small and much larger than their internal production capacity. These factors combine to produce many networked small manufacturers who use horizontal subcontracting to ensure sustained demand. Currently a largely China-based phenomenon, horizontal subcontracting is likely to spread beyond China, offering a new source of vitality to low-cost manufacturing in global factories, keeping global factories viable into the future.

Keywords Small and medium-sized enterprises (SMEs) · China · Global factory · Contract manufacturing · Qualitative research

Introduction

The global factory is an important concept as both the means of organizing global production and academically understanding how global production takes place (Buckley & Ghauri, 2004; Buckley et al., 2020; Kano et al., 2020). Contract manufacturing firms based in emerging economies have played a foundational role in executing global value chains since the 1980s (Berger & Lester, 2005). During the height of global trade integration and production from 2000 to 2008, global brands relied on large contract manufacturers for on-demand production (Buckley & Strange, 2015). Since contract manufacturers had thin profit margins and filled consistent large orders from global brands, scholars studying the global factory assumed contract manufacturers had to internally achieve economies of scale and dynamic capabilities to flexibly adjust for customized production.

The existing understanding of the global factory structure is based on layers of formal and contractual vertical subcontracting relationships. Global buyers subcontract manufacturing to dedicated integrated contract manufacturers who subcontract production of sub-assemblies and components to other specialized producers. Globally dispersed vertical subcontracting practices in the global factory emerged due to the demands for efficiency of production, product quality, and variety. It was facilitated by the availability of specific resources including low-cost labor, specialized firms with economies of scope and scale, and sustained high global demand.

Contract manufacturing, however, has evolved since the global financial crisis in 2008. Contract manufacturers could

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no longer assume continued and ever-deepening global economic integration. The retrenchment and restructuring of global value chains in the aftermath of the COVID-19 pandemic has accelerated these trends, making it important to revisit the structure and performance of global factories (Ciravegna & Michailova, 2022). An alternative approach to subcontracting, horizontal subcontracting, emerged to complement vertical subcontracting in production. Related to the concept first introduced by Spiegel (1993), horizontal subcontracting in contract manufacturing takes place when one firm is contracted to produce a given item, fills as much of the order as they are able based on their available capacity, and subsequently subcontract the remainder to a qualitatively identical firm. That firm repeats the process, until the entire order has been distributed across identically capable firms. Horizontal subcontracting by contract manufacturers enables firms to increase or decrease their effective production capacity on demand, maintain high rates of capital and workforce utilization, and fill orders from multiple types of buyers simultaneously without having to take on debt or risk for short-term expansion. While recent studies have considered the responses of contract manufacturers to global shocks (Choksy et al., 2022), none yet consider the role and agency of contract manufacturers as a buffering mechanism against unreliable and uncertain demand. Adding to complexity, despite the potential value of horizontal subcontracting, not all contract manufacturers have adopted this practice. When or under what conditions firms will opt for horizontal subcontracting as a production organization model is not yet known. To know the extent, potential global reach, and impact of horizontal subcontracting, we must uncover the causes leading firms to adopt this approach. Therefore, our primary research question is: *What factors triggered the addition of horizontal subcontracting to the structure of global factories*?

The emergent practice of horizontal subcontracting was observed during field research on innovation capabilities in China's export-oriented manufacturers. Observing systematic similarities among domestic contract manufacturers' approach to subcontracting and differences with those of incumbent foreign-invested subsidiaries, the research team set aside the innovation focus to concentrate on subcontracting. From 2015 to 2023, the team conducted a qualitative examination of plastic injection molding contract manufacturers in Dongguan, China. Since these contract manufacturers all produce for global brands, this led to a (re)consideration of the global factory perspective. Interviewed firms all operated in global factories with some established before the global financial crisis and others after 2010. Comparing semi-structured interview data, we established patterns of antecedent conditions and resources which facilitate the emergence of horizontal subcontracting as a viable approach to organizing production.

Understanding the causes of horizontal subcontracting matters because it reveals where else the practice is likely to arise. Horizontal subcontracting arises as a survival mechanism within a macro environment of declining demand, increased wage pressure from a shrinking labor force, and constrained access to capital. Our sample firms reported leveraging (1) tight relationships with qualitatively identical firms; (2) wide availability of second-hand machines and affordable facility rent; (3) reconceptualization of the employee hiring/firing cycle; and (4) improved customer visibility facilitated by online sourcing platforms. Increasingly widespread conditions of declining demand since 2020 have driven even medium- and large-scale firms to adopt horizontal subcontracting. Where these environmental-, firm- and industry-level conditions arise, horizontal subcontracting, in contrast to the known and accounted for practice of vertical subcontracting, is likely to emerge. Studying the causes of horizontal subcontracting in global factories contributes to rebuilding our understanding of production as practiced in global factories. It further provides a new look at the causes which may motivate international new ventures and born global businesses in global factories and shows how the global factory organization changes in response to external stimuli.

Theoretical background

Since the early 2000s, research extending understanding of the globalized nature of production has increasingly considered the global factory: an organizational structure through which global brands coordinate their activities and enable customized low-cost production (Buckley & Ghauri, 2004; Buckley et al., 2020; Kano et al., 2020). The global factory perspective integrates brand owners', contract manufacturers' and component suppliers' activities into an integrated globally distributed system. Brands gain competitive advantages they could not enjoy through internally developed capabilities.

The global factory literature divides the manufacturing stage among contract manufacturers in different locations who flexibly satisfy buyers' demand (Buckley et al., 2020). Contract manufacturers providing assembly services are clearly defined firms with internal economies of scale (Buckley & Ghauri, 2004). Each commands networks of component suppliers. This global factory organization is based on "vertical" subcontracting: contract manufacturers receive global brands' orders and then place orders for assembly services or components, much as construction general contractors apportion tasks to subcontractors without direct ties to the client.

The concept of horizontal subcontracting was first introduced by Spiegel (1993) in the context of subcontracting

by competitors after one firm in a group of firms working together successfully secured a production contract. This research stream, including more recent articles such as Marion (2015), has explored how competitors are able to collaborate in the market after a competitive phase, with the benefit of ensuring revenue for all. Ramaswamy expanded the concept in 2016 to include the manufacturing practices of Indian SMEs, showing how firms used subcontracting among peer enterprises in order to deliberately remain small so they could remain eligible for government subsidies. Murphree and Anderson (2018) further expanded the concept of horizontal subcontracting in their work on contract manufacturing firm size and strategic actions in response to dependence on global buyers.

Distinct from the competitors-turned-collaborators in earlier horizontal subcontracting research, the practice of horizontal subcontracting in the global factory consists of apportioning production orders to qualitatively identical firms to complete the same task at the same stage of production. The firms which receive subcontracted work may perform some of the work, up to the point their capacity is fully utilized, and again subcontract to a qualitatively identical firm. Horizontal subcontracting differs from vertical subcontracting such as explored by Zahoor et al. (2023) in that (1) the activities being subcontracted are not component production and (2) there is no clear lead contract manufacturer acting as an intermediary between global brands and subcontractors. Horizontal subcontracting in contract manufacturing is also distinct from Spiegel (1993) and Marion's (2015) definitions of horizontal subcontracting in that our focal firms are not large independently capable firms that use subcontracting after the fact to improve their margins. Unlike Indian SMEs studied by Ramaswamy (2016), firms do not remain small as a virtue, but rather use horizontal subcontracting to reduce the risk they would otherwise face were they to internally add employees or productive capacity.

Horizontal subcontracting therefore takes place when the subcontracted work is a portion of an order the contract manufacturer is unable to independently fill in a timeframe acceptable to the customer. Under horizontal subcontracting, there is no single central coordinating contract manufacturer. The firms are also not exactly competitors, as they are neither bidding for, nor seeking, orders from the same global brands. Participating firms are, however, all potential recipients of global brands' orders. All firms share work among themselves at the same level of production, rather than in a hierarchy wherein dominant contract manufacturers control communications and interaction with global brands. Indeed, the shifting nature of spare capacity among potential subcontractors at any given time mandates different sets of firms engage in subcontracted production each time an order is placed, even if the order is placed with the same global brand-facing contract manufacturer. The global factory's composition is highly fluid on an order-by-order basis.

The insights of horizontal subcontracting extend global factory theorization as conditions of increasingly scarce global orders and uncertainty spread worldwide. Studying horizontal subcontracting in the context of global factories helps elucidate another as yet understudied non-hierarchical mechanism in MNE–contact manufacturer relationships, helping further clarify the nature of power and location of opportunities in value chains (De Marchi et al., 2020). While contract manufacturing itself is considered a source of the unique low-cost and customizable production in global factories, horizontal subcontracting further enhances this capability. Horizontal subcontracting enables low-cost and multi-scale production options that make production in global factories viable even for small brands who otherwise struggle to find willing contract manufacturers. These important mechanisms and outcomes stemming from contract manufacturers' engagement in horizontal subcontracting lead to the call for theoretical extension of the global factory perspective and exploration of the antecedents for this phenomenon.

Methodology

Empirical setting: The historical context of global factories in Dongguan

Scholars have considered the economic structure and capabilities of manufacturers in Chinese cities like Dongguan, especially during the 1990s and 2000s (Yang & Liao, 2010; Yeung, 2001). Before 2008, Taiwanese- and Hong Kong-invested contract manufacturing subsidiaries dominated Dongguan's plastics industry. Demand was robust; plastics production grew 16.75% on average annually from 2000 to 2006 (DGSB, 2023). Real wages were low. Workers were readily available and could be flexibly hired or laid off following seasonal demand fluctuations. Contract manufacturers enjoyed access to bank loans, stock issues, or parent company investments, facilitating rapid scaling. Subsidiaries built internal capacity to meet peak demand in the summer and early autumn, leaving equipment idled and laying off employees during periods of low demand. These conditions changed radically after 2008.

Sample selection

Interviewed firms were selected from Dongguan's hundreds of plastics firms based on two criteria: whether they produced for export in global factories and whether they produced final consumer goods or components for electronics. Interviewee recruitment followed the grounded theory

sampling approach: interviewing continued until interviews ceased to provide new insights (Corbin & Strauss, 2008). Two global factories were studied in detail: plastic hunting decoys – Firms A through I, and plastic components for mobile phones – Firms J through O. These industry niches were chosen to determine whether the type of buyer – final retailers or final assemblers – shaped subcontracting practices. Selected contract manufacturers all participate in multiple global factories. None are fully dependent on single global brands like Firm A or contract manufacturers like Firm K. Organizations P though AA participate in other plastic goods' global factories or oversee the industry. These eleven firms, industry associations, and government offices began operations during the 1990s and 2000s. Their inclusion establishes the conditions for successful contract manufacturing before the global financial crisis. This provided contrast with newer firms' characteristics.

Data collection and analysis

Semi-structured interviews with organizations' founders or top managers provided primary data. Interviews were conducted over five research trips from 2015 to 2023. Forty-two interviews lasting 1–3 h each were performed with 18 contract manufacturers (11 post-2008 SMEs; seven large foreign subsidiaries), two global brands, a sourcing firm, a service company, a foreign-invested industry association, and four local government offices. Foreign-invested contract manufacturers provided insights into scale production and vertical subcontracting before 2008. Their practices had not changed despite the changed industry environment. SMEs revealed contract manufacturers' present situation and practice of horizontal subcontracting. Ten organizations were interviewed more than once for input on the emergent perspective of horizontal subcontracting. Table 1 provides information on organizations' age, size, ownership, year of interview, and number of individuals spoken to at each organization. Firms established before 2008 revealed subcontracting behaviors before and after the global financial crisis, emphasizing the pre-2008 patterns. Post-2008, SMEs only discussed their activities and performance during this time period, although interviewees also discussed their pre-2008 personal work experience. Pre- and post-2008 data was used to develop the understanding of how subcontracting behaviors changed in response to exogenous changes in the global factory and individual entrepreneurs' characteristics.

The authors, speakers of both English and Mandarin, conducted all but two of the interviews in Mandarin without interpreters, allowing interviewees to speak in their preferred language (Welch & Piekkari, 2017). Interviews were semi-structured based on predetermined themes; interviewees elaborated on areas of personal expertise (Burgess, 1984; Kvale & Brinkmann, 2009). Interviewees were asked to introduce themselves, their firms, products and markets, their firms' greatest challenges, competitive advantages and capabilities, peer or competitors' activities, and future opportunities and threats for plastics manufacturers. Asking about competitors encouraged interviewees to elaborate when they were hesitant to discuss their own activities. Repeat interviewees were asked if and how their subcontracting behaviors changed over time, and why. This checked previous interviews for consistency and allowed for perspective on changing practices. We also presented our developing understanding of horizontal subcontracting and solicited feedback on the causal factors we highlighted. As industrial research in China can be sensitive, interviewees were guaranteed anonymity and not recorded, keeping with the need for contextual sensitivity to encourage active interviewee participation (Welch & Piekkari, 2017). Quotes are identified as Firm A, Firm D, etc. Interviewee responses were collected in handwritten notes. The researchers took turns asking questions while the others took detailed notes, although both continuously noted responses.

Interview notes were transcribed, yielding detailed rich comparative data from each firm. Transcription was completed within 24 h of interviews to allow impressions to be added while still fresh in interviewers' minds. Interviewers compared notes to ensure consistency and validity, as well as completeness in case key information was missed during the note-taking process. Qualitative data analysis followed a template akin to that proposed for data management and interpretation in Gioia et al. (2013). However, the exact template was not followed as the analysis involved repeated visits to the field and consultation with the original raw data (Mees-Buss et al., 2022). Transcribed interview notes were converted into a spreadsheet organized by interviewee and responses to interview themes. Interviewees' who used, or not, horizontal subcontracting responses were then compared. This yielded commonalities and contrasts which were grouped into a typology accounting for the emergence of horizontal subcontracting. With each iteration of analysis, subsequent field research interviews were conducted to check whether the emergent explanation matched interviewees' understanding. This typology was then rechecked with interviewees' original responses to see whether the explanation matched their interpretation for why they adopted, or not, horizontal subcontracting.

Findings

Studying Dongguan's plastics manufacturers revealed a set of conditions which account for the emergence of horizontal subcontracting. The first set were changes to global factories in the aftermath of the global financial crisis which created an impetus for a new approach to production. The second set

Table 1 Interviewee summary data

Firm code	Established before/after 2008?	Firm employment	Ownership	Firm global factory role	Interview year	Interview count	Interviewee count
Firm A	After	< 10	Foreign, private	Global brand	2016, 2017, 2018	3	2
Firm B	After	< 10	Chinese, private	Sourcing coordinator	2016, 2017	3	1
Firm C	After	21–50	Chinese, private	Contract manufacturer	2016	2	2
Firm D	After	< 10	Chinese, private	Contract manufacturer	2016	1	1
Firm E	After	51–100	Chinese, private	Contract manufacturer	2016	1	1
Firm F	After	101–200	Chinese, private	Contract manufacturer	2016	1	1
Firm G	After	21–50	Chinese, private	Contract manufacturer	2016	2	2
Firm H	After	< 10	Chinese, private	Contract manufacturer	2016	1	1
Firm I	After	21–50	Chinese, private	Contract manufacturer	2016	1	1
Firm J	Before	> 1000	Chinese, publicly traded	Global brand	2017	1	1
Firm K	Before	> 1000	Chinese, publicly traded	Contract manufacturer	2016	1	1
Firm L	After	51–100	Chinese, private	Contract manufacturer	2016, 2017	2	3
Firm M	After	21–50	Chinese, private	Contract manufacturer	2017	1	1
Firm N	After	51–100	Chinese, private	Contract manufacturer	2017	1	1
Firm O	Before	101–200	Chinese, private	Contract manufacturer	2017	1	1
Firm P	Before	101–200	Chinese, private	Service firm	2017	1	1
Business association Q	N/A	N/A	N/A	Business association	2016	3	3
Firm R	Before	> 1000	Foreign, private	Contract manufacturer	2016	2	2
Firm S	Before	> 1000	Foreign, private	Contract manufacturer	2016	1	4
Firm T	Before	501–1000	Foreign, private	Contract manufacturer	2016	1	1
Firm U	Before	501–1000	Foreign, private	Contract manufacturer	2016	1	1
Government V	N/A	N/A	N/A	Municipal government	2015, 2016, 2017	3	1
Firm W	Before	501–1000	Foreign, private	Contract manufacturer	2016	1	3
Government X	N/A	N/A	N/A	Township Government	2016, 2018	2	2
Firm Y	Before	201–500	Foreign, private	Contract manufacturer	2016	1	2
Government Z	N/A	N/A	N/A	Municipal government	2016	1	2
Government AA	N/A	N/A	N/A	Township government	2023	3	1

were those of the entrepreneurs and enterprises themselves which account for why they opted for horizontal subcontracting to adapt to these conditions.

Changes to global factories following the global financial crisis

Following the global financial crisis, assumptions of ever-expanding demand, surplus low-cost workers, and capital access no longer remained true. These assumed conditions had underpinned the success of the contract manufacturing model in global factories as explored by Buckley and Strange (2015). Once changed, the old model was untenable, especially for SMEs, creating an impetus for a new approach.

Demand for plastics production in Dongguan has steadily fallen. The industry has contracted as global brands shift orders to other regions. Output declined steadily after 2012. In 2022, the output of plastic goods was 1.28 million tons, which is less than half of the 2.7 million tons produced in 2009 (DGSB, 2023). Interviewees observed this shift, usually in their first comments:

> *As the economy developed, there are higher costs and falling foreign demand, and even falling domestic demand, so there are fewer orders now. (Firm G)*

Second, labor shortages have become persistent. Availability of young workers has fallen since China's working age population peaked in 2010. Young Chinese also perceive greater opportunities close to their hometowns and in accordance with increased educational attainment:

> *The generations born in the 1970s and 1980s were willing to work very hard and eat bitterness. The post-1990s and 2000s generations have higher expectations out of life. They are not willing to do basic work. (Firm P)*

Declining labor availability, rising expectations, and labor demand from incumbent contract manufacturers pushed rapid wage inflation. When workers return to Dongguan after the Lunar New Year holiday, they often jump to employers offering higher wages. With constrained labor availability and labor market fluidity, bargaining power has shifted from factory owners to workers. During the 2010s, while Dongguan's official minimum wage remained low by developed-country standards, Firms C and D noted manufacturers had to increase wages 10–20% *per year* to attract workers. Accordingly, the old practice of hiring and laying off with fluctuations in demand was no longer viable: laid off workers rapidly found other, often better paid, work, making later rehiring to meet demand surges all but impossible.

Finally, firms' ability to expand through financing decreased. Stringent bank loan requirements and limited ability to attract investment as investors retrenched or sought other opportunities, such as real estate (before 2023), decreased capital availability. Limited capital access severely constrained firms' ability to grow. Even large firms have ceased to receive loans as banks doubt their ability to meet ongoing debt payments. Interviewees explained:

> *Banks require real estate as collateral for loans. For loans to significantly upgrade our production scale, this would be a lot of real estate. We are too small to get loans since we lack such collateral. (Firm C)*
> *I wouldn't have been able to get loans even if I tried. The government says that it supports loans to SMEs but not in reality. The only loans we could get would be high interest ones from unlicensed private lenders. (Firm D)*

Entrepreneur characteristics leading to horizontal subcontracting

Responding to the pressures of declining demand, rising wages, and constrained capital availability, the contract manufacturing stage of global factories in plastics changed to favor a new production system based on many horizontally linked small manufacturers as opposed to firms possessing independent economies of scale. Introducing Firm L, Firm R's manager explained:

> *[Firm L] is a good representative of the changes in Dongguan. In the past, plastics was dominated by foreign enterprise subsidiaries. But now it is getting cut up and taken over increasingly by local SMEs. (Firm R)*

These ventures' networked production system of horizontal subcontracting enabled them to overcome these challenges. Firm C is typical. Its founder previously worked for a Taiwanese-invested plastics manufacturer. It was established in 2014 after the mass bankruptcies following the global financial crisis. It employs just over 30 workers, mostly in their 30s and 40s. Most workers came to the factory through personal recommendations by their friends or family. Global buyers find their services through the online Alibaba platform where Firm C advertises its purported production capabilities.

Firms C through I and L through O, who all engage in horizontal subcontracting, share several characteristics that make it possible for them to do so. First, the founders' backgrounds help account for their ability to rapidly enter the industry, but also their limitations. All were previously employed in Taiwanese- or Hong Kong-invested export-oriented plastics manufacturers filling orders for overseas buyers in global factories. These firms, being co-ethnic with the host region, play an important role in facilitating knowledge

transfer which may have increased the likelihood for, and success rates of, new entrepreneurship after 2008. Interviewees reported that many of their first orders came from their former bosses, with whom they maintained personal ties. The founders of these businesses, being migrants to Dongguan with limited educational experience lack both deep local and direct global ties. They were forced to build horizontal relationships which, once those associates became entrepreneurs themselves, became the basis of a horizontal work-sharing network. In contrast, those subsidiaries established before 2008 lacked horizontal local ties as they were stand-alone subsidiaries oriented globally through their parent companies' existing business relationships and seeking to fill orders independently.

Enterprise and market characteristics leading to horizontal subcontracting

The second condition was availability of low-cost equipment and factory space. Widespread factory bankruptcies after the global financial crisis meant used production equipment could be purchased inexpensively, especially between 2009 and 2013. This trend has reemerged since 2020 as geopolitical headwinds pressure manufacturers. Availability of low-cost equipment substantially reduced the challenge of capital access as capital-constrained founders could launch new ventures. Low entry barriers facilitated a surge of small-scale entrepreneurship in the early 2010s. All interviewed firms founded post-2008 began with founders' savings or pooled capital from friends or family, typically less than $20,000 USD in total. Firm C used funds borrowed from family. Firm D used the founder's personal savings and $15,000 borrowed from friends. Firm G noted new Chinese-made plastics production equipment cost less than $10,000; used equipment cost as little as $1000. Inexpensive subleases for unused factory space, usually a wing or production building on another company's campus, are widely advertised and available. This surge of entrepreneurship created hundreds of similar firms with weak vertical ties to global buyers but strong horizontal ties to other new entrepreneurs. This set up a system in which work could be accessed through horizontal sharing, even if vertical ties to buyers failed to yield sufficient demand for a factory at any given time.

Concerning the challenge of limited and expensive workers, these firms have shifted from a labor-on-demand model to one of maintaining a small stable staff. With the ongoing labor shortage, hiring workers on demand became difficult; incumbent firms K, R and S are operating several hundred workers below capacity. Without the ability to lay off and rehire staff following demand cycles, some Dongguan firms changed the labor model. Post-2008 firms hire a core of workers, often older and more experienced, and neither lay off nor hire workers (nor purchase equipment) which may be underutilized. This allowed them to offer stable, year-round jobs in an environment otherwise known for its labor market fluidity. With a full-time largely fixed staff, owners face even greater pressure to ensure labor capacity is constantly used. The need to ensure constant productivity drives an incentive to look for horizontally subcontracted work in addition to courting global brands.

The final major shared condition was availability of online ordering platforms. These give even small firms access to distant clients and the ability to present themselves as independently capable. Unlike earlier periods in which buyers inspected factories in advance, online platforms enable arms-length ordering without fear of being inspected and firms' limited capacity discovered. Rather than relying on word-of-mouth from established clients or overseas sourcing agents as done by firms T and U, firms C, E, F, G, L, M and N advertise production capacity through online platforms such as Alibaba and Made-in-China.com. Online platforms provide SMEs similar market visibility as large incumbent firms. Further, online platforms do not thoroughly vet individual vendor's information. The production capacity listed on Alibaba for the interviewed SMEs was multiple times larger than their actual capacity. To reach the widest possible customer base, firms simply list the widest possible production range of one to several million pieces. They effectively include the production capacity of their entire potential horizontal subcontracting network in their online listings. When asked about the discrepancy between their actual and stated factory capacity, interviewees explained flatly that if they received an order which exceed their capacity, they would fill it within the customer's timeline by horizontally subcontracting to co-located peer firms.

These conditions have only become more prevalent in the aftermath of the COVID-19 pandemic's economic shock and recent deglobalization due to intensified geopolitical rivalries. Demand for contract manufacturing in Dongguan continues to decline, leading even large incumbent firms to adopt horizontal subcontracting:

> *From January to the end of June 2023, manufacturing capacity has shrunk by roughly 15% in [township]. Small factories are closing, and if one large factory isn't getting many orders and is on the brink of going out of business, they sell their machines and downsize their labor to more or less match the demand they still have. They then subcontract production capacity from another large factory [with excess capacity]. Now you have two separate companies operating under one roof, so overhead costs are lower. It is like a merger, but the companies stay separate. (Government AA)*

Discussion and conclusion

This article reveals how and why horizontal subcontracting emerged in China. The confluence of individual conditions and environmental stimuli pushed contract manufacturers established after the global financial crisis to engage in horizontal subcontracting. Specifically, similar entrepreneurial backgrounds of contract manufacturers led to strong business ties in the same industry and stage of production: low-cost, used production machinery and inexpensive factory rent led to low barriers to entry; tightening labor markets; limited capital access and lumpy, or otherwise uncertain, demand led to the need to avoid underused internal capacity; and the widespread use of digital sourcing platforms by buyers enabled contract manufacturers to receive orders both small and much larger than their internal production capacity. These factors combined to produce a large number of networked small manufacturers who use horizontal subcontracting to ensure sustained demand. See Fig. 1 for a visualization of these relationships.

Armed with the understanding of which conditions create a favorable environment for horizontal subcontracting, it is possible to understand how and when it may be beneficial to stimulate micro-level shifts. Industries with low barriers to entry, falling demand, tightening labor markets, and limited access to capital may be well positioned for government groups or industry associations to strategically implement policies which advocate for agglomerated procurement sites or platforms (such as trade fairs or buyer platforms) and strengthening ties and cooperation among would-be competitors occupying the same industry and stage of production. This may improve individual firms' performance and help sustain the vitality of the overall industry.

The antecedents of horizontal subcontracting call for a theoretical extension to the global factory perspective. It is no longer true in all cases that global factories consist exclusively, or even primarily, of vertical relationships of buyers and suppliers. The way in which our focal firms interact within the global factory has inherently changed due to the forces driving horizontal subcontracting. This study, therefore, not only calls for theoretical extension of the global factory perspective to account for the possibility of multiple firms at the same stage of production, but also elucidates the antecedences for this change. Our primary contribution to the theoretical restructuring of the global factory is to define which causal factors contribute to adoption of horizontal subcontracting practices. This is critical for understanding the future structure of manufacturing in global factories as deglobalization and geopolitical tensions continue to undermine previous trends toward increased vertical global sourcing and encourage more manufacturers to switch to this mode of production.

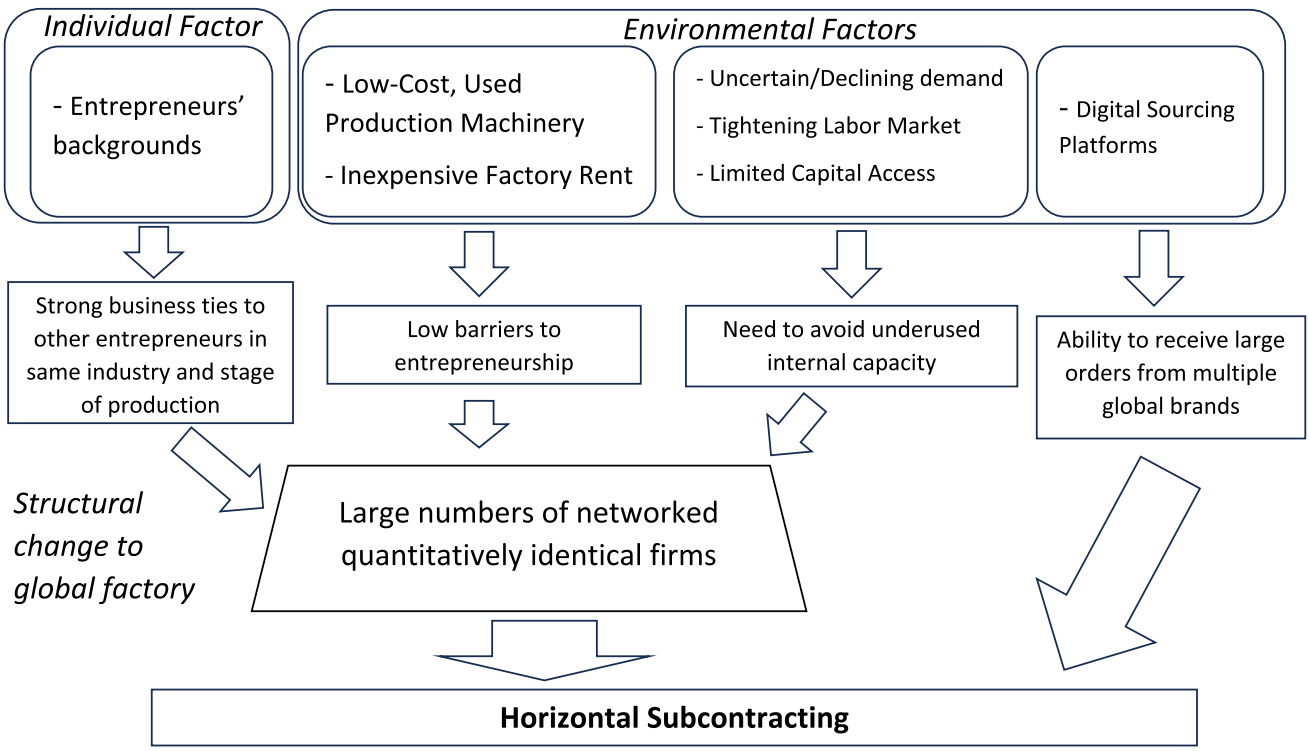

Fig. 1 Sources of horizontal subcontracting under changing global factory conditions

Indeed, our findings suggest the trend of horizontal subcontracting is accelerating. As demand continues to decline, the weakest firms exit the market. The flow of orders across qualitatively identical firms has come to an unsustainable trickle for the weakest firms (those most prone to quality issues or lacking the ability to generate orders independently and hence unable to reciprocate orders to other firms in the network). In contrast to previous work, this evidence suggests small firm size is not a necessary condition for engaging in horizontal subcontracting.

Understanding the causes of horizontal subcontracting makes it possible to see that entrepreneurial opportunities in low-end contract manufacturing are more plentiful than previously understood in global factories, with the emphasis on pyramids of large-scale contractors and dependent subcontracted suppliers. The rise in new opportunities came about, ironically, due to a downturn in demand for plastics in the focal region in the context of trust-based social networks. The decline in demand made cheap second-hand equipment and low factory rent available, reducing the need for external bank or investor capital. With many founders themselves having once been common workers, their labor management shifted from treating factory labor as transitory to permanent, shielding contract manufacturers from many of the less desirable attributes of a constrained labor pool. Finally, through widespread adoption of online marketplaces such as Alibaba, interviewed firms enjoy equal visibility to incumbent large-scale firms. With horizontal subcontracting, their advertised production capacity enables them to compete with large integrated enterprises for the same orders. The empirical evidence from plastics contract manufacturers suggests these conditions in combination may be key for horizontal subcontracting to begin. Where vertical subcontracting and large integrated contract manufacturers once enabled low-cost on-demand large-scale production in global factories, horizontal subcontracting today offers a new means of preserving the advantages of global factory production even under shifting global economic conditions.

Our results also impact the buyer's perspective on the global factory. Many, although not all, global brands may be unaware of the true structure of their global factories. This is likely to become more common as the conditions under which horizontal subcontracting emerged continue to spread, making horizontal subcontracting more than just a China phenomenon. There may be firms contributing to production which are completely hidden from buyers' view, even when audited. Indeed, due to the shifting composition of firms which comprise a global factory for any given order, it may well be impossible to understand and vet all the suppliers which contribute to the production of a given product without physical boots on the ground or engagement with blockchain technology, which is currently cost prohibitive for the product categories created by our sample firms. Regardless of intensified efforts put into supply chain visibility, even global brands may be unable to consistently or meaningfully understand the actors and environments from which their products are created. Further, due to the shifting nature of horizontal subcontracting, even with auditing only certain firms at a given snapshot in time will be visible to global brands. It is important for managers to understand that in some cases, the number of firms directly engaged in the production of an order may be double or even triple the number expected when purchasing from contract manufacturers which engage in horizontal subcontracting. Buyers must consider the conditions emerging in any potential sourcing location to anticipate whether horizontal subcontracting is likely to occur and the complexity it may bring to their global value chain (Liesch & Welch, 2024).

The availability of digital ordering platforms which makes horizontal subcontracting viable by providing a large number of different sized orders from arms-length clients also changes the power balance between global buyers and contract manufacturers by further obscuring the nature of the producers. Firms formerly listed their true, or marginally exaggerated, production capacity when advertising in trade fairs or through hired sourcing representatives. Today, contract manufacturers can list production capabilities which include the entire network of horizontal subcontractors – which is multiple times higher than their individual production capacity. From the perspective of a global buyer, one must be armed with insight into horizontal subcontracting to make the best strategic sourcing decisions for their company especially if they prefer not to have their orders subcontracted due to quality, transparency, or labor rights concerns.

While the conditions which give rise to horizontal subcontracting are likely to be found in many places worldwide, there remain some boundary conditions suggested by the field work. First, the global factories studied produced low-tech items. It is unclear whether horizontal subcontracting takes place in production of medium- and high-tech products. Second, Dongguan's horizontal subcontracting takes place in an environment with hundreds of co-located manufacturers founded by entrepreneurs with pre-existing social and professional ties, a collective scale which may be difficult to replicate elsewhere. However, trust- and relationship-based business ecosystems exist in Brazil and Nigeria and large-scale light industry agglomerations can be found in Vietnam and Bangladesh (Luo & Bu, 2018; Schmitz, 1995). Third, the work experiences of the entrepreneurs suggest potential importance of working for co-ethnic or culturally-similar foreign-invested firms – in this case from Hong Kong and Taiwan. Cultural homophily between these firms and their employees may have facilitated knowledge transfer to common workers making entrepreneurship more likely. Finally, entrepreneurs faced reduced financial entry barriers

due to the availability of low-cost production equipment in the early 2010s. However, as even large incumbent firms in Dongguan are now beginning to engage in horizontal subcontracting, it may be that large agglomerations of new small enterprises are not necessary, expanding the number of locations in which horizontal subcontracting may occur, so long as a critical mass of co-located firms exists in a context of uncertain orders, technological access to buyers, and potential stable workforces.

Horizontal subcontracting is likely to spread beyond China, offering a new source of vitality to low-cost manufacturing in global factories. It is entirely possible that many contract manufactures will be pushed out of global factories as rising costs and geopolitical rivalries exacerbate declines in demand. However, armed with understanding of the factors which triggered the addition of horizontal subcontracting to global factories in Dongguan, it is possible to predict where horizontal subcontracting will arise, keeping global factories viable into the future.

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