Inclusion of marginalized actors in local supply chains: A cluster analysis and implications for global supply chains

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Abstract

This study aims to answer the following research question: Which mechanisms of supply chain inclusion are employed empirically in local supply chains and how can these mechanisms influence social value creation in global supply chains? A cluster analysis is conducted using empirical data collected through a large-scale survey. The cluster analysis reveals three meaningful clusters of supply chain inclusion in Base of the Pyramid markets and highlights two main aspects: direct versus indirect mechanisms of inclusion and diversity in supplier relationships with local organizations aimed at either 'sourcing' local capabilities needed for inclusion or 'outsourcing' the inclusion.

Keywords: Base of the Pyramid, global supply chains, inclusive supply chains

Introduction

The inclusion of marginalized groups of actors at different stages of supply chains can have significant impact on sustainable development efforts. For example, Sustainable Development Goals mentions inclusion ten times more often than its predecessor the Millennium Development Goals (Heeks, 2014). We define 'marginalized actors' as individuals, households or groups which can be found in *"disenfranchised sectors of society"* and *"have structurally been denied access to resources, capabilities, and opportunities"* (George et al., 2012; pp. 661). Marginalized groups frequently include women, the disabled, ethnic minorities, informal sector entrepreneurs and those on lowest income levels in the economic pyramid (Heeks et al., 2014). From a supply chain and operations management perspective, the inclusion of actors from

marginalized groups has been brought to attention by Base of the Pyramid (BOP) debate. BOP is defined as the almost 4 billion people who live on less than $1500 per year (Prahalad and Hart, 2002).

Literature presents several cases of supply chain inclusion driven by multinational enterprises (MNE) where BOP can serve as producers and suppliers of raw materials (Hall and Matos, 2010) or distributors and consumers of food products (Gold et al., 2013). Yet, studies show that inclusion of vulnerable BOP actors presents severe difficulties for companies outside the BOP market due to institutional voids (Parmigiani and Rivera-Santos, 2015) and local network characteristics (Rivera-Santos and Rufin, 2010).

More recent empirical works suggest that key organizations for supply chain inclusion in BOP markets are micro, small and medium sized enterprises (MSME). While MNE often lack the skills and capabilities needed to co-create with local communities, MSMEs are in a better position to engage with local BOP actors. MSMEs in BOP markets have real potential to enable local supply chains through access to credit, market information, market access and higher productivity through provision of new technologies and equipment (Sodhi and Tang, 2011). Yet, their own survival is at risk due to challenges related to lack of capital and capabilities for scaling. Therefore, by integrating global competencies of MNE and local expertise of MSMEs, economies of scale and scope can be achieved, and larger social impact can be created in BOP settings.

In order to enable synergistic effects between global MNE-led and local MSME-led supply chains, this study investigates mechanisms of supply chain inclusion of MSMEs active in BOP markets and discusses implications for MNE aiming to expand to BOP markets. Therefore, this paper aims to answer the following research question: *Which mechanisms of supply chain inclusion are employed by MSMEs and how can they impact social value creation in MNE-led global supply chains?*

In order to answer this research question, the study is conducted in three stages. Firstly, a large scale empirical study of MSMEs operating in BOP markets is performed. Using the rich data set of 134 MSMEs, we systematically categorize supply chain inclusion in order to identify meaningful configurations through cluster analysis techniques. While exploratory cluster analysis does not involve hypotheses development and testing, the value of these techniques lies in mapping patterns in a data set while including multiple variables as drivers of configuration definition with rich descriptions of configurations (Ketchen and Shook, 1996). In this study, cluster analysis of an exploratory nature is employed to identify patterns in the data and make inferences related to supply chain inclusion in BOP markets. The cluster analysis techniques and post-hoc tests reveal three meaningful configurations of supply chain inclusion. Secondly, the cluster analysis highlights two important aspects of supply chain inclusion, namely direct versus indirect mechanisms of inclusion and diverse supplier relationships aimed at ‘sourcing’ local capabilities from local organizations or ‘outsourcing’ the inclusion. Thirdly, the findings are employed to inform theoretical implications for MNE-led global supply chains. In particular, the implications highlight different strategies of global-local supply chain inclusion and their implications for social impact creation in BOP markets.

This paper is structured in six sections. After this introduction, the research design is briefly described. Section three presents the main findings of the cluster analysis, namely the three cluster solution approach. The implications derived based on the three cluster solution approach are discussed in section four, while section five proposes theoretical implications for social value creation in global supply chains. Section six

outlines the main findings, theoretical contributions, limitations and further research avenues.

Methods

In order to develop a meaningful classification of MSMEs in BOP, a four-stage research design is employed. Stage one encompasses the data collection process, the descriptive analysis of the sample, and measures used for the clustering variables. The units of analysis for this study are MSMEs that operate in BOP markets. An online survey has been administered between August and November 2016 which has recorded responses from a final list of 175 MSMEs. After removing incomplete and low-quality surveys, a final data set of 134 MSMEs has been used for this study. In this study, the selection of clustering variables is guided by the literature and therefore a deductive approach for the selection of the clustering variables is employed (see Table 1) (Brusco et al., 2017). The clustering variables represent key analytical constructs from the literature on inclusion of marginalized actors in local supply chains. These constructs include information-sharing activities, value chain inclusion, and partnerships with business and non-business actors. Moreover, we collected data on the type of BOP model employed and the industry. Each construct was measured using items from the literature which were adjusted as a result of the testing phase. Table 2 summarizes each step undertaken in this study.

Table 1 – Overview of the analytical constructs for supply chain inclusion

Analytical Constructs for Local Supply Chain Inclusion in BOP markets	
1a) Supply chain inclusion:	Behavioural Inclusion
1b) Supply chain inclusion:	Inclusion in Value Creation Activities
2) Global partnerships:	Global MNE
3) Non-business partnerships:	NGOs Community associations Government Knowledge Institutions
4) Additional factors which may influence supply chain inclusion	Industry/themes BOP Models – Consumer versus supplier approach

Stage two entails the selection of clustering algorithms and determining the number of clusters, while stage three explains the tests conducted to assess the internal validity of the obtained cluster solution. Finally, in stage four, we employ post-hoc tests in order to identify statistically significant differences between the clusters, and conduct additional analyses to explore relationships between the clusters and other external variables.

Table 2 – Overview of the research stages

Research Stage	Objectives	Methods
1. Data collection	▪ Describe survey procedure: target respondents, response rate and sample description ▪ Describe measures and	▪ Deductive approach to variables selection ▪ Survey procedure ▪ Expert interviews for survey testing

	questionnaire items for clustering and external variables	▪ Descriptive analysis of the sample (N=134 enterpises) ▪ Sample representativeness ▪ Testing for biases (non-response, single informant, etc)
2. Cluster analysis: Preparation and determining the number of clusters	▪ Preparation: variables standardization and correlation analysis ▪ Clustering algorithms ▪ Choosing the number of clusters	▪ Variables standardization: Z-scores ▪ Clustering algorithms: hierarchical cluster analysis using Ward method ▪ Stopping rules: Calinski and Harabasz index (Pseudo F), Elbow method for the intra-cluster variation ▪ Clustering: K-means clustering with centroids determined by hierarchical cluster analysis with 5000 starts
3. Internal consistency	▪ Evaluate the internal consistency of the clusters	▪ ANOVA and discriminant analysis as multivariate techniques ▪ Cluster-wise stability assessment with bootstrapping (Henning, 2007)
4. External validation: Profiling the clusters	▪ Evaluate differences between clusters based on external variables	▪ One-way ANOVA, Levene‘s test of homogeneity of variance and post-hoc tests ▪ Cross-tabulation and Cramer‘s V strength of association index (Mair et al., 2012) ▪ Discusions with academics

Findings: Three clusters of supply chain inclusion

Our findings reveal three clusters of supply chain inclusion in BOP markets (see brief description of each cluster in Table 3). We cross-tabulate the three clusters with the BOP approach employed in order to explore whether some clusters are more likely to employ a consumer, a producer, or an intermediaries approach. Using Cramér‘s V index as a measure of association, we found significant differences between the clusters in terms of employed BOP approach (Cramér‘s V = 0,323, sig. = 0.000). A more detailed overview is shown in Table 4 and this reveals that Cluster 1 is driven by a consumer approach, Cluster 2 by both a producer and an intermediaries approach, and Cluster 3 by a mix of a consumer and an intermediaries approach. We also tested for differences between the clusters in regard to themes. We found differences in regard to employment (Cramér‘s V = 0,238, sig. = 0.022) and technology (Cramér‘s V = 0,226, sig. = 0.032). This analysis reveals that technology ventures are to be found in Cluster 1 (54%) and employment ventures in Cluster 2 (57%). These two approaches enable the profiling of

the three clusters and serve as an external validation of the solution approach found by the clustering algorithms (Brusco et al., 2017).

Table 3 – Brief description of the three clusters

Cluster	Brief description
Cluster 1 – Direct inclusion and a diverse network of supporting partners	▪ Very high levels of both behavioural and value chain inclusion and a wide and diverse network of non-business partners supporting the inclusion. ▪ Typical offerings include organic fertilizers, briquettes, clean cooking fuel and stoves, solar lamps, heating and rural electrification.
Cluster 2 – Indirect inclusion and a diverse network of partners	▪ Wide network of non-business partners and low levels of behavioural and value chain inclusion. ▪ Many enterprises follow the supplier- or intermediaries-based models, where products and services are either sourced from the BOP producers and commercialized to higher income markets or they are sold to intermediaries (NGOs, governments) and then distributed/sold at very low price to BOP consumers.
Cluster 3 – Direct inclusion and NGO as main supporting partner	▪ Medium levels of behavioural and value chain inclusion and a single type of partner - NGO with various competencies and networks. ▪ Enterprises which offer basic needs services, including nutritious food products, water, waste services and sanitation, last mile healthcare, sanitary pads, sanitation, water treatment systems, electricity, solar pump systems – services and products which traditionally have been in the repertoire of NGOs.

Supply chain inclusion in BOP markets

The three-cluster solution approach highlights two different mechanisms in order to solve core issues of supply chain inclusion of actors from disadvantaged groups: first, the chain of responsibility for the inclusion and second, diversity issues in supply chain partnerships.

First, regarding the chain of responsibility for inclusion, our model suggests that there are two main approaches to supply chain inclusion. We distinguish between direct and indirect inclusion based on the chain of responsibility for the inclusion. Direct inclusion refers to situations in which focal companies directly engage in inclusion activities with BOP and are only supported by local partners for different

activities (Clusters 1 and 3). In the case of indirect inclusion, the focal firms do not engage in inclusion themselves but rather 'outsource' the inclusion to local partners (Cluster 2). The indirect inclusion can take up different forms, whereby MSMEs can distribute products to BOP consumers through local micro-entrepreneurial distribution networks managed by NGOs or can create new markets for agricultural products of smallholder farmers. Both direct and indirect mechanisms of inclusion represent two potential ways to solve the supply chain inclusion in BOP markets, and each entails important implications for both the focal firm and the social impact created in local communities. One interesting aspect highlighted by Cluster 1, which directly engages in inclusion activities, is the idea of 'inclusion as an end or inclusion as a means to an end'. As shown by high values of supply chain inclusion, MSMEs in Cluster 1 tend to be inclusive across all value chain stages rather than being inclusive in a single stage (e.g. distribution). It is very likely that these types of MSMEs perceive BOP inclusion as their main value proposition and the products/services offered are only the means through which inclusion can be materialized. The indirect form of inclusion, where MSMEs, 'outsource' the function of integrating BOP across the supply chain, raises important aspects, namely the attribution of social impact and lack of control over extended supply chain networks. While the fact that some MSMEs create employment and opportunities for the BOP indirectly through partners does not necessarily imply they are not inclusive, the legitimacy of any social impact claims can be questioned.

Second, our findings suggest that supply chains in BOP markets tend to include many non-traditional partners. Moreover, the three-cluster solution approach highlights several tactics that MSMEs employ to address complexities caused by diverse organizational logics and modus operandi. The clusters reveal the issue of maintaining relationships with single or multiple types of organizational logics that can be observed between Clusters 1 and 3. In order to source the local capabilities needed to enable supply chain inclusion, some MSMEs tend to engage extensively with a wide range of partners and address different aspects raised by the nature of informal market characteristics (Cluster 1), while others rely on key NGOs who can handle all the local issues by leveraging on their extensive local network (Cluster 3). The aspect of collaborating with multiple partners is also valid for Cluster 2 where in order to 'outsource' the inclusion, MSMEs still need to collaborate with a variety of partners. Between Clusters 2 and 3, we can see there are two approaches to partnerships – multiple partners who handle specific issues, or a single large partner with diverse competencies (Parmigiani and Rivera-Santos, 2015). Therefore, while the nature of the relationship is different, the diversity in supplier partnerships is still present. The high diversity of partner network can cause complexities for supply chain management. In this sense, Cluster 3 aims to reduce supply chain complexity by decreasing the variety of partners and logics one has to deal with. Firms in BOP markets do sometimes choose only one single large organization as a partner instead of working with multiple partners, since this can be more cost-effective that identifying and developing partnerships with multiple organizations, particularly if there are large NGOs like BRAC or Grameen in Bangladesh who have extensive knowledge of local structures, systems, and even connections in the government (Parmigiani and Rivera-Santos, 2015). While working with multiple partners, MSMEs can leverage on a wider range of resources and capabilities. Yet, dealing with multiple type of partners with different goals, demands, and interests can result in issues of "stakeholder ambiguity" (Matos and Hall, 2007). Furthermore, additional costs may be incurred due to resources and capabilities needed to identify, select, and retain multiple partners for different stages of the supply chain.

Implications for global supply chains

Previously, the literature has suggested that MNCs can tap BOP markets through NGO collaborations. However, based on the results of our cluster analysis and the issues outlined above, we argue that the most effective and efficient way to tap local supply chains is through existing MSMEs (for earlier work advocating this approach, see Seelos and Mair, 2007). Collaboration with MSMEs can create partnerships with synergistic effects for the involved stakeholders and may present fewer challenges for MNCs due to similar logics and governance structures in contrast to collaboration with NGOs. By integrating global competences of MNCs and local expertise of MSMEs, economies of scale and scope can be achieved, and thereby social impact created in BOP settings. Following this narrative, the cluster analysis findings suggest two main scenarios for local-global supply chain symbiosis enabled by MSMEs, as shown by Figure 1. While the two scenarios can result in important benefits for MNEs, there are also challenges to be overcome. The challenges can result in trade-offs for social impact created in BOP communities. Scenario one, where MNEs integrate into their global supply chains local MSMEs which directly engage BOP actors can result in valuable synergies by combining competencies of MNEs and local embeddedness of these supply chains. MNEs can leverage the relationships already developed by MSMEs and build on the local structures. In this manner, MNEs can create and promote inclusive global value chains by upgrading economically, socially, and environmentally lower-level firms in the supply chains (Gereffi and Lee, 2012). Scenario two, where MNEs partner with MSMEs which indirectly engage BOP actors, can also present significant social impact opportunities. Yet, as the chain of intermediation becomes longer, issues of direct control and accountability can present challenges for social impact (Parmigiani et al., 2011).

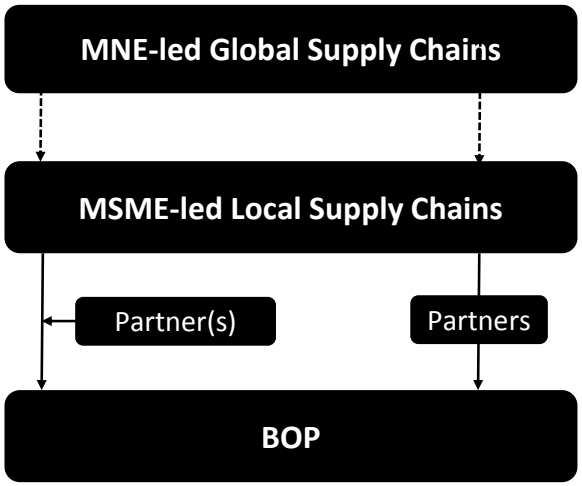

Figure 1 – MSMEs as connectors of global and local supply chains

Conclusion

This study aims to answer the following research question: Which mechanisms of supply chain inclusion are employed in practice by MSMEs, and how can these mechanisms influence social value creation in MNE-led global supply chains? Our empirical results and literature investigation suggest that MSMEs engage in either direct or indirect inclusion. Our proposed distinction confirms and extends current studies which argue that collaboration with cross-sector partners can be sufficient to bring

products and services to BOP markets (Nahi, 2016; Hahn and Gold, 2014). Our perspective of local supply chain inclusion in MSMEs extends the proposed classification of agency- and corporate-driven supply chains of MNEs by Parmigiani and Rivera-Santos (2015) by unraveling how inclusion of marginalized actors can materialize in local supply chains. The study points out valuable mechanisms which MSMEs with limited resources and diverse supply chain partners employ in order to effectively manage their supply chains. Our findings suggest that MSMEs need to make important decisions with essential implications for supply chain management to include marginalized actors: direct or indirect inclusion mechanisms and tactics for handling complexity in diverse partnership networks. Furthermore, we propose that MSMEs can serve as brokers between local BOP markets and global MNCs. In this sense, we extend the perspective of Sodhi and Tang (2011), who propose that small enterprises can support local supply chains in BOP markets, by suggesting that MNEs can further strengthen local MSMEs and supply chains by tapping into BOP markets through these MSMEs, thereby connecting global and local supply chains.

The empirical findings provide implications and research impulses for the debate on the necessity, the feasibility, and the antecedents of the supply chain inclusion of marginalized actors in BOP markets. Our empirical findings confirm the distinction between the single versus the multiple activities type of inclusion suggested by the literature (Nahi, 2016). In particular, studies adopting the perspective of global supply chains often focus on inclusion in particular activities, e.g. distribution, sourcing (see Gold et al., 2013; Hall and Matos, 2010). Our findings suggest that some (but not all) MSMEs tend to include BOP at all stages of their operations, and are thus truly inclusive. This may mean that for MNEs, supply chain inclusion is 'a means to an end', while for some MSMEs, it is 'the end'. From the perspective of MNEs, close partnerships with this type of MSMEs for whom inclusivity is 'the end', would enable synergistic combinations of interests and resources. Supply chain inclusion of marginalized actors requires significant time and resource investments but can have implications for the social impact created, and deep inclusion efforts are required to enhance capabilities of disadvantaged actors (Nahi, 2016). Therefore, a potential driver of supply chain inclusion in BOP markets may be the social orientation of the MSMEs or deep top management commitment and support for sustainability goals within MNEs. While it would be interesting to distinguish between MSMEs as 'social enterprises' versus traditional for-profits in order to investigate the inclusion mechanisms, empirically and based on the authors' experience with data collection in BOP context, one cannot easily make a clear distinction, mainly because practitioners use a large array of terms with vague definitions to denote organizations in BOP markets.

Our findings confirm literature insights that the supply chain inclusion of marginalized actors requires a collaborative mindset: regardless of the inclusion mechanism employed, the enterprises in our sample seem to collaborate closely with both business and non-business partners and develop wide and diverse stakeholder networks (Yunus et al., 2010). This seems plausible, given previous insights suggesting that there are severe power and knowledge asymmetries between marginalized actors and supply chain members, distrust towards MNEs, and a lack of understanding of local technical and business knowledge (Hall and Matos, 2010). As Rivera-Santos and Rufin (2010) argue, inclusive supply chains tend to be very diverse. Our findings reveal that in contrast to traditional supply chains, where the focus is on physical flows and economic concerns (Bals and Tate, 2017), in the BOP context, managing diverse logics and modus operandi in inclusive supply chains is a key aspect. Moreover, traditional supply

chains tend to be also inclusive in terms of various suppliers (of different sizes and from different industries); BOP supply chains tend to include non-business partners.

This study also entails several limitations that open up avenues for further research. First, all data for clustering variables and external variables have been collected through one survey. This methodological limitation may present biases in the data collection processes. Building the interpretation of the clusters based on insights from the literature as well as discussing the implications for global supply chains based on the literature, we have tried to account for limitations inherent to the data set. Second, it is important to explore how different structures of global and local value chain configurations influence social impact creation and to what extent governance models (e.g. social enterprises, traditional for-profits) impact inclusion in supply chains and social impact creation. Further research should investigate whether there are differences between the levels of inclusiveness and the relationship between social impact and other types of sustainable impact, i.e. economic and environmental.

The inclusion of marginalized actors in supply chains can open up new avenues for research in emerging and developing economies with a focus on social innovation, responsibility, and shared-value creation between stakeholders (Lee and Tang, 2017), but can also set new industry trends and norms in managerial practice.

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