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ORIGINAL PAPER

Analyzing Base-of-the-Pyramid Research from a (Sustainable) Supply Chain Perspective

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Abstract Research on the base-of-the-pyramid (BoP) approach and the associated business case for deprived participants in informal markets now appears frequently in a range of business ethics and management-related journals. The present analysis of how supply chain management (SCM) and sustainable supply chain management (SSCM) concepts are habitually used in base-of-the-pyramid research serves to strengthen the theoretical foundation of BoP research by addressing the related business case. Based on a content analysis of BoP papers published in English-speaking peer-reviewed journals between 2000 and 2014 from the Web of Science database, this literature review comprehends existing research in the context of established SCM and SSCM frameworks, using both frequency and contingency analyses. The frequency analysis indicates that supply chain management and sustainable supply chain management [(S)SCM] constructs regularly discussed in the BoP literature include supplier integration, strategic purchasing, decommoditization, long-term relationship and enhanced communication among supply chain actors. The identified contingencies reflect linkages between BoP research and (S)SCM constructs. The highest number of links was found between the SCM constructs of strategic purchasing and long-term relationship and the SSCM constructs of supplier integration and communication and coordination with suppliers. These can be regarded as the most crucial (S)SCM constructs in the BoP business environment. This analysis facilitates the development of future research propositions at this intersection, including the use of tools from (S)SCM theories to evaluate BoP propositions and projects. Granted the limited range of BoP-related papers analyzed, the findings provide a coherent understanding of (S)SCM practices crucial to the functioning of BoP markets and why they matter, so contributing to the related ethical rationale. These findings will be of use to researchers and practitioners alike for the formulation of business development strategies and their subsequent implementation in informal market economies.

Keywords Supply chain management · Sustainability · Base of the pyramid · Content analysis · Supplier integration · Developing economies

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Introduction

In many communities worldwide, pressing development challenges demand innovative propositions to kick-start processes for reaching social and economic targets. Informed by an ethical rationale (Hahn 2009; Calton et al. 2013), the business cases are acknowledged as primary tools for changing many people's economic destiny through an array of development opportunities that can help them to escape the vicious cycle of poverty (McMullen 2011; Sánchez and Ricart 2010). The term *base of the pyramid* (e.g., Prahalad 2006) refers to entrepreneurial activity in low-

income environments. The BoP debate calls for the formal corporate sector of the developed countries to initiate business activities in the informal markets of developing economies. It also highlights the crucial role that small-scale local entrepreneurs in informal markets can play in the economic development of their impoverished communities (Calton et al. 2013; London and Hart 2004). However, the BoP research stream is "still in a pre-paradigmatic state of development as an academic field" and needs sounder theoretical foundations on which to build, along with reliable tools for evaluating development strategies and business plans (Ansari et al. 2012, p. 836).

In this regard, recent research has explored the integration of unprivileged supply chain actors into productive activities (Reficco and Marquez 2012; Schrader et al. 2012), highlighting the role of (S)SCM in enriching the BoP approach and the related ethical research discourse (Gold et al. 2013; Esko et al. 2013). Issues like supply chain partner development, collaboration, stakeholder management, creating win–win scenarios, technological and logistical integration, innovation and learning, which are core constructs in theories of SCM (e.g., Chen and Paulraj 2004; Vachon and Klassen 2006) and SSCM (Beske and Seuring 2014; Pagell and Wu 2009; Seuring and Müller 2008; Yawar and Seuring 2015), also constitute the essence of the BoP debate (Prahalad 2012; Silvestre and e Silva Neto 2014; Vachani and Smith 2008). A recent analysis by Khalid et al. (2015) provided some first insights into the relevance of these topics for BoP-based research.

As a more mature research stream, (S)SCM has much to offer in the development of BoP research, but to date, the interface of these two streams has attracted little research interest (Gold et al. 2013). A brief description of some key findings at this intersection will help to illustrate this and to explain the research gap. Gold et al. (2013) have discussed how SSCM can complement the triple bottom line goals of multinational organizations. While that study sought to incorporate sustainability concepts in BoP research by focusing on SSCM, Sodhi and Tang (2011) and Sodhi and Tang (2014) employed a more traditional SCM perspective to examine supply chain issues in emerging economies. Sodhi and Tang (2011) identified attributes that enable social enterprises to operate successfully and help micro-entrepreneurs to sustain their supply chain operations, and Sodhi and Tang (2014) argued that current supply chain models cannot satisfy the operational needs of emerging economies. Matos and Silvestre (2013) adopted a more stakeholder-oriented perspective, describing SSCM strategies that can help organizations to connect better and "overcome challenges of conflicting interests when considering sustainability in their business models" against the backdrop of BoP. From these examples, it becomes clear that researchers attempting to inculcate SCM or SSCM in BoP research have tended to work with only one approach at a time; to our knowledge, no notable contribution has employed a cumulative (S)SCM approach to advance the BoP agenda.

The aim of the present paper is to enrich the theoretical basis of BoP research by analyzing the use of established (S)SCM concepts in BoP-related publications. To this end, the paper reports the findings of a literature review of 77 BoP papers from the Web of Science database, selected for their coverage of (S)SCM-related issues. The papers were coded in terms of the (S)SCM constructs developed by Chen and Paulraj (2004), Seuring and Müller (2008), Pagell and Wu (2009) and Carter and Rogers (2008) to establish how (S)SCM concepts relate to the current BoP debate and to deepen the analysis of BoP projects while broadening the (application) scope of (S)SCM.

The structure of the paper is as follows. The next section introduces the reader to the basic terminology used here. Section three elaborates the research methodology employed to conduct the literature review. The fourth section presents the results of the literature review, broadly categorized into frequency-related and contingency-related findings. Section five includes limitations of the study, along with a comprehensive discussion, with brief conclusions in the final section.

Basic Terminology and Conceptual Framing

The term *bottom/base of the pyramid* (BoP) was popularized by Prahalad's seminal work *The Fortune at the Bottom of the Pyramid* (2006). In the management literature, the term is used to refer to approximately four billion people who live on $9.05 per day or less, which includes a subset of approximately 2.6 billion people living on $2.00 per day or less (Arnold and Valentin 2013). While the precise income figure used to specify BoP depends on the researcher's definition of poverty, country-specific living conditions and other relevant factors, BoP refers more generally to those individuals excluded from "the current system of global capitalism" (Arnold and Williams 2012, p. 44). This group comprises the bottom tier of the world income pyramid and is mainly but not solely composed of citizens of so-called *developing* countries who are dependent on an informal market economy to fulfill their daily needs. Informal markets in these developing countries are characterized by an inefficient market mechanism, mainly as a consequence of a malfunctioning or absent institutional and communication infrastructure to support smooth market functioning (Schuster and Holtbrügge 2012).

In BoP research, a vibrant and efficient market mechanism and the resources of private enterprises are considered key in addressing the challenge of poverty (Hahn 2009). As

recent BoP research has focused more on the decisive role of small-scale local entrepreneurs in the development process, the BoP literature has advocated development of the capabilities of local entrepreneurs and their BoP business case rather than the intervention of multinational corporations (MNCs) in the BoP (London et al. 2010; Karnani 2007). The BoP literature therefore views progressive business practices like joint innovation and joint development as highly relevant for the co-creation of mutual value for all stakeholders in the unique business environment that is BoP (Ray and Ray 2010; Murphy et al. 2012).

Moving toward a supply chain perspective, Chen and Paulraj (2004, p. 119) acknowledged that "rising international cooperation, vertical disintegration, along with a focus on core activities have led to the notion that firms are links in a networked supply chain." In their recent article, Carter et al. (2015) conceptualized a supply chain as "…a distinct (relative to a particular product and a focal agent), bounded (by the visible horizon, which is subject to attenuation), and thus parsimonious unit of analysis." SCM contrives to manage all the business-related activities of supply chain actors, conceptualized as a network of interlinked firms, to smooth the flow of products and services along the chain. It is important to note that the subject of supply chains and their efficient management as nurtured in so-called *developed* countries predominantly addresses the issues of the corporate sector operating in formal markets (for a country level study, see Morali and Searcy 2013). As a result of the intense competition in the traditional formal markets of developed countries, contemporary supply chains have become global, driving many firms to source from relatively cheap and informal market economies.

SSCM broadens the scope of SCM by incorporating the notion of the triple bottom line into mainstream SCM theory. Building on earlier work by Seuring and Müller (2008) and Pagell and Wu (2009), SSCM has more recently been defined by Pagell and Shevchenko (2014) as "…the designing, organizing, coordinating and controlling of supply chains to become truly sustainable with the minimum expectation of a truly sustainable supply chain being to maintain economic viability, while doing no harm to social or environmental systems." Like its antecedent, the SSCM literature tends to focus more on formal market economies, so overlooking the challenges that modern enterprises must face in the informal market economies of developing countries (Gold et al. 2013).

The (S)SCM frameworks developed by Chen and Paulraj (2004), Seuring and Müller (2008), Pagell and Wu (2009) and Carter and Rogers (2008) were selected here for the purposes of theoretical framing, for a number of reasons. First, the four papers are well known and widely cited within this research community, lending validity to the constructs used and findings of this paper. Second, in their comprehensive approach to construct identification and development, the four papers have sought to consolidate the dispersed (S)SCM knowledge base, so extending comprehension of these topics. Third, in their treatment of such business-enabling constructs as communication, long-term relationship development, decommoditization, stakeholder engagement and joint innovation, the four frameworks align well with BoP advocacy of market opportunity exploration in appreciating the potential for business development. We acknowledge that any such selection of sources is likely to have inherent and insuperable limitations and that the selection of other frameworks might yield different results.

Tables 1, 2, 3 and 4 summarize the core constructs from the four selected papers, accompanied by a brief description of each construct for ease of comprehension. Additional references are provided for each construct, linking them to the wider BoP literature. The evident overlap among individual items confirms the close relationship between SCM and SSCM. The results of the frequency analysis are also indicated, so avoiding repetitive explanation; however, we will discuss them further in "Frequency analysis" section.

While there is some overlap among these constructs, this is not decisive for the methodology applied here. More importantly, these constructs encompass a wide range of topics that are central to (S)SCM, and as the aim is to evaluate their use in BoP-related research, this comprehensiveness should prove advantageous in providing detailed insights.

Research Methodology

As the core methodology of this paper, a literature review can be defined as "a systematic, explicit and reproducible design for identifying, evaluating and interpreting the existing body of recorded documents" (Fink 2014). The present review followed the process proposed by Hart (2001). It should also be mentioned that a set of SSCM constructs advanced by Beske and Seuring (2014) was used in a related paper to analyze the same body of the literature (Khalid et al. 2015). The present analysis is wider, not least because it also takes account of constructs from *traditional* SCM (Chen and Paulraj 2004). The complementarity of these approaches will be further discussed in "Discussion" section.

In line with Seuring and Gold (2012), the present study is delimited by the following boundaries. BoP papers were collected using the Web of Science database and search engine (http://www.webofscience.com). The two key phrases *base of the pyramid* and *bottom of the pyramid*

Table 1 Supply chain management constructs (based on Chen and Paulraj 2004)

Construct	Description	Examples in BoP literature	Frequency
Antecedents			
Environmental uncertainty	Supply chain uncertainties arising from inconsistencies in supply and demand and technological unpredictability	Arora and Romijn (2012), Webb et al. (2010)	6 (7.8%)
Customer focus	Central to contemporary business strategy, reflecting the importance of customers in the formulation and execution of supply chain strategy	Rammal et al. (2014), Chelekis and Mudambi (2010)	19 (24.7%)
Top management support	The resources committed by business executives in formulating supply chain decisions on strategic purchasing, relationship development with supply chain partners and adoption of information technology	Akula (2008)	10 (13%)
Supply strategy			
Competitive priorities	Company preference to compete on the basis of cost, quality, speed, dependability or flexibility	White (1996)	0
Strategic purchasing	Proactive and long-term focus in making purchasing decisions that will drive the firm's success	Kistruck et al. (2013), Arnould and Mohr (2005)	12 (15.6%)
Supply chain integration			
Information technology	Presence and mode of electronic transactions and communication for the efficient flow of information among supply chain actors	Berger and Nakata (2013), Gino and Staats (2012)	9 (11.7%)
Logistics integration	The backbone of the modern supply chain, providing the necessary infrastructure to successfully meet market demands through seamless logistics integration based on regular lines of communication for exchanging information about the three cornerstones of logistics: warehouses, inventory and transportation between buyer and seller	Vachon and Klassen (2006), Chen and Paulraj (2004 for SCM), Vachani and Smith (2008), Viswanathan et al. (2009)	8 (10.4%)
Supply network structure	An intermediate form of market governance mechanism, involving inter-firm relations and informal social systems linked through a network	Karamchandani et al. (2011), Parthasarathy (2010)	46 (59.7%)
Buyer–supplier relationships			
Supplier base reduction	Indices measuring the "reduced number of suppliers, contractual agreements and supplier retention policies utilized by buying firm" (Chen and Paulraj 2004, p. 125).	Lim et al. (2013), Gold et al. (2013)	2 (2.6%)
Long-term relationships	Strategically managed trustworthy long-term relationships with key suppliers in particular and other supply chain actors in general, impacting positively on firm performance	Galariotis et al. (2011), Hill (2010)	56 (72.7%)
Communication	The efficient exchange of information and interaction among supply chain actors	Nakata and Weidner (2012), Ray and Kanta Ray (2011)	45 (58.4%)
Cross-functional teams	Organizing cross-functional and (in certain cases) supplier-involved teams to oversee such strategic operations as product design, strategic purchasing and supplier selection	Ramachandran et al. (2012)	2 (2.6%)
Supplier involvement	The extent of involvement of suppliers in the product development phase	Hall et al. (2014), Schrader et al. (2012)	19 (24.7%)
Supply chain performance			
Supplier performance	The performance of suppliers as measured by their compliance with performance frontier criteria defined by the buying firm	Agnihotri (2013), Reficco and Marquez (2012)	6 (7.8%)
Buyer performance	Buying firm performance as measured by operational and financial performance indicators		0

Table 2 Sustainable supply chain management constructs (based on Seuring and Müller 2008)

Construct	Description	Examples in BoP literature	Frequency
Sustainability antecedents			
Pressure from governance	The first of three triggers of sustainability, referring to pressure from regulatory authorities to make supply chains more sustainable	Schrader et al. (2012)	1 (1.3%)
Pressure from customers	Second trigger of sustainability, referring to pressure from customer groups requiring firms to be more sustainable in their business operations	London and Hart (2004)	1 (1.3%)
Pressure from stakeholders	Third trigger of sustainability, representing a wider pressure group that includes all stakeholders directly or indirectly affected by the relevant business activities	Hudnut and DeTienne (2010), Perez-Aleman and Sandilands (2008)	7 (9.1%)
Sustainability dimensions			
Economic risk management	Strategies and practices adopted by a firm to manage the economic risks associated with its business operations in a given market	Akula (2008), Kistruck et al. (2011)	18 (23.4%)
Social risk management	Compliance of the focal firm and its suppliers with certain social standards (e.g., SA 8000)	Hall et al. (2012), Mena et al. (2010)	7 (9.1%)
Environmental risk management	Focal firm activities and efforts to make its suppliers—and, in the process, itself—greener, normally indicated by extent of compliance of supply chain actors with environmental standards (e.g., ISO 14001)	Seelos and Mair (2007)	5 (6.5%)
Performance			
Win–win	The ultimate aim of a sustainable supply chain management strategy, in which all stakeholders, including the environment and society, can benefit from sustainable supply chain activities	Berger and Nakata (2013), Van den Waeyenberg and Hens (2012)	45 (58.4%)
Trade-off	Compromising on the three sustainability objectives (economic, environmental and social) in order to achieve good economic performance as defined by operational objectives such as cost, quality, speed, dependability and flexibility	Olsen and Boxenbaum (2009)	1 (1.3%)
Minimum criteria	The basic environmental and social standards or compliance criteria set by the focal firm for its suppliers to be regarded as order qualifiers	Ahlstorm (2010)	1 (1.3%)
Supplier evaluation			
Importance of supplier selection	The significance for the focal firm's business strategy of selecting a reduced number of optimal suppliers	Gold et al. (2013), Lim et al. (2013)	5 (6.5%)
Supplier self-evaluation	The requirement that suppliers must explicitly declare their compliance with social and environmental standards		0
Auditing and monitoring suppliers	Monitoring of suppliers by the focal firm for compliance with social and environmental standards in support of sustainable supply chain management	Kistruck et al. (2013), Morali and Searcy (2013)	4 (5.2%)
Implementation of environmental standards	Focal firm demand for implementation of environmental standards by suppliers, mainly in response to customer pressure	Gold et al. (2013)	4 (5.2%)
Implementation of social standards	Focal firm demand for implementation of social standards by suppliers, mainly to satisfy customers	Mena et al. (2010)	4 (5.2%)
Supplier integration	Communication and coordination with suppliers to integrate them seamlessly into focal firm activities for more efficient achievement of sustainability objectives	Halme et al. (2012), Ramachandran et al. (2012)	25 (32.5%)
Supply chain management			
Communication and coordination with suppliers	Enhanced communication and active coordination with suppliers as a prerequisite for supplier integration and sustainable supply chain management	Ramani et al. (2012), Berger et al. (2011)	32 (41.6%)
Total life cycle	Product life cycle (or overall supply chain) perspective with particular focus on reverse logistics and remanufacturing issues	Hart and Dowell (2011), Hart (2005)	6 (7.8%)
Cost and profit sharing	Business models based on cost and profit sharing to develop the performance and standards compliance capabilities of disadvantaged supply chain actors	Ramachandran et al. (2012)	2 (2.6%)

Table 2 continued

Construct	Description	Examples in BoP literature	Frequency
Joint innovation	Aggressive involvement of suppliers in focal firm innovation activities as a consequence of active supplier integration in a sustainable supply chain	Bardy et al. (2012), Chatterjee (2014)	55 (71.4%)
Third-party involvement			
For auditing and monitoring	Involvement of third parties like NGOs in supplier auditing and monitoring activities, which is sometimes more useful than focal firm involvement or dependence on supplier information about compliance with environmental and social standards	Gold et al. (2013), Perez-Aleman and Sandilands (2008)	5 (6.5%)
As enabler/consultant	Involvement of stakeholders like NGOs, government agencies and educational/research institutes in implementation and compliance with environmental and social standards and developing performance-related capabilities of disadvantaged supply chain actors	Kaplinsky (2011), Rivera-Santos and Rufín (2010)	32 (41.6%)

were used to select papers, as these are used interchangeably in the BoP literature. The search was conducted in the research domains of business and economics, social sciences and other topics and operations research and management sciences and was confined to papers published in English-speaking peer-reviewed journals during the period 2000–2014. The search was independently carried out by a second researcher and then double-checked. Decision on including a paper into the sample or excluding it was discussed among the two researchers. This initial search yielded a total of 212 papers. After eliminating duplicates (step 1 of the literature review process), that number was reduced to 136 articles of potential relevance. A subsequent process of reading, analyzing and discriminating (step 2 of the literature review process) further reduced the final number of papers to 77. In that second step (and in line with the study objectives), only those papers mentioning one or more (S)SCM constructs derived from Chen and Paulraj (2004), Seuring and Müller (2008), Pagell and Wu (2009) and Carter and Rogers (2008) were selected. Those addressing such issues as factors affecting purchasing decisions of BoP customers and the impact of institutions on BoP consumers were excluded as irrelevant to the aims of the study. Following this content screening, each of the 77 BoP papers was coded against (S)SCM constructs; only those papers mentioning a particular construct specifically in the context of the BoP business environment are coded against that construct.

The involvement of multiple researchers (in this case three) in coding a subset of five papers helped to ensure the validity and reliability of the overall process. However, beyond this pilot phase coding, the rest of the selected papers were coded by a single researcher, who requested help only in ambiguous cases. To ensure construct validity, papers were coded with the original description in mind; coding also followed the original interpretations of constructs.

Following completion of the coding phase, the frequencies of individual constructs were calculated—that is, the number of occurrences of a particular construct as compared to the base sample. For a thorough understanding of the subject matter, pair relationships among constructs were explored using contingency analysis, where contingency indicates that two constructs are interrelated without specifying causality, leaving this open to theoretical interpretation. To ensure more reliable results, only contingencies among constructs with frequencies of at least 10% of the base sample are considered here. Based on the contingency findings (Tables 5, 6, 7, 8), SCM-focused and SSCM-focused models were developed (see Figs. 6, 7).

Results and Findings

The BoP concept has evolved rapidly in recent years (Kolk et al. 2014). Close analysis of the yearly distribution of the selected articles indicates that the BoP research stream increased from 2010 onwards (see Fig. 1). The spike in the number of BoP articles published in the years 2010 and 2012 is accounted for by two special issues of the *Journal of Business Research* (JBR) addressing sustainability-related aspects of BoP.

The journal-specific distribution of BoP papers in Appendix 1 reveals that although BoP scholars have published work across multiple business and management journals, certain periodicals stand out in this extensive list. Specifically, the Journal of Business Research (JBR) is the leading publication, followed by the Journal of Business Ethics (JBE). We turn next to the detailed results of the construct-driven literature review.

Table 3 Sustainable supply chain management constructs (based on Carter and Rogers 2008)

Construct	Description	Examples in BoP literature	Frequency
Strategy			
Sustainability	Strategically driven pursuit of activities that will impact positively not only on its "natural environment and society but which also result in long-term economic benefits and competitive advantage for the firm"	Varadarajan (2014), Arnold and Williams (2012)	23 (29.8%)
Organizational culture			
Deeply ingrained	Organization-wide long-range vision generating an internal drive to change the corporate culture and mindset to align with the organization's triple bottom line strategy	Ray and Ray (2010), Hudnut and DeTienne (2010)	16 (20.7%)
Organizational citizenship	An "organizational culture which considers the welfare of others and which is fair and supportive" in the effort to align its economic interests with the greater interests of society	Akula (2008), Ansari et al. (2012), Hall et al. (2012), Mena et al. (2010)	37 (48%)
Values and ethics	An organizational culture based on "core values and cultures and a sense of purpose beyond the economic bottom line"	Olsen and Boxenbaum (2009), Schrader et al. (2012)	26 (33.7%)
Transparency			
Stakeholder engagement	To avoid any gray areas in the sustainable business operations, "transparency includes not only reporting to stakeholders, but actively engaging stakeholders and using their feedback and input to both secure buy-in and improve supply chain processes"	McMullen (2011), Vachani and Smith (2008)	45 (58.4%)
Supplier operations	Coordination with suppliers to increase the transparency of the purchasing process and supplier sustainability while lowering transaction costs (e.g., performing sustainability audits of supply chain operations)	Sánchez and Ricart (2010), Schrader et al. 2012)	24 (31.1%)
Risk management			
Contingency planning	"Supply chain risk management can occur through contingency planning….", embracing the concept of security in supply chain operations to identify "plan B" to manage any anticipated future risks	London et al. (2010)	25 (32.4%)
Supply disruptions	Building resilient supply chains to avoid supply chain risks arising from natural disasters, poor supplier quality, shipment quantity inaccuracies, legal liabilities and poor environmental and social performance that might result in costly legal actions	Karamchandani et al. (2011), London and Hart (2004)	15 (19.4%)
Outbound supply chains	Coordinating with different stakeholders to build more agile supply chains in order to avoid risks arising from poor demand forecasting and failure to coordinate demand requirements across the supply chain	Schuster and Holtbrügge (2012), Vachani and Smith (2008), Kistruck et al. (2011)	12 (15.5%)

Frequency Analysis

The first step of the analysis was to assess the frequencies of single constructs and items. As explained above, the selected BoP papers have been coded accordingly, enabling identification of the core constructs referred to in this body of literature.

Supply Chain Management Constructs

As noted earlier, BoP papers were coded against the SCM constructs developed by Chen and Paulraj (2004). Figure 2 indicates that these papers regularly refer to certain SCM constructs considered essential in addressing the unique business challenges of informal markets. These include top management support (Sinkovics et al. 2014; Seelos and Mair 2007; Sánchez and Ricart 2010); information technology (Weidner et al. 2010; Parthasarathy 2010); strategic purchasing (Hudnut and DeTienne 2010; Gino and Staats 2012); customer focus (Viswanathan et al. 2009, 2012); supply network structure (Parthasarathy 2010; Reficco and Marquez 2012); communication (Kistruck et al. 2013; Hudnut and DeTienne 2010); long-term relationship development (Sesan et al. 2013; Schuster and Holtbrügge 2014); logistics integration (Vachani and Smith 2008) and supplier involvement in new product development (Agnihotri 2013; Arnould and Mohr 2005). This confirms the relevance of Chen and Paulraj's (2004) arguments in advancing the BoP agenda.

An emphasis on building long-term relationships with supply chain partners is regarded as one of the most striking characteristics of the BoP business environment

Table 4 Sustainable supply chain management constructs (based on Pagell and Wu 2009)

Construct	Description	Examples in BoP literature	Frequency
Design/innovation capability			
Business process	Signifying organizational capabilities to go beyond lean and total quality management practices and to develop innovative business models that can integrate "economic and non-economic elements of sustainability"	Seelos and Mair (2007), Van den Waeyenberg and Hens (2012)	57 (74%)
Product	Pioneering product design changes leading to products that are safer for the environment and users, which remains the hallmark of sustainable organizations targeting niche markets	(Sesan et al. 2013)	48 (62.3%)
Managerial orientation toward sustainability			
Guiding value	The "guardrail" that "was tightly tied to the business model, protected the brand and was used to guide decision making"	Viswanathan et al. (2009)	20 (26%)
Alignment of economic, social and environmental goals	Proactive top management working toward formulation of business strategies in which environmental and/or social goals and activities can complement economic activities of the firm (and vice versa)	Webb et al. (2010), Weidner et al. (2010)	29 (37.6%)
Proactive and commitment	Prerequisite for sustainability-led formulation of strategic goals and operational activities	Varadarajan (2014), Perez-Aleman and Sandilands (2008)	47 (61%)
Supply chain reconceptualization			
Who is who in supply chain	Rethinking who is in the supply chain before allocating specific roles and responsibilities to supply chain members	Pervez et al. (2013)	45 (58.4%)
Collaboration with non-traditional members	Searching for and actively coordinating a wide spectrum of non-traditional supply chain actors as a prerequisite for making supply chain operations sustainable	Reficco and Marquez (2012), Rivera-Santos and Rufín (2010)	66 (85.7%)
Supply base continuity			
Transparency	"Transparency provides insight into what is happening in the chain and enables improvements… transparency also has a strong element of social responsibility because it ensures that no one in the chain is being abused."	Rivera-Santos et al. (2012)	14 (18.1%)
Traceability	A novel form of information sharing to reduce the risk triggered by suppliers knowingly or inadvertently using material and/or processes that could harm people and/or the environment	Schrader et al. (2012)	6 (7.7%)
Supplier certification	Safeguarding purchasing activities against potential economic, social or environmental risks through supplier certification in respect of social and environmental issues	Gold et al. (2013)	5 (6.5%)
Decommoditization	Practices for moving suppliers from commodity status to strategic partner status	Hall et al. (2012), Kaplinsky (2011)	31 (40%)
Traditional supply chain practices			
Investment in human capital	To make supply chains more socially sustainable	Bardy et al. (2012), Berger et al. (2011)	32 (41.6%)
Closed-loop supply chains	Using reverse logistics or closed-loop supply chains to reduce the environmental impact of supply chain operations	Vachani and Smith (2008)	4 (5.2%)
Economic viability/profitable supply chain			
Economic viability/ profitable supply chain	Achieving economic viability of supply chain/business operations without compromising sustainability objectives	Berger et al. (2011)	58 (75.3%)
Rewards and incentives for sustainable outcomes			
Rewards and incentives for sustainable outcomes	Intrinsic or extrinsic compensation offered to employees of an organization "for pursuing environmental and/or social improvements"	Galariotis et al. (2011), Gino and Staats (2012)	8 (10.4%)

(Viswanathan et al. 2012), and the frequencies count confirms this, as long-term relationships are mentioned in 56 of the 77 papers (72.7%). Establishing such relationships with BoP communities is imperative for social embeddedness and ultimately helps in developing co-inventing capabilities (Sinkovics et al. 2014; Ramani and Mukherjee 2014). Long-term relationships among supply chain actors depend on frequent and efficient communication and level of trust

Table 5 Contingency results among SCM constructs

Contingent variables		Phi coefficient	Approximate significance	Exact significance (1-sided)	Observed frequency	Expected frequency
Constructs from Chen and Paulraj (2004)						
Customer focus	Information technology	0.354	0.002	0.006	7.79	2.86
Strategic purchasing	Communication	0.362	0.001	0.001	15.58	9.09
Strategic purchasing	Supplier involvement in new product development	0.335	0.003	0.007	9.09	3.90
Strategic purchasing	Logistics integration	0.44	0	0.002	6.49	1.56
Supply network structure	Long-term relationship	0.449	0	0	53.25	43.51
Long-term relationship	Communication	0.608	0	0	55.84	42.47

Table 6 Contingency results among SSCM constructs (in individual SSCM papers)

Contingent variables		Phi coefficient	Approximate significance	Exact significance (1-sided)	Observed frequency	Expected frequency
Constructs from Seuring and Müller (2008)						
Supplier integration	Communication and coordination with suppliers	0.71	0	0	29.87	13.51
Supplier integration	Joint innovation	0.316	0.006	0.004	29.87	23.25
Constructs from Pagell and Wu (2009)						
Guiding value	Proactive and commitment	0.352	0.002	0.001	23.38	15.84
Proactive and commitment	Who is who in SC	0.353	0.002	0.002	44.16	35.71
Proactive and commitment	Economic viability/profitable SC	0.346	0.002	0.003	53.25	45.97
Who is who in SC	Decommoditization	0.424	0	0	33.77	23.51
Who is who in SC	Investment in human capital	0.39	0.001	0.001	33.77	24.29
Who is who in SC	Economic viability/profitable SC	0.434	0	0	53.25	44.03
Transparency	Decommoditization	0.437	0	0	15.58	7.27
Decommoditization	Investment in human capital	0.382	0.001	0.001	25.97	16.75
Decommoditization	Economic viability/profitable SC	0.408	0	0	38.96	30.39
Constructs from Carter and Rogers (2008)						
Sustainability as part of an integrated strategy	Values and ethics	0.314	0.006	0.007	16.88	10.13
Deeply ingrained	Organizational citizenship	0.34	0.003	0.003	16.88	10.00
Deeply ingrained	Values and ethics	0.447	0	0	15.58	7.01
Supplier operations	Contingency planning	0.491	0	0	20.78	10.13

(Gold et al. 2013). Additionally, 58.4% of the selected papers argued for wider communication across supply chain actors (that is, beyond suppliers). In a socially interactive BoP business environment, "consumers and sellers share information about products and services through face-to-face communication" (Weidner et al. 2010, p. 561), and less than optimal communication beyond the buyer seller dyad is seen to be a significant obstacle to realizing business potential in a BoP context (Karnani 2007).

Because BoP communities are bonded by strong social ties, long-term relationships and active communications serve to develop the focal firm's social capital (Reficco and Marquez 2012), contributing to the establishment of

Table 7 Contingency results among SSCM constructs (among three SSCM papers)

Contingent variables		Phi coefficient	Approximate significance	Exact significance (1-sided)	Observed frequency	Expected frequency
Constructs from Seuring and Müller (2008) and Pagell and Wu (2009)						
Win–win	Proactive and commitment	0.407	0	0	45.45	35.71
Win–win	Who is who in supply chain	0.305	0.007	0.007	41.56	34.16
Supplier integration	Product innovation	0.31	0.007	0.006	27.27	20.26
Supplier integration	Who is who in supply chain	0.303	0.008	0.007	25.97	18.96
Supplier integration	Decommoditization	0.562	0	0	25.97	13.12
Supplier integration	Investment in human capital	0.485	0	0	24.68	13.51
Supplier integration	Economic viability/ profitable SC	0.333	0.004	0.002	31.17	24.42
Communication and coordination with suppliers	Transparency	0.354	0.002	0.002	14.29	7.53
Communication and coordination with suppliers	Decommoditization	0.597	0	0	31.17	16.75
Communication and coordination with suppliers	Investment in human capital	0.305	0.007	0.007	24.68	17.27
Joint innovation	Product innovation	0.458	0	0	54.55	44.55
Constructs from Seuring and Müller (2008) and Carter and Rogers (2008)						
Win–win	contingency planning	0.416	0	0	28.57	18.96
Supplier integration	supplier operations	0.491	0	0	20.78	10.13
Supplier integration	contingency planning	0.348	0.002	0.004	18.18	10.52
Communication and coordination with suppliers	supplier operations	0.4	0	0.001	22.08	12.99
Communication and coordination with suppliers	supply disruptions	0.317	0.005	0.008	14.29	8.05
Joint innovation	contingency planning	0.316	0.006	0.006	29.87	23.25
Constructs from Pagell and Wu (2009) and Carter and Rogers (2008)						
Guiding value by	Values and ethics	0.767	0	0	24.68	8.83
Alignment of economic, social and environmental goals by	Sustainability as part of an integrated strategy	0.605	0	0	24.68	11.30
Proactive and commitment by	Values and ethics	0.402	0	0	29.87	20.65
Proactive and commitment by	Contingency planning	0.383	0.001	0.001	28.57	19.87
who is who in SC	Supplier operations	0.397	0	0	27.27	18.18
who is who in SC	Contingency planning	0.36	0.002	0.001	27.27	18.96
Decommoditization	Supplier operations	0.648	0	0	27.27	12.60
Decommoditization	Contingency planning	0.392	0.001	0.001	22.08	13.12
Decommoditization	Supply disruptions	0.332	0.004	0.005	14.29	7.79
Investment in human capital	Supplier operations	0.4	0	0.001	22.08	12.99
Investment in human capital	Contingency planning	0.316	0.006	0.006	20.78	13.51
Investment in human capital	Supply disruptions	0.45	0	0	16.88	8.05
Economic viability/profitable SC	Contingency planning	0.333	0.004	0.002	31.17	24.42

networks (Hahn and Gold 2014). Supply chain networks characterized by informal social associations and intra-firm relationships (59.7%) play a crucial role in the development of inclusive business opportunities at the BoP level (Reficco and Marquez 2012; Ansari et al. 2012). However, network development remains dependent on the strategic purchasing goals set by top management. The results show that the SCM constructs of strategic purchasing and top management support were, respectively, addressed by 15.6% and 13.0% of the selected papers. Advocates of

Table 8 Contingency results among SCM and SSCM constructs

Contingent variables		Phi coefficient	Approximate significance	Exact significance (1-sided)	Observed frequency	Expected frequency
Constructs from Chen and Paulraj (2004) and Seuring and Müller (2008)						
Top management support	Economic risk	0.334	0.003	0.009	7.79	2.99
Top management support	Supplier integration	0.31	0.007	0.011	9.09	4.16
Strategic purchasing	Win–win	0.362	0.001	0.001	15.58	9.09
Strategic purchasing	Supplier integration	0.467	0	0	12.99	5.06
Strategic purchasing	Communication and coordination with suppliers	0.437	0	0	14.29	6.49
Long-term relationship	Supplier integration	0.362	0.001	0.001	31.17	23.64
Long-term relationship	Communication and coordination with suppliers	0.339	0.003	0.002	37.66	30.26
Communication	Supplier integration	0.303	0.008	0.007	25.97	18.96
Communication	Communication and coordination with suppliers	0.337	0.003	0.003	32.47	24.29
Supplier involvement in new product development	Supplier integration	0.632	0	0	20.78	8.05
Supplier involvement in new product development	Communication and coordination with suppliers	0.618	0	0	23.38	10.26
Logistics integration	Supplier integration	0.309	0.007	0.012	7.79	3.38
Logistics integration	Communication and coordination with suppliers	0.317	0.005	0.008	9.09	4.29
Constructs from Chen and Paulraj (2004) and Pagell and Wu (2009)						
Long-term relationship	Who is who in supply chain	0.312	0.006	0.007	49.35	42.47
Supplier involvement in new product development	Product innovation	0.383	0.001	0	23.38	15.32
Supplier involvement in new product development	Decommoditization	0.39	0.001	0.001	18.18	9.87
Constructs from Chen and Paulraj (2004) and Carter and Rogers (2008)						
Supply network structure	Stakeholder engagement	0.382	0.001	0.001	44.16	34.94
Long-term relationship	Stakeholder engagement	0.371	0.001	0.001	50.65	42.47

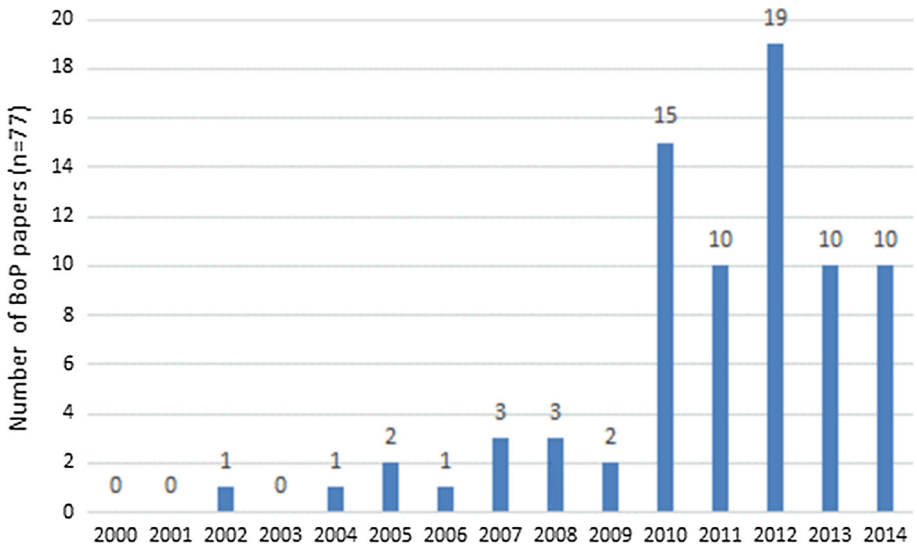

Fig. 1 Yearly distribution of BoP papers

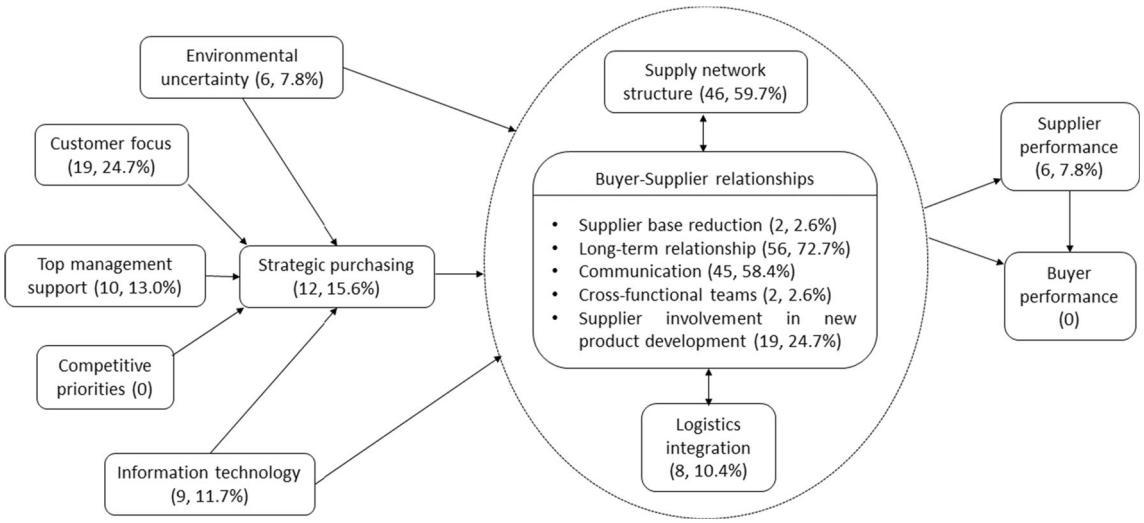

Fig. 2 Frequencies of SCM constructs (Adapted from Chen and Paulraj 2004)

producer-oriented BoP campaign in particular for the inclusion in global supply chains of marginalized social segments as producers, arguing that the win–win objective cannot be realized unless firms rethink their strategic purchasing policies and include BoP producers as suppliers (Lim et al. 2013; Arnould and Mohr 2005). In other words, strategic purchasing policies should be mindful of the potential productivity of the BoP. As a proactive strategy, strategic purchasing requires investment in relationship building in BoP environments, which may lack professional business structures. Realization of strategic purchasing policy therefore depends on the active involvement of the focal firm's top management (Lim et al. 2013) in supporting network development, primarily through mutual cooperation and long-term trust-based relationships, if they are to outperform their competitors in informal markets (Vachani and Smith 2008). The active support of top management in formulating and implementing strategic purchasing policy is a pivotal driver of supply chains in BoP business environments. There is also evidence that networks play a crucial part in the innovation process by facilitating learning (Seelos and Mair 2007; Hudnut and DeTienne 2010). In fact, 24.7% of the selected papers considered it critical to involve suppliers in the development of new products and processes in order to satisfy the diverse and unique needs of BoP consumers. Increasingly, firms also use telecom and computer applications to assess and anticipate customer expectations in BoP environments (Parthasarathy 2010). In particular, Ramachandran et al. (2012) highlighted process innovations to overcome logistics-related obstacles, and Berger and Nakata (2013) discussed the vital role of information technology in coping with a malfunctioning transport infrastructure, especially in the financial services industry. More generally, the communication and information technology industry plays a key role in addressing the unique challenges of BoP (Schuster and Holtbrügge 2012), and Ray and Ray (2010) discussed how that industry has itself managed to develop within a resource-constrained environment.

Some key issues remain unexplored in this body of research. For instance, none of the selected papers explicitly mentioned the role of competitive priorities in strategic purchasing decisions or the impact of customer/buyer performance on the overall supply chain performance. Given the importance of such performance objectives for well-functioning supply chains, this omission is surprising but may indicate a need for further professionalization. As it can safely be assumed that even supply chains will pursue some core objectives, future research should seek to identify which of these are applied and why they have not been addressed in the existing research. Although the uncertainty that characterizes informal markets is considered a critical feature of BoP, only six of the selected papers discussed this issue (e.g., Arora and Romijn 2012; Webb et al. 2010). Similarly, while the active support of executives is considered prerequisite in formulating a profitable business plan for BoP (Gold et al. 2013; Schrader et al. 2012), few of these papers have commented on the active involvement of top MNC management in market entry and operational strategies in this context. Other neglected questions include the impact of supplier base reduction and the significance of cross-functional teams for more efficient BoP supply chain operations. Although Vachani and Smith (2008) have illustrated how logistics integration can help to access a dispersed consumer base, concrete logistical alternatives to overcome the daunting challenge of malfunctioning or missing communication and transport infrastructure have yet to be identified.

Sustainable Supply Chain Management Constructs

Certain SSCM constructs feature more prominently in the reviewed articles. As shown in Fig. 3, the most often discussed of the SSCM constructs developed by Pagell and Wu (2009), Seuring and Müller (2008) and Carter and Rogers (2008) is collaboration with non-traditional supply chain members (85.7%). Building collaborative relationships with non-traditional stakeholders and involvement of third parties (41.6%) to compensate for foreign firms' meager BoP market knowledge are regarded by some as qualifying criteria for entry to BoP markets (Calton et al. 2013; London and Anupindi 2012; Rivera-Santos et al. 2012; McMullen 2011; Arnold and Valentin 2013). This practice remains vital in the search for outside-the-box solutions to meet the unique needs of BoP consumers (VanSandt and Sud 2012; London and Anupindi 2012). An economically viable supply chain can be achieved only by means of this kind of mutual cooperation (Pagell and Wu 2009; Calton et al. 2013); however, while the BoP literature frequently advances this agenda (75.3%), alignment of economic, social and environmental goals (37.6%) in developing the BoP business case appears to have been downplayed. Additionally, the sustainable competitive advantage that features among the core aims of any business strategy cannot be realized unless all actors receive their fair share of the value generated by the supply chain, and creation of win–win scenarios (58.4%) remains the prime goal of any SSCM strategy (Seuring and Müller 2008). Surprisingly, although the win–win debate is a frequent topic, the discussion seems to be dominated by the firms' perspective on managing the economic risks associated with their business activities (e.g., Tashman and Marano 2010) while ignoring how deprived BoP participants must confront the challenge of economic insecurity. The clear link between top management support, economic risk management and supplier integration (Table 5) suggests that active integration of BoP suppliers is seen primarily as a means of safeguarding the economic interests of MNCs in the volatile environment of informal market economies (Sánchez and Ricart 2010; Ray and Ray 2010; Ramachandran et al. 2012). Surprisingly, the constructs of environmental and social risk management are rarely addressed in the BoP debate, with respective frequencies of 6.5% and 9.1%, and further research is needed in this regard. From a supply chain perspective, more specific proposals are needed to address the risk management aspects of minimizing supply disruptions (19.4%) caused by fragile transportation and communication infrastructure in BoP markets and how outbound supply chains (15.5%) can be re-designed to mitigate supply chain risks.

In the supplier-oriented BoP literature, certain supplier development-centered constructs are common in BoP debate, including supplier integration (32.5%) (Ramachandran et al. 2012); decommoditization (40.2%) (London et al. 2010); communication and coordination with suppliers (41.6%) (Pervez et al. 2013); and supplier operations (31.7%) (Reficco and Marquez 2012). However, the literature review also reveals that some supplier development-oriented topics have been overlooked; these include supplier certification (6.4%) (Gold et al. 2013); transparency (18.1%) (Ray and Ray 2010); traceability (7.7%) (Mena et al. 2010); importance of supplier selection (6.5%) (Hill and Mudambi 2010); and auditing and monitoring of suppliers (5.2%) (Kistruck et al. 2013). The findings also indicate that the BoP literature advocates a

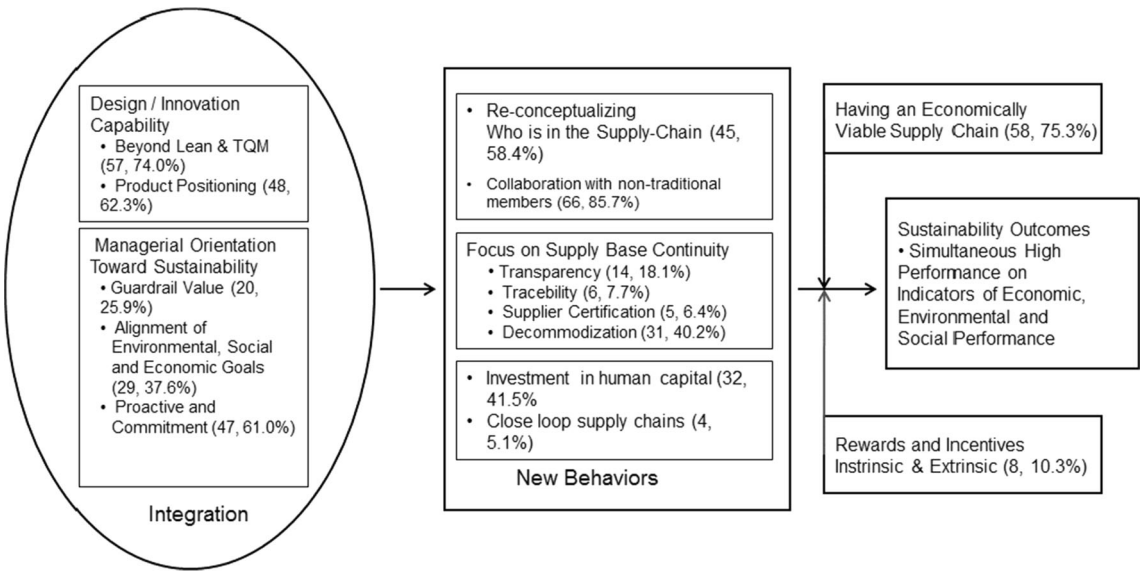

Fig. 3 Frequencies of SSCM constructs (Adapted from Pagell and Wu 2009)

market-based development agenda for the creation of win–win scenarios for all stakeholders on a sustainable and more or less voluntary basis, and the integration of indigenous entrepreneurs with limited financial and technological capabilities as suppliers in global supply chains is a cornerstone of the partner-oriented BoP literature (Shivarajan et al. 2013; Perez-Aleman and Sandilands 2008; Reficco and Marquez 2012). More marginal constructs in the BoP debate include pressure on the corporate sector to become more sustainable, exerted by government entities or other stakeholders, including customers (Fig. 4).

While importance of supplier selection is considered significant for business success in BoP (Lim et al. 2013; Hill and Mudambi 2010), this and other constructs related to supplier evaluation need more vigorous exploration in the context of emerging economies. Given the uncertainty that characterizes informal markets, and the lack of institutional infrastructure to oversee contract enforcement, there is a need for innovative approaches to supplier evaluation. In this regard, rigorous research is needed to evaluate the viability or adaptability of current concepts or to devise novel approaches to supplier evaluation in particular and, more generally, to evaluation of supply chain partners. The total life cycle (TLC) approach has been marginally addressed in the BoP literature; Agnihotri (2013) and Ramachandran et al. (2012) reported how the construct of cost and profit sharing was successfully applied to help marginalized communities to escape the vicious circle of poverty. However, this construct remains largely beyond the scope of current BoP debate. Finally, a few studies have discussed the promising consequences of third-party involvement in auditing and monitoring the activities of supply chain partners (e.g., Kistruck et al. 2011; Mena et al. 2010) (Fig. 5).

Contingency Analysis

To more fully understand scholarly perspectives on BoP, the findings of the literature review were subjected to a contingency analysis. The contingency analysis helped to infer causality in informal economies by identifying correlations between pairs of constructs without specifying the direction of association, leaving this open to theoretical interpretation. According to Gold et al. (2010, p. 235), "a contingency analysis detects positive association patterns between categories, i.e., it identifies pairs of categories which occur relatively more frequently together in one paper than the product of their single probabilities would suggest." Contingency is measured in terms of the phi coefficient (φ); a value of $\varphi > 0.3$ indicates a significant association between two constructs or categories, and the higher the value of φ, the stronger is the association (Gold et al. 2010; Fleiss et al. 2003). The value of φ provides only an indication of these relationships, based on the frequency of occurrence of particular constructs. In this way, contingency analysis offers scope for theoretical interpretation of observed associations among constructs.

The results presented here include contingencies among SCM constructs (Table 5), SSCM constructs (Tables 6, 7) and SCM and SSCM constructs (Table 8). As mentioned earlier, Tables 1, 2, 3 and 4 provide brief descriptions of the individual constructs used in the model. The process of coding BoP papers against (S)SCM constructs and subsequent exploration of whether and how (S)SCM constructs are correlated in the context of BoP has helped to clarify the general relationship of BoP research to (S)SCM constructs and the respective research streams.

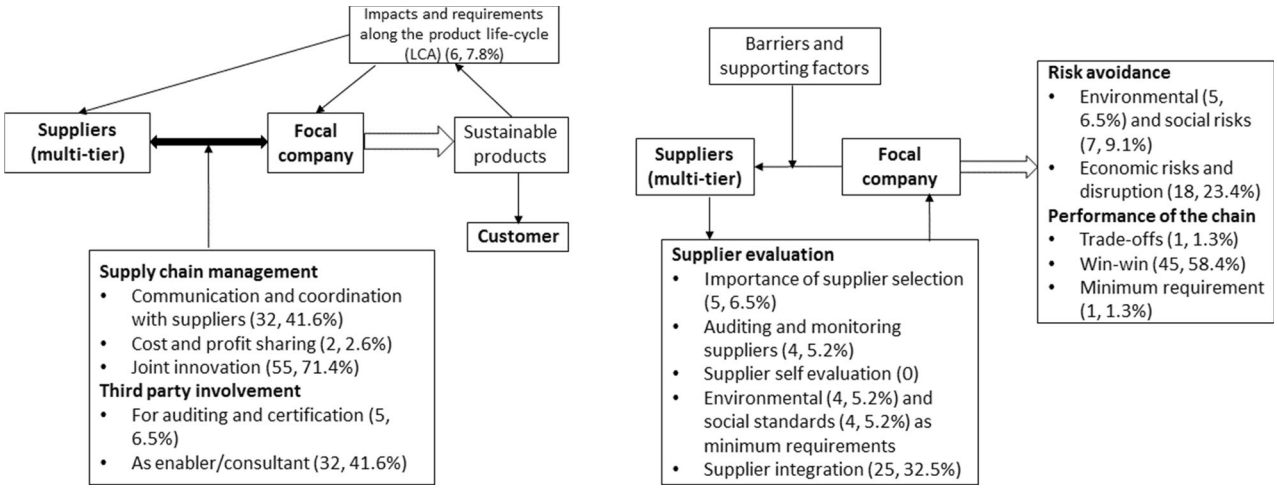

Fig. 4 Frequencies of SSCM constructs (Adapted from Seuring and Müller 2008)

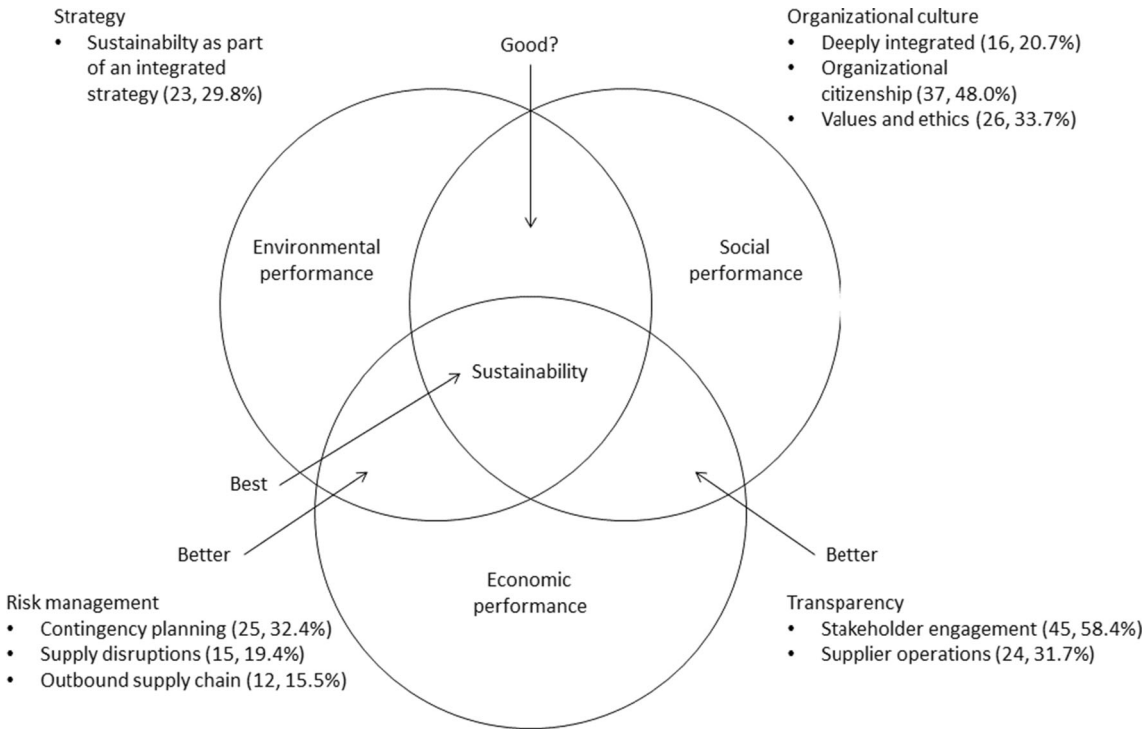

Fig. 5 Frequencies of SSCM constructs (Adapted from Carter and Rogers 2008)

Contingencies Among SCM and SSCM Constructs

This section discusses both the contingencies among SCM constructs as informed by Chen and Paulraj (2004) and the contingent relationships of SCM and SSCM constructs from Pagell and Wu (2009), Carter and Rogers (2008) and Seuring and Müller (2008). Table 5 shows contingencies established among Chen and Paulraj's (2004) SCM constructs, and Table 8 shows contingencies between those constructs and SSCM constructs from the other three papers.

Based on the contingencies in Tables 5 and 8, the (S)SCM model in Fig. 6 illustrates the major relationships among constructs; box size is an approximate indicator of construct frequencies. All contingent relationships are shown in the model, other than that between information technology and customer focus (Table 5) (Chen and Paulraj 2004). These two constructs are distinct from the main body of the model because they are not contingent with any other construct derived from the four base papers. The relevant core constructs from Chen and Paulraj (2004) are strategic purchasing and long-term relationship, which yielded the highest number of contingencies to other items (six contingencies per construct). This is interesting because although long-term relationship was frequently referred to (56 papers), strategic purchasing was mentioned in only 12 papers. Despite this low frequency, strategic purchasing exhibited a high number of contingencies, emphasizing MNCs' strategic investment in sourcing decisions and the construct's relevance to the relationship with suppliers, as most other items can be subsumed under this wider term (Ray and Kanta Ray 2011; Viswanathan et al. 2009). The importance of strategic sourcing decisions and of relationship building in BoP markets is further endorsed by the high relevance of long-term relationships, as shown by its high number of contingencies and its high frequency count. Similarly, supplier integration as discussed by Seuring and Müller (2008) returned eight contingencies. With the highest number of contingencies, strategic purchasing, long-term relationship and supplier integration are therefore the core constructs in this model. The clear logical links between supplier integration and long-term relationship and between supplier integration and strategic purchasing need no further explanation (Ramachandran et al. 2012). The link between long-term relationship and who is who in the supply chain reflects concerns about re-conceptualizing the individual roles of supply chain actors in informal markets, with particular reference to producers or indigenous entrepreneurs, and about nurturing relationships for the purposes of building trust (Arnould and Mohr 2005). As the supply network structure is to some extent determined by the long-term orientation of stakeholder relationships, the relationship between supply network structure, stakeholder engagement and long-term relationship is unsurprising (Chesbrough et al. 2006).

The use of a communication-related construct by both Chen and Paulraj (2004) and Seuring and Müller (2008)

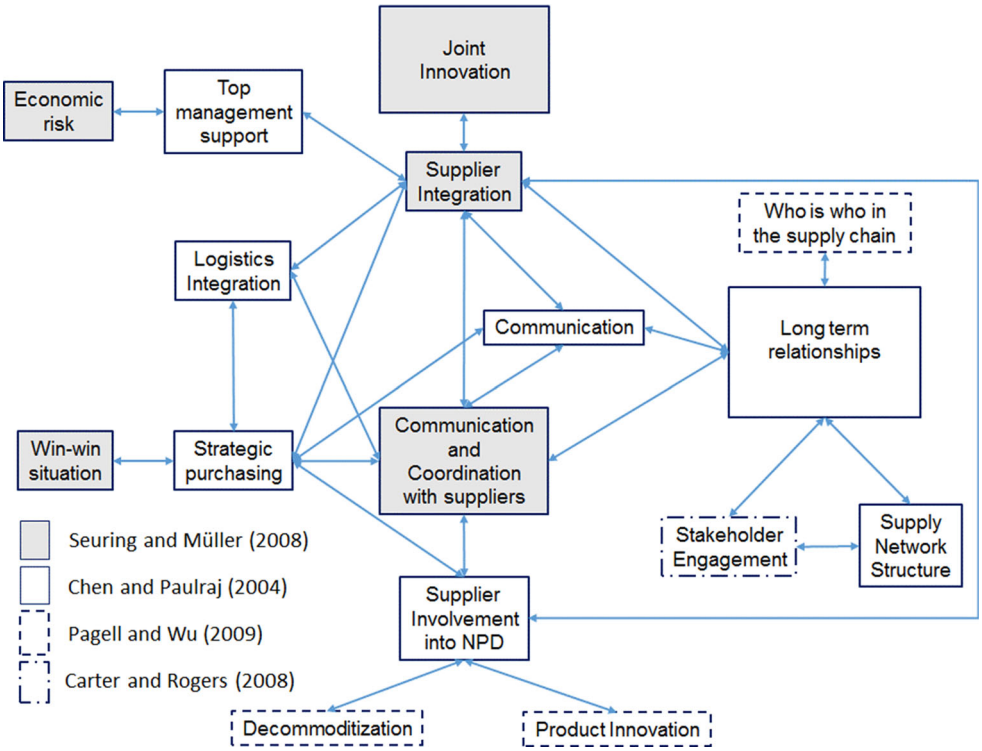

Fig. 6 (Sustainable) supply chain model

would almost suggest condensing this into a single construct. However, communication and coordination with suppliers (Seuring and Müller 2008) is more precise and shows a frequency of only 32 as compared to 45 for the wider communication construct of Chen and Paulraj (2004). Communication of product requirements and customer demands to suppliers as one foundation for BoP projects aligns with the findings of Khalid et al. (2015), which also emphasize the centrality of these concepts for management of supply chains in a BoP context. It is also unsurprising, then, that supplier involvement in new product development is related to supplier integration, communication and coordination, as well as to strategic purchasing (Gold et al. 2013). The relationship of supplier involvement in new product development with two constructs from Pagell and Wu (2009)—decommoditization and product innovation—refers to arguments in the BoP literature concerning the potential benefits for MNCs of treating BoP suppliers as strategic partners. As has been repeatedly argued, indigenous entrepreneurs have a better understanding than foreign MNCs of consumer needs and preferences in the BoP. Active involvement of indigenous entrepreneurs in new product development not only enhances MNCs' product innovation capabilities but is also a vital aspect of supplier development strategy, leading to the integration of suppliers as strategic partners (Kaplinsky 2011). This argument is reinforced by the link between supplier involvement in new product development and product innovation and decommoditization (Schrader et al. 2012).

The link between strategic purchasing and identifying win–win situations is well established (Kistruck et al. 2013). If the *right* suppliers are identified, it may be possible to produce at the BoP and source from the BoP as well as supplying to BoP customers.

Logistical integration also shows three contingencies and is closely connected to a number of constructs mentioned above (Vachani and Smith 2008). In line with the arguments made earlier, top management support is linked to supplier integration on the one hand (Lim et al. 2013) and to economic risk on the other. The link to economic risk is quite surprising but may be explained by the economic rationale that top management must typically keep in mind (Olsen and Boxenbaum 2009) in pursuing a BoP project (Schrader et al. 2012), which can be seen as quite risky from a conventional investment perspective.

Contingencies Among SSCM Constructs (In Individual Papers)

As shown in Table 6, only two contingencies were identified from the Seuring and Müller (2008) framework. Supplier integration emerges as the central construct, along with communication and coordination with supplier, overlapping with Chen and Paulraj's (2004) constructs. By virtue of their high number of contingencies, two

constructs advanced by Pagell and Wu (2009) emerged as central: decommoditization (8 contingencies) and who is who in the SC (7 contingencies). The contingent relationship between who is who in the supply chain and decommoditization, and of both of these constructs with investment in human capital and economic viability of the supply chain (Table 6), further strengthens the influence of these two constructs in the BoP literature. The pattern of contingencies of who is who in the supply chain and decommoditization clearly reflects a key debate in the BoP literature related to appreciation of BoP populations as suppliers in global supply chains and subsequent MNC investment to develop their core capabilities (Sinkovics et al. 2014). The next section shows these constructs to be well connected to other constructs.

Turning to Carter and Rogers (2008), the three organizational culture-related constructs of values and ethics, organizational citizenship and a deeply ingrained culture attracted the highest number of contingencies and so assume central importance among Carter and Rogers' (2008) constructs (Bardy et al. 2012; Mena et al. 2010). More precisely, organizational citizenship stands out with the highest frequency (48.0%), followed by values and ethics and a deeply integrated culture with frequencies of 33.7 and 20.7%, respectively (Fig. 5).

Contingencies Among SSCM Constructs (Among Three SSCM Papers)

For a fuller understanding of the research findings, along with the contingencies from Seuring and Müller (2008), Pagell and Wu (2009) and Carter and Rogers (2008) discussed briefly above, contingencies were also calculated for SSCM constructs from the three papers (Table 7). Interestingly, this generates a higher number of contingencies than among the individual papers. This may be explained in part by the partial overlap between the three frameworks, although each item was coded separately for individual assessment. The interplay and overall interpretation of contingencies will be outlined subsequently.

The results show that Carter and Rogers' (2008) construct of contingency planning has the highest number of contingencies, followed by supplier integration from Seuring and Müller (2008). Based on these contingencies from the three approaches to SSCM, a model was developed to facilitate easier comprehension of the core issues (Fig. 7); box size is an approximate indicator of construct frequencies. Beyond the overview of all contingencies in Table 7, the model is based on those constructs that we considered most significant. It is worth noting that although Carter and Rogers' (2008) construct of contingency planning returned the highest number of contingencies (9), the construct is not part of the model. Although viewed by Carter and Rogers (2008) as a key risk management strategy, we believe that contingency planning is almost always at play at every step of the supply chain and in almost every scenario, as no business model can be developed or implemented without pre-planning of risk management strategies for the various forms of associated risk. Although mentioned by various BoP scholars with a medium frequency of 32.4%, contingency planning can be considered a vital part of general supply chain risk management strategy but not as something unique to BoP supply chains.

Figure 7 illustrates the centrality of supplier integration and decommoditization. Indeed, supplier integration (9 contingencies in total; numbers in brackets); decommoditization (8); who is who in supply chain (7); investment in human capital (6); and supplier operations (5) are all contingent with each other. This emphasizes the centrality of these five items and suggests that each component must be taken into account. Close analysis of these five key constructs further reveals that all five are supplier development-focused (as already briefly mentioned in the discussion of frequencies in "Sustainable supply chain management constructs" section), aligning with the debate on social issues in supply chain management (Yawar and Seuring 2015; Ray and Ray 2010). Supplier development is fundamental in BoP contexts, with debate focusing on the role of indigenous entrepreneurs in informal markets. Communication and coordination with suppliers (Seuring and Müller 2008) is contingent with four of the five key constructs (supplier integration, decommoditization, supplier operations and investment in human capital), suggesting that active communication with supply chain actors in general and suppliers in particular provides a foundation for the wider BoP supplier development program (Gold et al. 2013). This also bears on the issues of transparency and supply disruptions, both of which are contingent with communication and coordination with suppliers and decommoditization; transparency is contingent with supplier integration and supply disruptions with investment in human capital. The respective contingent relations of transparency and supply disruptions suggest that firms can pave the way for a smooth integration of indigenous BoP suppliers in their supply chain operations by treating their suppliers as strategic partners through efficient lines of communication and development of their supply chain capabilities (Perez-Aleman and Sandilands 2008; Ramachandran et al. 2012). By pursuing this kind of strategic approach to supplier integration, firms can not only address the issue of inconsistent supply lines in BoP but can also increase the transparency of their supply chain operations.

The remaining contingencies, relating to a number of other constructs, tend to confirm the arguments already made. The requisite innovation capabilities to meet the

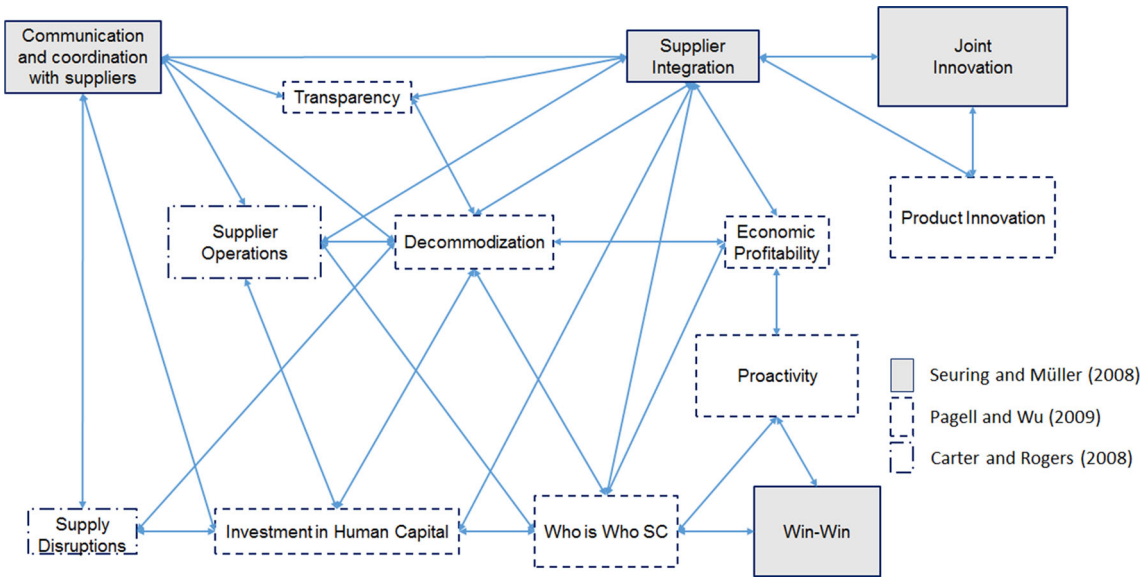

Fig. 7 A supplier integration and decommodisation based model of sustainable supply chain management

unique demands of BoP consumers are to an extent determined by the depth of relationships that foreign firms develop with the BoP community in general and indigenous suppliers in particular (Schrader et al. 2012; Viswanathan et al. 2009). On that basis, the contingent relationship of joint innovation with product innovation and with supplier integration is not unexpected. Similarly, the contingent relationship of economic viability of BoP supply chains with supplier integration, decommoditization and who is who in the supply chain is readily explained (Vachani and Smith 2008).

Finally, a proactive approach on the part of top management remains crucial in developing economically viable supply chains and producing win–win outcomes for all stakeholders (Sánchez and Ricart 2010). This is endorsed by the contingent relationship of proactivity with economic viability and win–win constructs. Re-conceptualizing who is part of the supply chain and what role they play remains a cornerstone of the strategies developed by proactive management to make BoP supply chains profitable and generate win–win solutions for all supply chain actors (Ramani and Mukherjee 2014; Van den Waeyenberg and Hens 2012).

Discussion

By linking (S)SCM constructs with BoP literature, this paper contributes to the enrichment of the BoP debate. The systematic literature review enables further insights to be gained and conclusions to be drawn from than the previous studies that have analyzed a more limited set of BoP cases (Gold et al. 2013; Esko et al. 2013). The only similar approach (Khalid et al. 2015) did not integrate the *traditional* supply chain view and was confined to a much more limited SSCM perspective. In contrast, here the focus is on the centrality of integration constructs, representing various facets of a broad and comprehensive *supplier development program*, in both SCM- and SSCM-focused analyses.

The present findings highlight those (S)SCM constructs of relevance to BoP researchers and practitioners alike when addressing the unique challenges posed by informal markets. Based on a sound theoretical foundation, this review advances the case of integrating BoP into the (S)SCM debate (and vice versa). Given the frequency of discussion of *long-term relationship development*, *economic viability of supply chain* and *innovation related constructs*, it is reasonable to infer the BoP literature's support for the development of collaborative relationships among supply chain actors to facilitate the process of innovation. A process is considered imperative in establishing economically viable businesses in informal economies (Chesbrough et al. 2006; Elaydi and Harrison 2010). The BoP literature emphasizes the development of trustworthy long-term relationships with traditional and non-traditional stakeholders, whether prosperous or destitute, boosting economic activity in the marginalized communities of informal market economies, as elaborated by Gold et al. (2013).

The (S)SCM literature's long tradition of research on capability development as well as strategically oriented supplier collaboration and integration has much to offer in developing the BoP research agenda. However, BoP should not be considered as just another aspect of the

collaboration-centered (S)SCM literature. Rather, BoP markets demand novel solutions involving the apprehension of the unique conditions of informal market economies. This implies that business transactions are governed by market-specific informal institutions, instead of the practice of formal institutions overseeing market mechanisms in developed economies (Kolk et al. 2014). One of the prime obstacles concerning the development of BoP projects is missing or malfunctioning communication infrastructure. Upgrading this through government as well as BoP initiatives should facilitate sound communication and coordination with suppliers, benefiting both the BoP context and the wider business community. As another core theme of contemporary SCM research, logistics and logistical integration has focused mainly on developed economies. These issues are yet to be scrutinized in BoP contexts, and future research needs to address these challenges (Gold et al. 2013; Esko et al. 2013).

The current BoP literature mainly comprises either case-based empirical studies or conceptual papers (Kolk et al. 2014). More survey-based research is needed if we are to learn more about BoP itself beyond the immediate interests of foreign firms. The requisite empirical research to close the gap will illuminate the dynamics of doing business in BoP, but can also potentially open new frontiers of knowledge.

Another interesting finding was that Chen and Paulraj's (2004) competitive priorities related to cost, quality, speed, dependability and flexibility for driving supply chains in formal economies were scarcely to be seen in the selected BoP articles. While a few BoP scholars cited certain examples such as Nirma washing powder (Agnihotri 2013) in an effort to argue that low cost, average quality products can be a success in BoP markets, concrete proposals have yet to be formulated. Similarly, the pressure from stakeholders, governance and customers that Seuring and Müller (2008) considered primary in forcing firms to manage their business operations more sustainably was barely of relevance in the BoP literature. This can be explained by the largely unsaturated and therefore non-competitive nature of BoP markets (Prahalad 2006), in which stakeholders including regional and national governments struggle to provide the basic amenities of life to poverty-stricken consumers rather than worry about being more environmentally friendly. This highlights the strategic decision making of MNCs and other actors before they invest in BoP projects, as argued by Schrader et al. (2012).

While the (S)SCM enabling factors identified by Chen and Paulraj (2004) and Seuring and Müller (2008) were barely considered relevant in the BoP literature, the *precursors* of SSCM developed by Pagell and Wu (2009)—innovation and proactive and committed management—have regularly been referred to in the BoP-related debate (Tashman and Marano 2010). Similarly, the enabling SSCM constructs related to organizational culture, developed by Carter and Rogers (2008), have attracted comments from some BoP scholars. The present findings suggest that while the qualifying criteria for (S)SCM developed by Chen and Paulraj (2004) and Seuring and Müller (2008) seem inappropriate for BoP, the SSCM enabling factors developed by Pagell and Wu (2009) appear well suited to BoP markets, followed by those articulated by Carter and Rogers (2008).

Markman and Krause (2016) have recently advocated to prioritize sustainability goals and SSCM practices that focus first on enhancing *ecological health*, followed by nurturing *ethical standards to further social justice*, and a commitment to *improve economic vitality*. In contrast, the BoP literature seems to prioritize the economic agenda, sometimes overlooking the social and ecological costs of proposed business solutions for the development of deprived communities. Hall et al. (2012) sought to highlight the gray areas of economically driven policy frameworks designed to initiate entrepreneurial activity in BoP communities. To advance the sustainable development agenda in BoP communities, research must move beyond the purely economic rationale to incorporate social and ecological aspects of doing business in BoP contexts (Brix-Asala et al. 2016).

Furthermore, the results of the literature review highlighted certain gaps and respective suggestions in the BoP literature to enable a sustainable development of marginalized societies by respective BoP initiatives. Table 9 shows the respective suggestions by BoP scholars and apparent gaps. This is concluded from putting the evaluations, presented in the extant paper, into the wider context of BoP-related research and is based on thoughtful reasoning.

Current BoP literature talks about inclusive business opportunities in BoP societies, while mainly advocating for incorporating BoP actors in entrepreneurial activity either as suppliers or as customers (Halme et al. 2012; Reficco and Marquez 2012). The literature thereby presents a limited perspective when it comes to defining the role of BoP actors in respective supply chains. Apparently, this view of the BoP literature has barred the concerned stakeholders from appreciating the diverse roles and activities open to BoP actors in global supply chains. BoP scholars are yet to come up with a more holistic view of entrepreneurial activities in BoP markets and have to explore more diversified roles for integrating members of marginalized societies in global supply chains (Kolk et al. 2014).

As evident from Table 9, concerning the outcomes of BoP initiatives, though the mainstream BoP literature talks about the operational and economic performance, [related

Table 9 Research gaps at the intersection of BoP and (S)SCM

Source	Suggestion	Related (S)SCM constructs	Gap	Examples of existing research
Kolk et al. (2014)	Integration of poor in supply chain network	Who is who in the supply chain (Pagell and Wu 2009); Supplier integration in new product development (Chen and Paulraj 2004); Supplier integration (Seuring and Müller 2008)	BoP cases showing the integration of poor into supply chains	London and Anupindi (2012)
Kolk et al. (2014)	Assessing outcomes of BoP initiatives	Supplier operations (Carter and Rogers 2008); Economic profitability (Pagell and Wu 2009)	Social and environmental performance	Mena et al. (2010), London and Hart (2004), Silvestre and e Silva Neto (2014)
Lim et al. (2013)	Innovation process, not only product innovation	Product innovation (Pagell and Wu 2009); Joint innovation (Seuring and Müller 2008)	Innovation process in focal firm and along the supply chain	Halme et al. (2012), Ramani and Mukherjee (2014)
Dembek and Sivasubramaniam (2016)	Shared value creation	Win–win situation (Seuring and Müller); Transparency (Pagell and Wu 2009); Stakeholder engagement (Carter and Rogers 2008)	Sharing value along the supply chain.	Varadarajan (2014)
Tulder et al. (2016)	Solving societal problems	Investment in human capital (Pagell and Wu 2009)	Supply chains as institutional act	Ansari et al. (2012), Bardy et al. (2012)

(S)SCM constructs are shown in Table 9 and also in Figs. 6 and 7], social and environmental performance outcomes are apparently not appropriately addressed (Busse 2016). In spite of referring to social and environmental aspects of BoP initiatives by certain BoP scholars (Mena et al. 2010; London and Hart 2004; Silvestre and e Silva Neto 2014), concrete social and environment-related constructs in context of BoP still need to be developed and respective issues be integrated into the BoP debate.

Even though it has been repeatedly argued for product innovation (Fig. 7) in mainstream BoP literature (Arnould and Mohr 2005), aspects related to the adjustment/modification of a focal firm's innovation process to accommodate the unique business environment of BoP are still insufficiently addressed. So far, product innovation itself (Ramani and Mukherjee 2014) has been in focus.

A fair distribution of value generated across the entire supply chain remains a prerequisite for prosperity of all supply chain actors (Vachani and Smith 2008). BoP literature strongly argues for the creation of win–win scenarios for the sustainable development of BoP communities (Arora and Romijn 2012). The literature review revealed that concrete recommendations emphasizing and suggesting the course of action to be followed to ensure equitable distribution of wealth generated among BoP supply chain actors still need to be presented.

The work of Tulder et al. (2016) concerning solutions of societal problems through cross-sector partnerships in BoP highlights the role partnerships can play in finding sustainable solutions to certain social dilemmas in BoP. An apparent research gap which needs to be addressed relates to the possibilities of institutionalizing supply chain resources in BoP to address social perils in BoP (Hall and Matos 2010).

One potential opportunity for future research is to empirically validate the present findings. By highlighting and arguing for a range of (S)SCM concepts regularly discussed in BoP research discourse, we have tried to provide a foundation for future researchers. Interactions among the relevant (S)SCM concepts have also been elaborated. It seems worthwhile to undertake an empirical screening of the individual constructs and contingencies presented here, thereby enriching BoP research with practical recommendations that draw on the more robust research traditions employed to develop (S)SCM theories.

The present study has some limitations. Among these, the selection process and the number of papers included in this literature review might appear very selective. However, it is fair to observe that a thorough screening of all the available literature was neither the aim of the study, nor would this have been feasible. Instead, the intention was to acquaint the reader with theoretical tools that can be adopted from (S)SCM to analyze the corresponding challenges in BoP, thus integrating these research streams. More generally, not all available BoP papers were suitable for the subject matter as they did not correspond with the aims of this research in many cases. With regard to the (S)SCM constructs addressed in this literature review, we are confident that the selected

(S)SCM practices and constructs from four widely cited papers were appropriate for an evaluation of the BoP literature. Nevertheless, the selective choice of constructs invites further research for a broader comparison. Also using well-cited frameworks, we have tried to address the issue of construct validity by employing multiple researchers to analyze results and compile findings. However, we acknowledge that the reliability of the research remains limited because of the single-researcher approach to coding.

Conclusion

In seeking to address one of humanity's most serious contemporary challenges, BoP research remains at an embryonic stage and in need of stronger theoretical foundations. Poverty and development-related aspects of emerging economies have been addressed mainly from a more macroeconomic perspective by development economists (see for example the work of Amartya Sen). Nevertheless, BoP research has prompted management scholars to address the challenges of poverty by devising mechanisms for kick-starting economic activity in impoverished societies.

Regional and national supply chains are now linked to global supply chains, making SCM a global matter and opening underdeveloped regions to inclusive business, potentially advancing the development agenda. The present paper highlights the potential collective contribution of (S)SCM theories to progressing the BoP agenda. However, further research is needed to evaluate the compatibility of current (S)SCM knowledge with the exclusive business environment of informal markets in emerging economies. In the relevant literature, certain practices developed in the context of supply chain operations in the so-called *developed* world have been found relevant in the context of the *developing* world. The paper also notes the natural association of (S)SCM practices with the BoP business environment as portrayed in the literature. While the respective supply chain practices address aspects of the development of a collaborative BoP business environment, questions about how to establish, manage and govern these mainly relationship-based collaborations in non-monetary terms remain unclear and require careful further scrutiny. The present findings also highlight how apparently central aspects of BoP like logistics and risk management have been overlooked in the BoP literature. As these and related topics are regularly discussed in the (S)SCM literature, management researchers can hope to build on that literature in addressing these and other neglected issues to advance BoP research.

Appendix 1

See Table 10.

Table 10 Journal-wise distribution of BoP papers (singletons are shown in Appendix 2)

Journal title	No. of papers
Journal of Business Research	9
Journal of Business Ethics	6
Technovation	5
California Management Review	5
International Business Review	4
Entrepreneurship Theory and Practice	4
Journal of Management Studies	4
Journal of International Management	3
Journal of Product Innovation Management	3
Harvard Business Review	3
Organization	2
Journal of Management	2
MIT Sloan Management Review	2
Business Strategy and the Environment	2
Academy of Management Perspectives	2

Appendix 2

Journals with Single Entries in Base Sample

1. Business horizons
2. International Journal of Technology Management
3. Journal of Academy of Marketing Sciences
4. Journal of Development Studies
5. Research Technology Management
6. Research Policy
7. Proceedings of National Academy of Sciences
8. Journal of International Business Studies
9. Journal of Production Innovation Management
10. Journal of Asian Pacific Economy
11. South African Journal of Economy and Management Sciences
12. Technological Forecasting and Social Change
13. IEEE Transactions on Engineering Management
14. Business and Society
15. European Management Review
16. World Development
17. Business Ethics Quarterly
18. Journal of Public Policy and Marketing
19. International Marketing Review
20. Global Strategy Journal
21. Strategic Entrepreneurship Journal

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