Received: 23 August 2021 | Revised: 21 August 2022 | Accepted: 29 August 2022

DOI: 10.1002/bse.3254

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

Sustainability performance measurement in risk and uncertainty management: An analysis of base of the pyramid supply chain literature

Sadaf Aman [1] | Stefan Seuring [1] | Raja Usman Khalid [2]

[1]Faculty of Business and Economics, Institute of Management and Business Studies, University of Kassel, Kassel, Germany

[2]Faculty of Suleman Dawood School of Business, Lahore University of Management Sciences, Lahore, Pakistan

Correspondence
Sadaf Aman, Faculty of Business and Economics, Institute of Management and Business Studies, University of Kassel, Kleine Rosenstraße 1 – 3, Kassel 34117, Germany.
Email: sadaf.aman@uni-kassel.de

Funding information
Deutscher Akademischer Austauschdienst (DAAD, German Academic Exchange Service), Grant/Award Number: 57459038

Abstract

Risk management in the base of the pyramid (BoP) environment is needed to ensure that firms performance objectives are met. Accordingly, integrating sustainability performance measurement in the supply chain risk management would offer interesting avenues for managing risks in BoP supply chain. Therefore, the paper conceptualizes an intersection between supply chain risk/uncertainty management and sustainable performance measurement. This intersection is then tested by a literature review of 164 BoP SC articles between the years 2000 and 2022. Descriptive, frequency, and correlation analysis identify various risks factors studied in the BoP literature so far, their management strategies and respective performance measures. The findings show a broad strategical aspect of managing SC risks and proffered the tactical or operational level performance measures which along with these practices can manage the related risks. Therefore, their incorporation into the risk management process should be considered. The correlation findings highlight the important role of performance process measures and the impact of these along with the management practices on firm's performance outcomes. The study contributes to supply chain risk and performance management literature by capturing the nexus between BoP and supply chain management.

KEYWORDS
base of the pyramid, performance, supply chain risk management, sustainability performance measurement, sustainable supply chain

Abbreviations: BoP, Base of the pyramid/Bottom of the pyramid; BoP-SCM, Base of the pyramid/Bottom of the pyramid-Supply chain management; BSC, Balance score card; CSR, Corporate Social Responsibility; CSE, Corporate Social Entrepreneurship; EMS, Environmental management system; Env, Environment; GDP, Gross domestic product; GDSS, Good Decision Support System; GHG, Greenhouse gas; GRI, Global Reporting Initiative; HRM, Human resource management; ICT, Information communication technologies; IGI, International Genealogical Index; ISO, International Organization for Standardization; KPI(s), Key performance indicators; LCA, Life cycle assessment; LCC, Local community commitment; LR, Literature Review; MNC(s), Multinational companies; MNE, Multinational enterprise; NGO, Nongovernmental organization; OHS, Occupational health and safety; OHSAS, Occupational Health and Safety Assessment Series; PCB, Printed Circuit Board; PIs, Performance indicators; PM, Performance measurement; PMs, Performance measurement systems; R&D, Research and Development; RM, Risk management; R-O-F, Resource-output-flexibility; RQ, Research question; SC, Supply chain; SCBSC, Supply chain balance score card; SCM, Supply chain management; SCOR, Supply chain operations reference; SCPM, Supply chain performance measurement; SCRes, Supply chain resilience; SCRM, Supply chain risk management; SSCM, Sustainable supply chain management; SSCPM, Sustainable supply chain performance measurement; TBL, Triple bottom line; UN, United nations; WHO, World health organisation; WOS, Web of Science.

1 | INTRODUCTION

The primary aim of any firm revolves around achieving the overall performance targets. With globalization and increasing pressure from the stakeholders for sustainable production (Gouda & Saranga, 2018), firms are compelled to focus beyond their organizational boundaries to achieve their performance targets. Therefore, supply chain management becomes necessary. The idea of boundary-less management has brought in risks that differ in their context and managerial approaches to solve them (Fan & Stevenson, 2018; Simangunsong et al., 2012; Tang, 2006; Tummala & Schoenherr, 2011). Besides, addressing these risks is essential since the repercussions of inappropriate risk management become more significant for the performance-related dimensions (Hult et al., 2010; Simangunsong et al., 2012). These performance dimensions range from economic to social to environmental ones (Das, 2018), which are often referred to as triple bottom line or sustainability (Khalid et al., 2015). The concerned literature also suggests that "the sustainability performance management is not often due to direct demand enforced by the legal act but because the companies aim to reduce the related risks" (Seuring & Müller, 2008, p. 1703). Therefore, these two streams of research share several overlaps and integrating them will bring depth in the theoretical understandings (Arzu & Erman, 2010; Gouda & Saranga, 2018; Maestrini et al., 2017; Simangunsong et al., 2012; Tummala & Schoenherr, 2011).

Risk also depends on the environment in which it prevails (Tang, 2006). The BoP environment or the prevailing conditions of informal markets expose firms to various risks. For example, London and Hart (2004) posit that the BoP markets are associated with unique challenges, whereas Alvarez and Barney (2007) describe it as an environment with a high level of uncertainty. Similarly, the institutional context of these markets often provides little support for economic activities (Khanna & Palepu, 2005). Non-existent formal capital markets, an uneducated workforce, poorly developed public infrastructure (Zomorrodi et al., 2019), informal governance mechanisms (Webb et al., 2010), and little or no protection of property rights (Soto, 2000) are all characteristics of the BoP context that also make the environment challenging for the firms to operate efficiently. Especially, the MNCs or the local producers experience a high level of knowledge and information gap because of the poor development of the business ecosystem (Zomorrodi et al., 2019). Consequently, lack of a proper business ecosystem serves as a barrier for the manufacturing as well as the distribution of the products being produced (Varga & Rosca, 2019). Moreover, it is advocated in the BoP literature that the practices introduced there mainly enhance the strategical level understanding of operating in this environment (Khalid et al., 2015). However, incorporating performance measures into the risk management process would enhance specific or tactical level knowledge about the performance indicators linked to the risk management practices. Furthermore, the PM literature argues "that what is not measured is not managed" (Manuj & Mentzer, 2008, p 216). Therefore, integrating performance measurement in risk management would provide a narrative for BoP SCs to operate in this environment successfully and sustainably.

Further, integration of PMS in the risk management process can be found in other management domains such as "finance" (e.g., Weekes-Marshall, 2020). However, the SCM researchers identify the combined importance of risk and performance management in SC and call for more research in this regard (e.g., Akwei & Zhang, 2018; Samson & Gloet, 2018). Consequently, to address these gaps in the literature, the current study aims to develop a risk management framework for BoP environment by integrating sustainability performance measures.

Therefore, the broad research question taken up for the study is as follows.

- RQ: How supply chain risk management has been dealt with in the BoP literature?
  - RQ1: Which risk factors are prevalent in BoP literature?
  - RQ2: Which risk management strategies are frequently used in BoP literature?
  - RQ3: Which sustainability performance measurement dimensions are frequently used in BoP literature?
  - RQ4: Which risk management strategies are linked to performance measurement dimensions?

The paper is structured as follows: First, SCRM conceptual framing by sustainability performance measurement literature while explaining its relevance for the BoP literature. Second, the methodology is explained. Third, the paper presents a finding section containing the answers to sub-research questions 1–3 using frequency analysis and RQ4 by conducting a correlation analysis. These findings are then discussed in subsequent sections, along with the limitations, future directions, and implications. Lastly, a conclusion addressing the main research question is made.

2 | SCRM CONCEPTUAL FRAMING AND BOP LITERATURE

The section starts with a conceptualization of SCRM and the role of sustainability performance measurement therein by taking arguments from SCRM and sustainability supply chain performance measurement (SSCPM) literature. It further presents a selection of the constructs from the SCRM and SSCPM literature. The operationalization of these selected constructs is shown in the tables. Furthermore, an outline of BoP-related research along with an intersection of SCRM and BoP research is discussed.

2.1 | Conceptualizing supply chain risk management and sustainability performance measurement

It is well documented in the risk management literature that the supply chain risks are managed through a process (Fan & Stevenson, 2018). The risk management process is usually divided into

three broad phases, i.e., identification and assessment, evaluation, planning and mitigation, control, and monitoring (Tummala & Schoenherr, 2011). The identification, assessment, and evaluation of the risks (phase one) can tell the probability and magnitude of their occurrence alone. Once identified and evaluated, risk management strategies (phase two) are implemented, which then lead to control and monitoring (phase three). Therefore, in order to understand a risk management process, all these things need to be explored which will be done in the subsequent paragraph.

The terms risk and uncertainty are often used interchangeably; however, some authors have argued that both terms have several distinctions as both offer different performance outcomes (Simangunsong et al., 2012; Tummala & Schoenherr, 2011). Tummala and Schoenherr (2011) used uncertain environmental conditions as triggers to certain risks factors. Whereas Simangunsong et al. (2012) presented sources that can contribute to the uncertain environment. After scrutinizing these two frameworks, the triggers used by the former are overlapped with the sources of uncertainty identified by the latter. Therefore, we have compared these two frameworks to operationalize the identification of the "risk" phase. These two papers identify the most prevalent risks in the risk management literature such as demand, supply, distribution, transportation, delay, supplier, manufacturing, capacity, sovereign, and, most recently, disruption risk (Chen & Paulraj, 2004). These risk factors can also be seen in recent debates, for example, Manhart et al., 2020; Ivanov & Dolgui, 2020; Paul & Chowdhury, 2021, thus making them appropriate for the study.

Further, risk planning and mitigation require a set of strategies that need to be deployed to mitigate related risks. Within the broader prospect of risk management, it is managed at strategical and tactical levels. The strategical level risk is often directed towards the probability of occurrence of a certain event, for which preventive risk strategies could lead to positive outcomes. The practices include the product design, shorter planning period, good decision support system, collaboration decision policy and procedures, use of information communication and technological (ICT) system, pricing strategy, redesign of chain configuration, and/or infrastructure (Manhart et al., 2020; Simangunsong et al., 2012). These practices are devised to reap long-term strategic benefits as well as protection against risks (Manhart et al., 2020). The tactical level is linked to the operational level risk and often needs reactive mitigation strategies to reduce their effects on performance (Gouda & Saranga, 2018). Most identified reactive mitigation strategies in risk mitigation literature include postponement, volume/delivery flexibility, process flexibility, customer flexibility, multiple suppliers, strategic stocks, lead time management, financial risk management, and quantitative techniques (Ali et al., 2017; Christopher & Holweg, 2017; Moktadir et al., 2021; Tang, 2006). Therefore, the list offered by Simangunsong et al. (2012) is both comprehensive and relevant for both preventive and reactive risk management strategies.

Once the strategy is decided by the top management to prevent or mitigate a risk then related performance measures are devised to see whether the deployed risk management strategy reaps the intended benefits (Chenhall & Langfield-Smith, 2007). The scenario entails the role of PM in the risk management process and how embedded it is in the management of risk which is also often mentioned in the risk management literature (Gouda & Saranga, 2018). Therefore, sustainability efforts are integrated as a later stage after risk management strategies.

The SSCPM literature includes several performance measurements tools as well as specific performance measures, often regarded as control and monitoring tools (Laihonen & Pekkola, 2016; Selviaridis & Norrman, 2014), which could be beneficial for the management of risk (Seuring & Müller, 2008; Weekes-Marshall, 2020), for example, such as environmental benchmarking, social reporting, and financial auditing. These performance tools and measures are the part of performance measurement systems and are frequently discussed in the performance management literature (Arzu & Erman, 2010; Grosvold et al., 2014). The firm can also put these measurement systems in place to monitor the implementation of risk management strategies (Beske-Janssen et al., 2015; Seuring & Müller, 2008). This approach has grounds in strategy and performance measurement literature, where, for example, a strategy is devised, and related performance measures are proffered by different functional units of an organization to track or evaluate the success of the implemented strategy (e.g., Blos et al., 2009; Chenhall & Langfield-Smith, 2007; Laihonen & Pekkola, 2016). They can be beneficial in triggering the defect in a firm's operations through continuous auditing and reporting of changes once the risk management strategy has been implemented (Arzu & Erman, 2010). Therefore, incorporating these sustainability performance management efforts as control and monitoring of risk strategies is crucial in the risk management process; however, it was previously mentioned only as a strategy to prevent uncertainty (Simangunsong et al., 2012).

In sum, conceptualizing risk management is a complex process that requires details on the risk factors, management practices, and performance measurement. Therefore, a complete risk management process can only be provided if all these phases are explained together (Figure 1). After extensive scrutiny and cross comparison of various supply chain risk and sustainable supply chain performance literature, we selected four major papers to combine for the purpose of our conceptualization. For the constructs of risk related factors, Tummala and Schoenherr (2011) and Simangunsong et al. (2012) papers were used. Moreover, for performance measurement constructs two performance papers, i.e., Maestrini et al. (2017) and Beske-Janssen et al. (2015) were selected (Table 1). These two papers were used to capture most of the performance constructs (conventional and sustainable, respectively) used so far in supply chain management literature and were suggested by experts in the field. How these constructs are also relevant for BoP literature is discussed in the subsequent section.

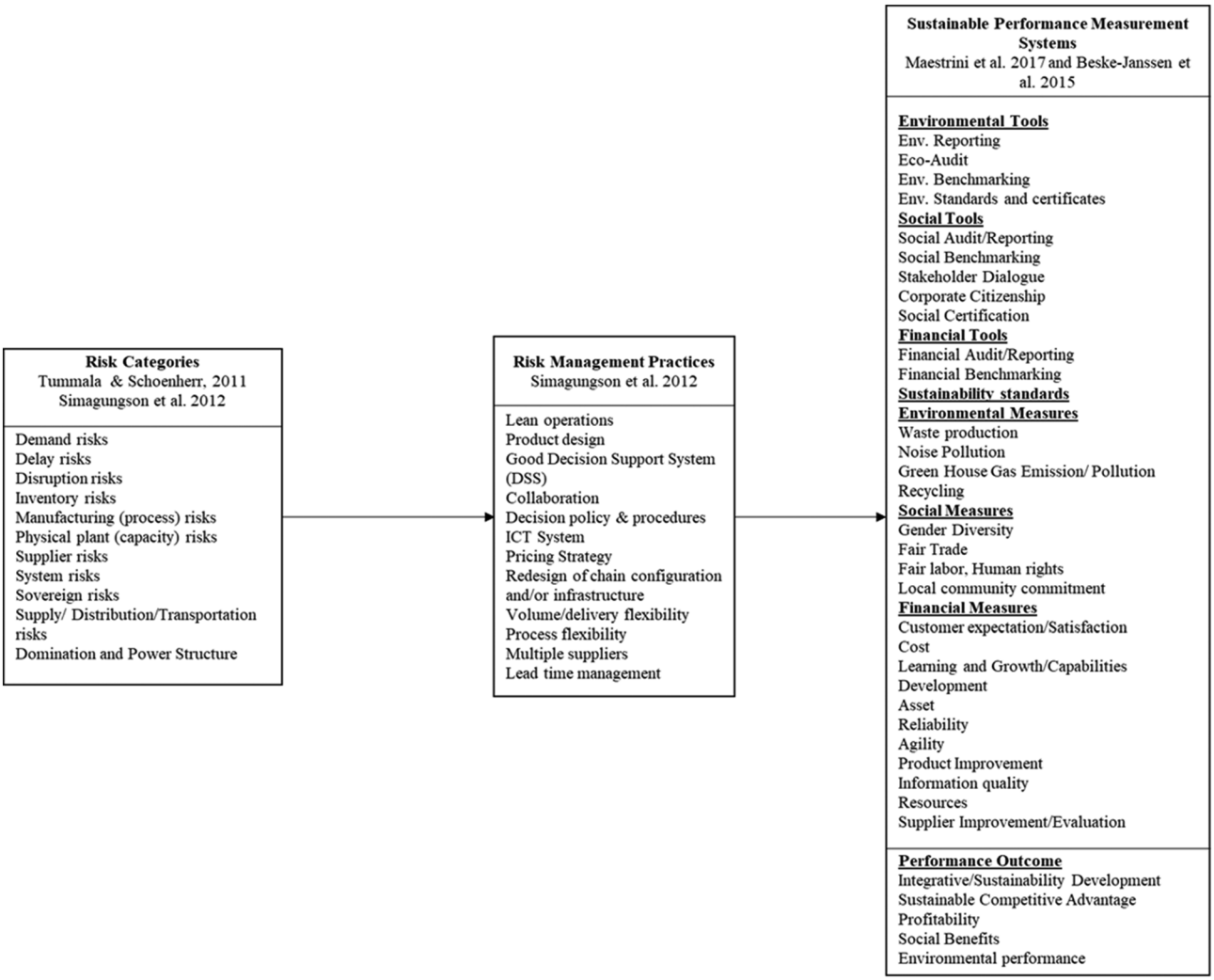

FIGURE 1 Risk and performance management: An overarching logic

2.2 | Base of the pyramid and supply chain risks

The BoP markets seek novel solutions to serve the poor; thus, the usual mindset of national responsiveness may not operate efficiently in these unique markets (Alvarez & Barney, 2007; Golicic et al., 2020; Lashitew et al., 2021). The environment of the BoP is considered unique because it poses challenges of institutional voids, poverty, and informal market structures to the firms operating or aim to serve there (Ramachandran et al., 2012; Shivarajan & Srinivasan, 2013). These challenges make the BoP environment riskier for the firms to operate efficiently. In the wake of the institutional void, the asymmetrical knowledge, expertise and other resources remain in the hand of a few, which might pose risks for the manufacturing firms (source, make, deliver) in achieving their performance targets (Alvarez & Barney, 2007). Besides, the informal markets and infrastructural challenges make it difficult to procure and disperse the produces to the large base of potential customers, i.e., contributing to the supply and distribution risk (Varga & Rosca, 2019). It might further create barriers to tap the purchasing power and social sustainability ingrained in these communities (Golicic et al., 2020).

Similarly, poverty is one of the significant challenges, contributing to the demand risk, which needs to be addressed for successful operations in these markets. Addressing this issue in wholesome manner requires firms to have a deep understanding of their customer base, their needs, and affordability (Calton et al., 2013). Not only this, implementing the risk management strategies also needs strong monitoring to ensure whether these strategies are helpful in BoP context. Since the geographical dispersion in these markets is evident, the use of performance measurement tools or specific performance measures can help facilitate the process. Therefore, the overarching logic of risk management is similar for the BoP discourse (Figure 1), and it proffers a perfect contextual lens to develop the risk framework further and provide insights from the emerging or developing economies.

Institutional voids can describe the background or the environment of the BoP markets, but which risk factors are prevalent for the firms in these markets still needs further exploration. Research specifically addressing institutional voids has been conducted previously, e.g., Parmigiani and Rivera-Santos (2015) and Rehman et al. (2020); however, the former explicitly addresses the institutional voids and how firms can attain competitive advantage by managing these voids,

TABLE 1 Constructs and description

Risk phases	Description
Identification/measurement/assessment	Risk identification involves a comprehensive and structured determination of potential SC risks associated with the given problem, their consequences, magnitude of impact and likelihood of occurrence
Evaluation	Risk evaluation involves the sub-steps of risk ranking and risk acceptance. These two sub-steps are practical particularly when objective probability assessment is difficult or sufficient data are not available to derive probabilities
Prevention	The management of risk before its occurrence, i.e., risk planning
Mitigation	The management of risk after its occurrence, i.e., coping
Control and monitoring	Ensure the execution of the risk plans and evaluate their effectiveness. One can examine the progress made regarding the implemented risk response action plans; corrective actions can be taken if deviations occur in achieving the desired SC performance
Risk categories adapted from Tummala and Schoenherr (2011) and Simangunsong et al. (2012).	
Risk categories	**Description adapted from Tummala and Schoenherr (2011) and Simangunsong et al. (2012).**
Demand risks	Order fulfillment errors, Inaccurate forecasts due to longer lead times, product variety, swing demands, seasonality, short life cycles, and small customer base due to consumer affordability, Information distortion due to sales promotions and incentives, lack of SC visibility, and exaggeration of demand during product shortage
Delay risks	Excessive handling due to border crossings or change in transportation mode, Port capacity and congestion, Custom clearances at ports, Transportation breakdowns
Disruption risks	Natural disasters, Terrorism and wars, Labor disputes, Capacity and responsiveness of alternate suppliers, Regional instability[a]
Inventory risks	Costs of holding inventories, Demand and supply uncertainty, Rate of product obsolescence, Supplier fulfillment
Manufacturing (process) risks	Poor quality (ANSI or other compliance standards), Lower process yields breakdown, Higher product cost
Physical plant (capacity) risks	Lack of capacity flexibility, cost of capacity
Supplier/procurement risks	Supplier fulfillment errors, Selection of wrong partners, High capacity utilization supply source, Inflexibility of supply source, Single source of supply, Poor quality or process yield at supply source, Supplier bankruptcy, Rate of exchange, Percentage of a key component or raw material procured from a single source, Opportunistic Behavior[a]
System risks	Information infrastructure breakdowns, Lack of effective system integration or extensive system networking, Lack of compatibility among SC partners, Lack of knowledge about new system, risk of Stakeholders conflicting interest[a] and legitimacy
Sovereign risks	Communication difficulties, Government regulations, Loss of control, Intellectual property breaches
Supply/distribution/transportation risks	Quality of service, including responsiveness and delivery performance risks, Paperwork and scheduling, Port strikes, Delay at ports due to port capacity, Late deliveries, Higher costs of transportation
Additional risk constructs	
Investment risks[a]	Can be generated from resource scarcity, or other financial hindrances, lack of financial resources
Domination and power structure[a]	Use of power and pressure from the people in authority. Political influence in an organization that leads to the uncertainty of the execution of a supply chain decision, e.g., senior versus junior employees/managers
Risk management strategies adopted from Simangunsong et al. (2012).	
Reducing strategies	**Description adopted from Simangunsong et al. (2012).**
Lean operations	By making a process leaner, it becomes a simpler process with less inherent uncertainty, (Taylor, 2006; Tracy & Knight, 2008).
Product design	Establishing a good initial design or changing the design of a product to enable a better and more robust manufacturing process (Davis, 1993).
Good Decision Support System (DSS)	Refers to the use of decision support systems as a problem solving strategy for complex decision making situations (Shim et al., 2002).
Collaboration	Integration, Contractual agreements with suppliers or buyers, Partnership programs by working more closely with suppliers or customers, for example, in terms of collaborative planning, forecasting and replenishment (CPFR) initiatives (Christopher & Peck, 2004), to reduce uncertainty regarding problems of other members of the supply chain. E-intermediation to facilitate greater information sharing so that adequate information is available for key tasks (Boyle et al., 2008).

(Continues)

TABLE 1 (Continued)

Risk management strategies adopted from Simangunsong et al. (2012).	
Reducing strategies	**Description adopted from Simangunsong et al. (2012).**
Shorter planning period	Runs a planning system in a shorter period thereby reducing the last minute changes (Fisher, 1997).
Decision policy and procedures	Refers to the use of better decision policy & procedures to improve supply chain processes. For example, bureaucratic decision making policies require signatures from several people, making it a difficult and lengthy procedure. Therefore, redesigning procedures to reduce the number of signatures will reduce inherent uncertainty (van der Vorst et al., 1998; van der Vorst & Beulens, 2002).
ICT system	A strategy to use application software, computer hardware and communication technology. For example, the use of specific software, e.g., virus-removing software and firewall software, to prevent damage to the IT/IS system caused by software-based attacks (Bandyopadhyay et al., 1999; Greg, 2006).
Pricing strategy	Refers to the use of a pricing strategy or other incentives to reduce demand uncertainty. Marketing activities such as price promotions could influence end-consumer demand to favor an organization's plan and hence help with managing uncertainty caused by seasonal demand variability (Miller, 1992; Gupta & Maranas, 2003).
Redesign of chain configuration and/or infrastructure	Refers to the process of redesigning the supply chain configuration and/or infrastructure, i.e., the plants, distribution centers, transportation modes, production processes and network relationships, which will be used to satisfy customer demands. The redesign of supply chains often leads to big impacts that span large parts of the organization, and not just incremental changes (Harrison, 2001).
Coping strategies	**Description adopted from Simangunsong et al. (2012).**
Postponement	Delaying activities or processes until the latest possible point in time makes it possible to make things according to known demand rather than to forecast demand (Yang et al., 2004; Yang & Yang, 2010). Toyota, for example, delays decisions on critical specifications until the last possible moment when market information is more definite (Yang et al., 2004).
Volume/delivery flexibility	The agility to manufacture a product despite changes to volume and mix, (Braunscheidel & Suresh, 2009). This can be achieved by providing dedicated production facilities or multiple production facilities (van Donk & van der Vaart, 2005), or by using multi–skilled workers (Miller, 1992).
Process flexibility	The flexibility of the workforce, plant and equipment enable a company to cope with uncertainty caused by frequent product changeovers on the shop floor. For example, multi-skilled workers may lead to process flexibility (Miller, 1992). In addition, process flexibility could be achieved through the implementation of general purpose machines, equipment and technologies (Miller, 1992; Ulrich, 1995).
Customer flexibility	Exploiting relationships with customers that are less sensitive to uncertainty issues and are able to adapt their plans. For example, uncertainty caused by unexpected machine breakdowns in the Printed Circuit Board (PCB) industry may be passed to flexible customers who are less sensitive to the problem (Sawhney, 2006).
Multiple suppliers	Exploiting the availability of potential suppliers and their willingness to help an organization manage its sources of uncertainty. For example, multiple suppliers may enable an organization to cope with changing production plans caused by production problems by choosing a supplier that provides prompt delivery of raw materials (Sawhney, 2006).
Strategic stocks	Refers to the use of inventory to buffer against uncertainty (Davis, 1993; Wong & Arlbjorn, 2008).
ICT system	The availability of a computer based information system to provide information transparency between supply chain partners, which then enables better and faster information flow, but in contrast to one in reducing strategies, this is without reducing the source of uncertainty. For example, an ICT system may facilitate information sharing for managing end-customer demand variations, in terms of cost efficiency and responsiveness to end-customer orders (Prater, 2005).
Lead time management	Refers to the quoting of a longer lead time for customer orders compared with the expected manufacturing lead time, (Prater et al., 2001).
Financial risk management	Refers to techniques of financial risk-mitigation such as purchasing insurance, e.g., business interruption insurance, and buying & selling financial instruments, e.g., forward and futures contracts, (Tomlin, 2006). It may also include other financial risk management planning.
Quantitative techniques	Employing operations research techniques, e.g., forecasting, simulation, and mathematical modeling, to reduce the impact caused by a source of uncertainty, (Behzadi et al., 2018).
Sustainability performance measurement constructs adopted from Beske-Janssen et al. (2015)	
Environment constructs	**Description**
LCA (product system)	Life cycle assessment is a "cradle-to-grave" approach for assessing industrial systems. "Cradle-to-grave" begins with the gathering of raw materials from the earth to create the product and ends at the point when all materials are returned to the earth. LCA evaluates all stages of a product's life from the perspective that they are interdependent, meaning that one operation leads to the next. Sustainable Development Indicator Group (1996)

TABLE 1 (Continued)

Sustainability performance measurement constructs adopted from Beske-Janssen et al. (2015)	
Environment constructs	**Description**
Env. reporting	The reports showing the environmental performance.
Eco-audit	The process of measuring the environmental performance of the focal firms and SC actors.
Env. benchmarking	The environmental standards against which the environmental performance is compared.
Env. standards and certificates	Includes both international and local standards, e.g., ISO 14001
Social constructs	**Description**
Social LCA	Social life cycle assessment is a systematic process using best available science to collect best available data on and report about social impacts (positive and negative) in product life cycles from extraction to final disposal. Benoît et al. 2010
Social audit/reporting	The instrument and reports for measuring the social performance of the focal firms and SC actors.
Social benchmarking	The social standards against which the social performance is compared.
Stakeholder dialog	Communication with both traditional and non-traditional stakeholders.
Corporate citizenship, i.e., sponsorship, CSR, CSE (entrepreneurship)	Corporate citizenship either for reputational benefits or providing the social solution.
Social certification	Includes both international and local standards, i.e., SA 8000; OHS
Economic constructs	**Description**
Financial audit	"material quality, output quality, new product development, modify product, product improvemen" Adapted from Gunasekaran and Sandhu (2010, p. 132)
Financial reporting	"manufacturing lead time, rate of introducing production, delivery leadtime, due-date performance, frequency of deliver" (Gunasekaran & Sandhu, 2010, p. 130)
Financial benchmarking	"percentage of orders delivered date, average lateness of orders, proportion of products in stock, mean deviation from promised arrival, schedule adherenc" (Gunasekaran & Sandhu, 2010, p. 135)
Performance process and outcome constructs adopted from Maestrini et al. (2017) and Beske-Janssen et al. (2015)	
Focus	
Internal	Scope internal supply chain processes
External	Scope external supply chain processes, i.e., supplier, customer
	Customer expectation/Satisfaction
	Supplier Improvement/Evaluation
Economic/operational/ conventional constructs	**Description adopted from Maestrini et al. (2017)**
Learning and growth/capabilities development	New products developed; New markets entered; R&D spend/sales; Training/sales; Investment/total assets/ capability development[a]
Financial performance	Sales growth, Profit growth, Return on equity, Return on assets, growth in volume of people
Asset	Asset attribute refers to the efficiency and effectiveness of asset utilization measured in terms of cash-to-cash cycle time, return on fixed assets and return on working capital.
Responsiveness	Responsiveness refers to the speed at which tasks are performed
Cost/scalable	Less cost with greater output, i.e., Cost reduction
Reliability	Reliability represents to the ability to perform tasks as expected (perfect conditions of the orders fulfilled)
Agility	Flexibility, adaptability and value at risk
Product improvement	Continuous improvement in already existing product
Sustainable competitive advantage/ competitiveness	Achieving and maintaining competitive advantage
Information quality	The quality in logistics education, quality of interaction between buyers and suppliers

(Continues)

TABLE 1 (Continued)

Economic/operational/ conventional constructs	Description adopted from Maestrini et al. (2017)
Resources	Resources have been categorized as physical capital, human capital, and organizational capital (Barney, 1991) and have been extended to include financial capital, technological capital, and reputational capital (Grant, 1991). They may be tangible, such as infrastructure, or intangible, such as information or knowledge sharing (Größler & Grübner, 2006). Resources are "something a firm possesses or has access to, not what a firm is able to do" (Größler & Grübner, 2006 p. 460)
Environmental outcomes	**Description**
Waste production	The production of unwanted materials as a by-product of economic processes (Sustainable Development Indicator Group, 1996).
Green house gas emission/ pollution	The emissions of harmful gases into the air is called air pollution because they alter the chemical composition of the natural atmosphere. (adapted from Daly & Zannetti, 2007)
Noise pollution	Noise pollution is generally defined as regular exposure to elevated sound levels that may lead to adverse effects in humans or other living organisms (Environmental Pollution Centers, 2019).
Recycling	Recycling means the processing of waste (i.e., unwanted or useless materials) and its (re)introduction back into the material cycle so that contamination of the environment is minimized. (Tanskanen, 2013)
Environmental performance	Environmental benefit achieved as a result of business activity—that is, energy consumed, waste produced, improved air quality, and so on.
Social outcomes	**Description**
Gender diversity	It is the proportion of males to females in an organization that can affect the way in which they interact and behave with one another at the workplace, and thereby impact the social and cultural environment (IGI Global, 2020).
Fair trade	Fairtrade means that the producers receive prices that cover their average costs of sustainable production, the premium which can be invested in projects that enhance social, economic and environmental development (Fairtrade International, 2019).
Human rights	Human rights include the right to life and liberty, freedom from slavery and torture, freedom of opinion and expression, the right to work and education, and many more. Everyone is entitled to these rights without discrimination (United Nations, 2020).
Fair labor	"This includes paying less than the minimum wage, employing young children, and working employees for long hours without premium overtime pay" (Goldstein, 1999, p. 1003).
Local community commitment	LCC means, taking the long-term view of, the embeddedness of firms into local communities to deal with the local contestations for survival that filter into everyday lives of the poor (Ansari et al., 2012).
Social benefit/social performance	Social benefits achieved as a result of a business activity—poverty alleviation, empowerment, inclusiveness, and so on.
Integrative/sustainability development	Sustainability without focusing on particular dimension, i.e., meets the needs of the present, without compromising the ability of future generations to meet their own needs. The integrative aspect in addition provides the means to include environmental and social management into the conventional economic management.
Additional constructs	
Internationalization performance/ BoP performance	Investment intensity, geographic concentration, geographical extensity
Employee/intrapreneuralship	The proactivity of employees within an organization, i.e., self-motivated, action oriented
Social capital	Social capital is defined as those features of social structures—such as levels of interpersonal trust and norms of reciprocity, mutual aid etc—which act as resources for individuals and facilitate collective action. (Nahapiet & Ghoshal, 1998)
Trust	The degree of reliability enjoyed between the SC partners which also facilitates SC processes (Al-Saa'da et al., 2013)
Commitment	Commitment may be defined as the relative strength of an individual's identification with and involvement in a particular organization (Steers, 1977)
Supplier integration	Integrating suppliers and buyers into the SC processes (Schrader et al., 2012)
Empowerment	Empowerment means meeting the need of individuals along with increasing their productivity and income level (Ansari et al., 2012)

TABLE 1 (Continued)

Additional constructs	
Mutual benefits/value creation/win-win	Aventure's ability to generate acceptable economic returns to their investors and provide valued societal returns to the local community in which they operate
Innovation	Innovation here is largely regarded as a new ways or new innovative products delivered to the poor concentrating on their specific needs.

[a]Additional explanation of the constructs frequently observed in BoP literature.

while latter differentiates between institutional voids and shows its impact on supply chain risks and performance. From the above two, it clear that institutional voids and SC risk offer different concepts; therefore, a clear distinction between two has already been established (Rehman et al., 2020). Furthermore, the latter does deal with the performance constructs but does not incorporate performance measurement, i.e., leaving a gap in understanding the SSCPM aspect. Furthermore, the latter paper also neglected the supply chain risk phases, i.e., leaving a gap in the literature, which makes it even more interesting to what extent this overarching risk management logic is applied in the BoP literature.

3 | METHODOLOGY

In general, a literature review is a recommended methodology to anchor a research idea in the body of existing knowledge (Seuring & Gold, 2013). Fink (2019, p. 6) defined a literature review (LR) as "a systematic, explicit, and reproducible design for identifying, evaluating and interpreting the existing body of recorded documents." The aim of the paper is to identify risk, related strategies and performance measures from the existing body of BoP-SCM documents. Besides, it is a sort of a meta-narrative which identifies and understands all potentially relevant research traditions that are impossible using a meta-analysis effect-size (Snyder, 2019). Therefore, a LR is found to be a suitable method for this study. The approach also allows the researchers to apply open coding as well as using existing codes, which helps to incorporate additional constructs that emerged during the review process. Therefore, an abductive research approach has been undertaken.

Furthermore, the BoP papers were gathered using the Web of Science (WOS) database, which was selected because of the extensive data set of the peer-reviewed journals and also because of high accessibility and user-friendly interface. Only English language peer-reviewed articles were considered for further analysis because English is the widely understood language in the world.

The analyzed papers were identified employing keyword search in WOS. Initial keywords include "base of the pyramid," "BoP," or "bottom of the pyramid." This method identified around 944 papers from diverse fields of study. Among these papers, three independent SCM researchers shortlisted the papers particularly falling under the SCM domain (using title, abstract, conclusion approach) and reach a consensus of their inclusion into the content analysis. A total of 216 papers were identified through this approach. All these papers were then downloaded in MAXQDA to shortlist papers particularly addressing risk and sustainability performance. As a result, a total of 164 papers (Figure 2) from the year 2000 to 2022 were selected and mutually agreed upon between 3 researchers to ensure face validity, the approach undertaken is also recommended by various researchers (such as Snyder, 2019).

After condensing the BoP risk and performance literature, a content analysis technique was employed (Snyder, 2019). The content analysis technique comprises coding of the selected articles on a scale (Mayring, 2015). However, standardized means of abstracting appropriate information from each article should be used, such as "it can take the form of conceptualizations of a certain idea or theoretical perspective" (Snyder, 2019, p. 337). Since the paper uses a conceptualization from the general supply chain risk management and performance measurement literature, content analysis is suitable for extracting information from the BoP literature. Therefore, the content of the shortlisted papers for this study was first analyzed on a Likert type scale (containing three questions per construct; i.e., is the construct represented in the paper? Is the construct used as an antecedent to achieve something? Is the construct mentioned as an outcome/endpoint?).

Furthermore, the meta-narrative approach by Snyder (2019) also argues that this approach is often combined with the quantitative analysis techniques such as descriptive, frequency, contingency, and meta-analysis (for example, Borman & Dowling, 2008). The contribution of this approach includes "the ability to map a field of research, synthesize the state of knowledge, and create an agenda for further research or the ability to provide a historical overview or timeline of a specific topic" (Snyder, 2019 p. 335). Therefore, descriptive analysis was conducted to map the constructs in the BoP context and correlation analysis were performed on the analyzed content to synthesize the state of knowledge based on the identified links. For the said purpose, the data set was prepared in an excel file and afterwards converted to a .csv file to run frequency and correlation analysis in SPSS.

The frequencies show the number of times a construct appear in the relative dataset (Mayring, 2015). Therefore, the results of frequencies alone cannot explain the relationship between the constructs, for which correlation analysis technique was employed (Mayring, 2015). The BoP literature provides rich content on risk management. However, the specific focus of the papers was rather diverse. The papers used the constructs in both habitual (i.e., customary mentioning of a construct) and explicit (specifically dealing with the construct) ways. The habitual ways of dealing with a construct often create biases in the results. Due to limited knowledge about the use of constructs, by employing 0 and 1, the constructs may be only assessed superficially, which makes issues in the validity of the data. The point has already been raised by several researchers but never addressed so far

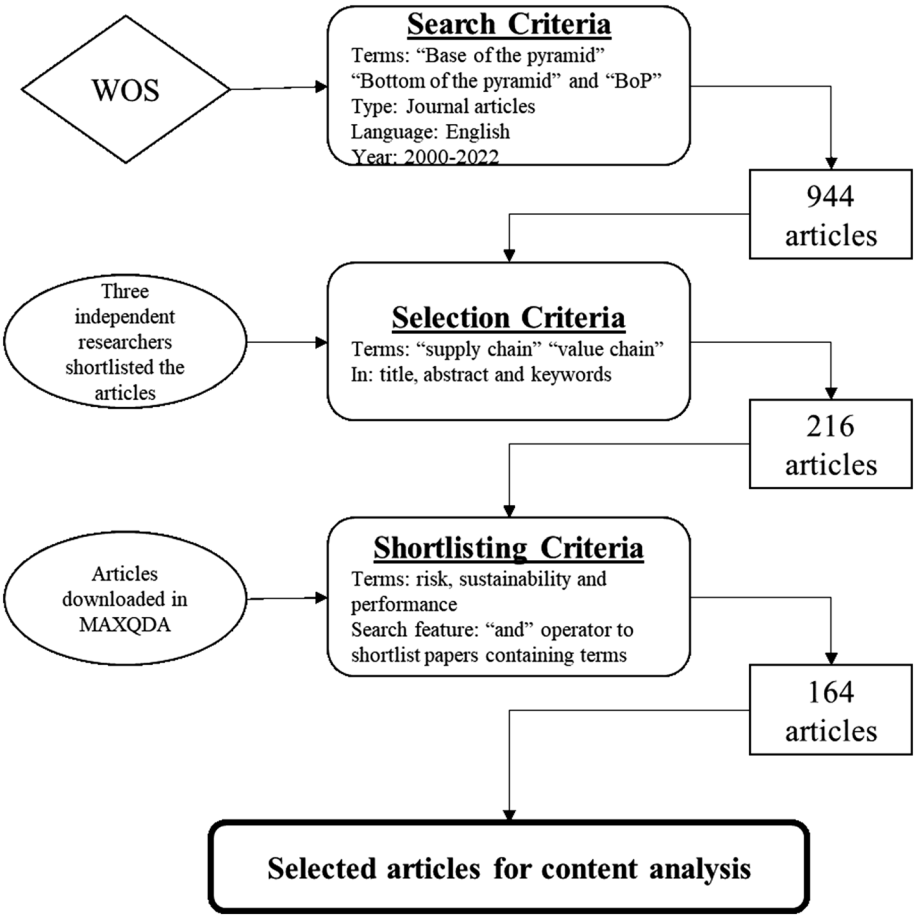

FIGURE 2 Data collection process

(Rehman et al., 2020). Therefore, to address this, an in-depth analysis tool has been formulated to get the in-depth natural essence of the constructs used in BoP literature. It helped in eliminating the chances of adding constructs that were only mentioned habitually in the literature. The findings comprise the spearman correlation coefficient values greater than 0.3 and significant at *p* value less than 0.001. This non-parametric correlation coefficient is also selected because it is appropriate if an ordinal scale is being used. Only significant correlation values were used for the interpretation of the literature.

4 | FINDINGS

The findings are divided into three sections: (1) descriptive, (2) frequencies, and (3) correlation. Descriptive and frequencies present the current state of BoP literature as per the appearance of selected constructs in the scientific papers. Correlation gives an association between two constructs based on their pattern of occurrence in the analyzed papers.

4.1 | Descriptive

First, all the papers were selected based on the richness of their content related to respective constructs. The analyzed papers are distributed between the year 2000 and 2022 (Figure 3).

Figure 3 shows the number of BoP papers appeared in English language peer-reviewed journals during the last decade, where the most published papers were in the year 2012, because of the special issues dealing with the subject in the *Journal of Business Ethics* (JBE) and *Journal of Business Research* (JBR). Following a decrease in BoP focus in years afterwards, i.e., reaching the smallest number of papers in 2016, the BoP literature again saw a boost in 2019. It is because of recent calls for special issues in the *Journal of Business Logistics* (JBL) and *International Journal of Physical Distribution and Logistics Management* (IJPDLM). However, the data set contains paper until 2022. We encourage other researchers to examine the research further to keep the research stream up to date. A list of journals and the number of selected articles is presented in Figure 3.

Lastly, the methodological dispersion among the BoP papers is quite diverse. It mainly comprises the case study methodology (81 papers, 49%), followed by survey research (41 papers, 25%). Moreover, conceptual and theoretical research (28 papers, 17%) is the third most used methodological approach. Only 22 papers (i.e.,13%) use literature review as a research methodology, therefore, choosing literature review contributes to the strength of the paper at hand. Lastly, three papers used mathematical models (3 paper, 2%) and no paper used Delphi-study technique, suggesting a gap in the methodological choices. The total methodological dispersion exceeds the total number of paper due to use of more than one methodology in one paper. These findings are in line with previous research, i.e., Kolk et al. (2014).

4.2 | Correlation and frequency findings: A synthesis of the BoP literature

The correlation findings are further interpreted in parts. Figures 4–6 present three frameworks derived from correlation analysis (see Table 3). These three frameworks include risk and related strategies, risk strategies, and related performance measures, interlink between performance measures. Frequencies of each construct are also mentioned in these frameworks; however, a complete frequency analysis is presented in Table 2. Significantly correlated constructs that are less frequently mentioned exhibit gaps in the BoP literature for future studies to address. The subsequent sections discuss these three frameworks and synthesize the BoP literature.

4.2.1 | Risk and related practices

The first analysis (Table 3) predicts general association between the risk factors, the management practices (Figure 4). The risk categories are further divided into internal and external risk factors that prevail in the BoP environment. The two prominent risk factors external to firms are system risk and investment risk. The system risk being described as a risk associated with the business ecosystem; therefore, it is viewed here as an overarching risk in BoP supply chains. A significant body of the literature suggests collaboration, redesign of the chain configuration and decision policy as best strategies to circumvent system risk (e.g., Calton et al., 2013; Turker & Vural, 2017). Similarly, financial management is frequently discussed practice in combination with investment risk.

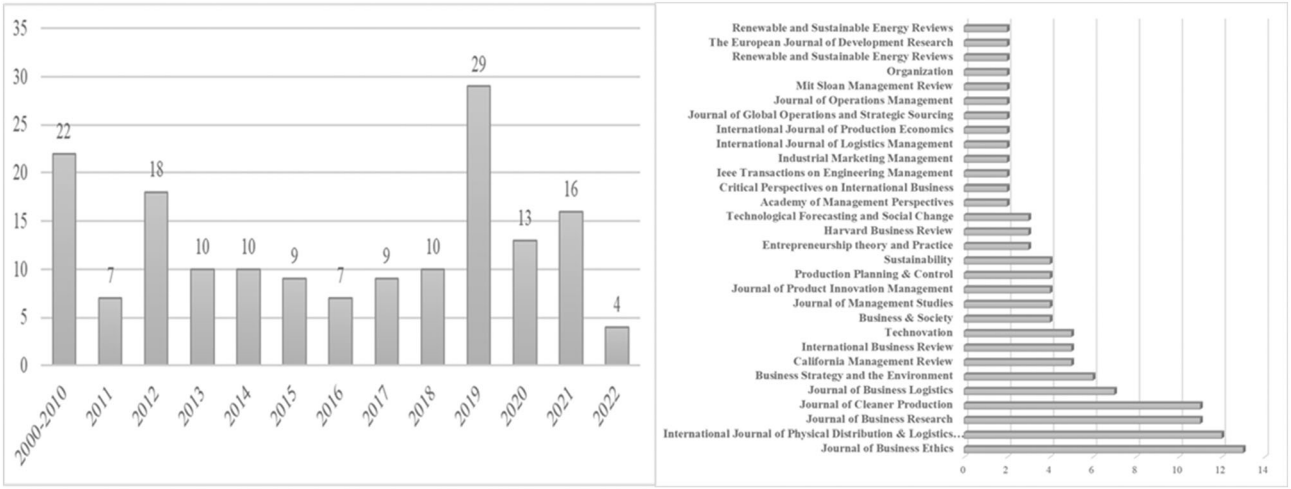

FIGURE 3 Distribution of supply chain papers (years and journals) covering the BoP domain.

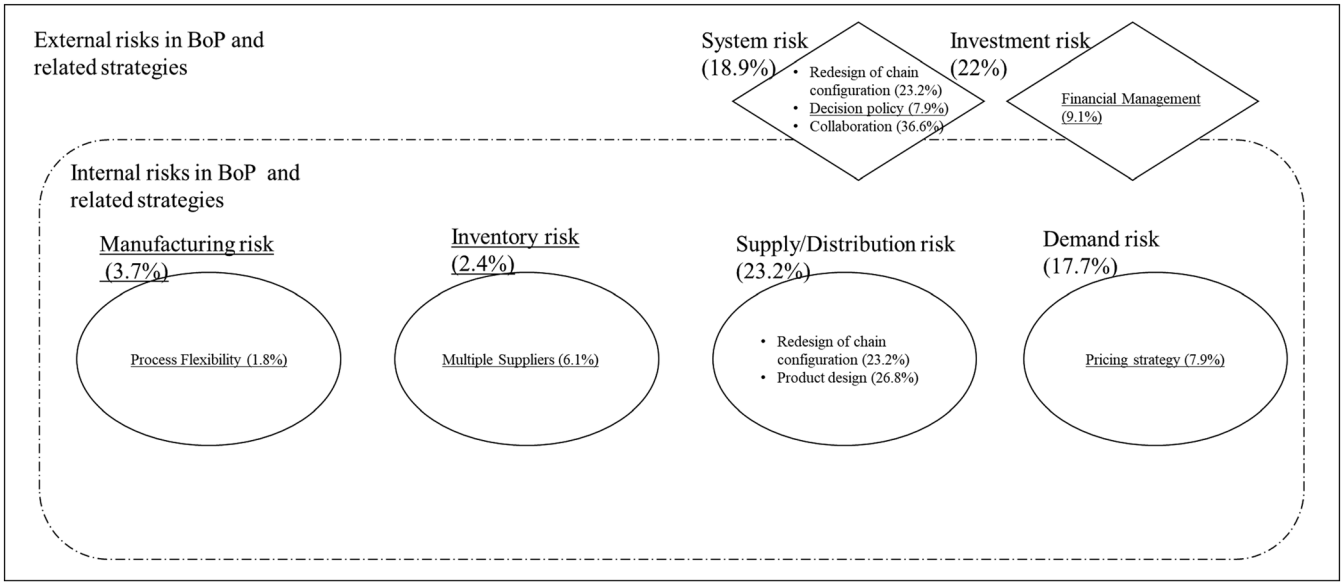

FIGURE 4 Correlation between risk factors and related practices

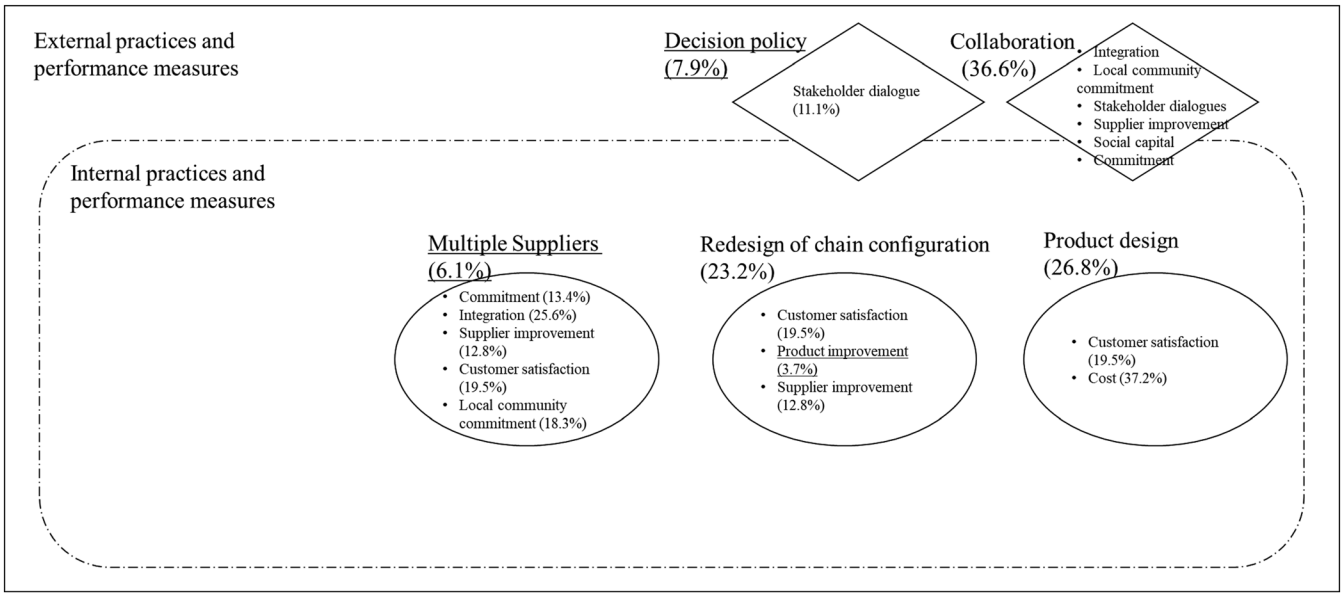

FIGURE 5 Correlation between risk management practices and performance measures

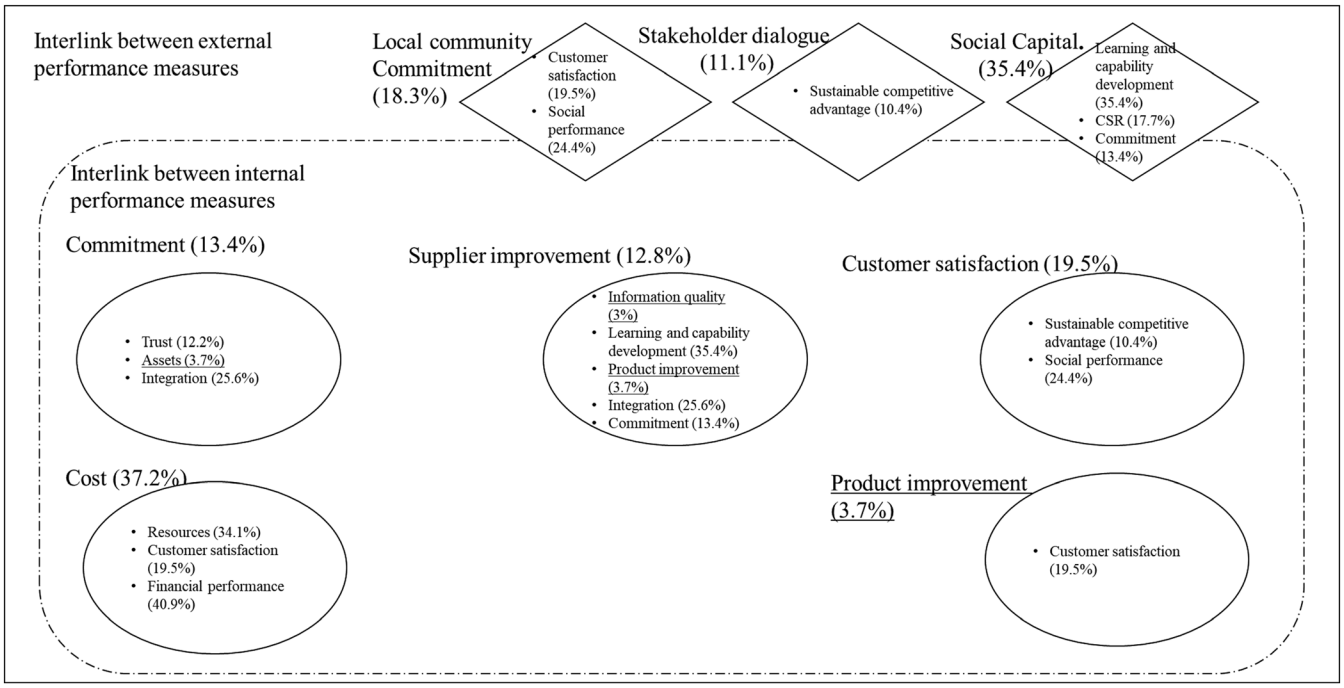

FIGURE 6 Correlation between performance measures

Moreover, internal risks include manufacturing, inventory, supply/distribution, and demand risk where process flexibility, multiple suppliers, redesign of chain configuration or product design, and pricing strategy are the proffered risk management practices to contain these risks, respectively. Each of these risk factors and the associated practices (as presented in Figure 4) are discussed in the subsequent sections.

System risk and collaboration, redesign of the chain configuration, and decision policy

System risk is the lack of compatibility among the supply chain actors, lack of or unreliable information infrastructures, lack of knowledge and awareness about new system, which all together defines the BoP ecosystem, and referred to as "institutional voids" and "poverty" within the BoP literature (Seelos & Mair, 2007). The incompatibility

TABLE 2 Constructs used as a basis of content analysis along with the frequencies

Risk phases		**Frequency (%)**
Identification/measurement/assessment		46.3
Evaluation		29.9
Prevention		15.9
Mitigation		43.3
Control and monitoring		8.5
Risk categories	**Example from BoP literature**	
Demand risks	(Anderson & Markides, 2007; McMullen, 2011)	17.7
Disruption risks	(Duarte et al., 2019; Hill & Mudambi, 2010)	8.5
Inventory risks	(Duarte et al., 2019; Ramachandran et al., 2012)	5.5
Manufacturing (process) risks	(London et al., 2010; Schrader et al., 2012)	2.4
Supplier risks	(Hahn & Gold, 2014; Rosca et al., 2019)	3.7
System risks	(Akula, 2008; Kistruck et al., 2011; Rivera-Santos et al., 2012)	18.9
Sovereign risks	(London et al., 2010; Varadarajan & Kaul, 2018)	19.5
Supply/distribution/transportation risks	(Hens, 2012; Vachani & Smith, 2008)	23.2
Additional risk constructs	**Example from BoP literature**	
Investment risks	(Akula, 2008; VanSandt & Sud, 2012)	22.0
Domination and power structure	(Vachani & Smith, 2008)	8.5
Preventive strategies	**Example from BoP literature**	
Lean operations	(Rebehy et al., 2017)	4.3
Product design	(Ramachandran et al., 2012)	26.8
Good Decision Support System (DSS)	(Berger et al., 2011)	9.1
Collaboration	(Calton et al., 2013; Hahn & Gold, 2014; Rivera-Santos et al., 2012; Rivera-Santos & Rufín, 2010)	36.6
Decision policy and procedures	(Varadarajan, 2014)	7.9
ICT system	(Berger & Nakata, 2013)	12.2
Pricing strategy	(Karnani, 2007)	7.9
Redesign of chain configuration and/or infrastructure	(Rivera-Santos & Rufín, 2010; Schrader et al., 2012)	23.2
Mitigation strategies	**Example from BoP literature**	
Volume/delivery flexibility	(Ahrens et al., 2019)	2.4
Process flexibility	(Ahrens et al., 2019)	1.8
Multiple suppliers	(Rivera-Santos et al., 2012; VanSandt & Sud, 2012)	6.1
Lead time management	(Howell et al., 2018)	3.0
Financial management	(Koster et al., 2019; London et al., 2010)	9.1
Performance measurement tools	**Example from BoP literature**	
Eco-Audit	(Seuring et al., 2019)	0.6
Env. standards and certificates	(Gold et al., 2013)	4.9
Social audit/reporting	(Seuring et al., 2019)	1.2
Social benchmarking	(Koster et al., 2019)	0.6
Stakeholder dialog	(Calton et al., 2013; Matos & Silvestre, 2013)	11.0
Corporate citizenship, i.e., sponsorship, CSR, CSE (entrepreneurship)	(Arnold & Valentin, 2013)	17.7
Social certification	(Koster et al., 2019)	4.9
Environmental measures	**Example from BoP literature**	
Waste production	(Rebehy et al., 2017; Varadarajan, 2014)	5.5
Green house gas emission/pollution	(Rebehy et al., 2017; Varadarajan, 2014)	5.5

(Continues)

TABLE 2 (Continued)

Environmental measures	Example from BoP literature	
Recycling	(Rebehy et al., 2017)	4.9
Environmental performance	(Hudnut & DeTienne, 2010; Rebehy et al., 2017)	8.5
Social measures	**Example from BoP literature**	
Gender diversity	(Hens, 2012)	1.2
Human rights	(Mena et al., 2010)	1.8
Fair labor	(Arnold & Valentin, 2013)	2.4
Social benefit/social Performance	(Hall et al., 2012; Halme et al., 2012)	24.4
Local community commitment	(VanSandt & Sud, 2012)	18.3
Integrative/sustainability development	(Marconatto et al., 2016)	26.2
Economic/operational/conventional measures	**Example from BoP literature**	
Learning and growth/capabilities development	(Ansari et al., 2012; Lim et al., 2013)	35.4
Financial	(Gino & Staats, 2012; McMullen, 2011)	40.9
Asset	(Shivarajan & Srinivasan, 2013)	3.7
Responsiveness	(Duarte et al., 2019)	6.1
Cost	(Elaydi & Harrison, 2010; Lim et al., 2013; Ray & Ray, 2010)	37.2
Agility	(Berger & Nakata, 2013; Nakata & Weidner, 2012)	9.8
Product improvement	(Ahlstrom, 2010)	3.7
Sustainable competitive advantage/competitiveness	(Anderson & Markides, 2007; Schuster & Holtbrügge, 2014)	10.4
Information quality	(Galariotis et al., 2011)	3.0
Resources	(Ray & Ray, 2010; Tashman & Marano, 2009)	34.1
Customer expectation/satisfaction	(Matos & Silvestre, 2013)	19.5
Supplier Improvement/evaluation	(Jajja et al., 2019)	12.8
Additional measures	**Example from BoP literature**	
Internationalization performance/BoP performance	(Bardy et al., 2012)	14.0
Employee/intrapreneuralship	(Halme et al., 2012)	6.1
Social capital	(Ansari et al., 2012; Kistruck et al., 2013; Varga & Rosca, 2019)	35.4
Trust	(Schuster & Holtbrügge, 2012; Sutter et al., 2014)	12.2
Commitment (supply chain actors)	(Duarte et al., 2019; Vachani & Smith, 2008)	13.4
Integration	(Rivera-Santos & Rufín, 2010)	25.6
Empowerment	(Ansari et al., 2012)	6.7
Mutual benefits/value creation/win-win	(London et al., 2010)	25.0
Innovation	(Ahlstrom, 2010; Halme et al., 2012)	48.8

demands the need to create awareness and knowledge sharing among and within the BoP communities, which if remain unsolvable can make the markets less attractive to the MNCs as well as local producers. Further, the fragile environment of the BoP markets can easily be used for the exploitation of local members of the society (Kistruck et al., 2013). The exploitation leads to a trade-off of social benefit to the sole financial benefit of the big multi-national, transnational, and local powerful companies (Arora & Romijn, 2012). However, forming collaboration (as an overarching strategical choice) can help in dealing with the system risk.

A large body of scholars endorses strategies like collaborating with the third party actors, for example, Perez-Aleman and Sandilands (2012) and Varga and Rosca et al. (2019), consider collaboration with NGOs as a preliminary requirement to enter the BoP markets. Because the NGOs tend to have strong links within the community and can serve as a bridge between focal firms and upstream and downstream supply chain actors, i.e., dealing with the information infrastructure barriers (Chesbrough et al., 2006). For example, the native suppliers, especially, the small scale often sell their products, lower than market cost, to the available buyers because they lack the resources to reach markets cost-efficiently (London & Anupindi, 2012). NGOs can help in recognizing, training and making them a part of supply chain which in turn empower them and make them compatible to overcome the system risk. Similarly, a correlation

TABLE 3 Correlation values greater than 0.3 and significant at $p < 0.001$

	1 Local_Comm_ commitment	2 Social_ audit	3 Social_ bench	4 Stakeholder_ dialogue	5 Social_ benefits	6 CSR	7 Social_ certificates	8 Learning_ capabilites_ develp	9 Financial	10 Assets	11 Cost	12 Agility	13 Cust_ satisfaction	14 Product_ improvement	15 Sustainable_ competitive_ advantage	16 Supplier_ improvement	17 Info_ quality	18 Resources
1	1																	
2	−0.03	1																
3	−0.029	.660**	1															
4	.237**	0.137	0.029	1														
5	.308**	0.137	0.055	0.133	1													
6	.162*	0.077	−0.003	.205**	0.151	1												
7	−0.031	.374**	.227**	.304**	0.137	0.049	1											
8	0.111	−0.08	0.026	.270**	.180*	.298**	.248**	1										
9	.189*	0.092	−0.022	0.103	.450**	.166*	0.022	0.016	1									
10	0.137	0.012	0.106	0.081	0.044	−0.029	−0.05	−0.044	.169*	1								
11	.292**	0.065	0.083	0.068	.246**	0.009	0.058	−0.006	.338**	.229**	1							
12	0.142	−0.059	−0.059	0.073	0.087	−0.002	0.079	.181*	0.06	0.106	0.126	1						
13	.333**	.198*	.179*	.185*	.307**	0.12	.195*	.211**	.221**	.157*	.496**	.186*	1					
14	.240**	−0.058	0.056	0.092	.174*	0.059	0.045	.263**	0.129	0.097	.228**	.281**	.375**	1				
15	0.148	.238**	0.135	.334**	.199*	.295**	.180*	.211**	0.099	0.147	.163*	.287**	.338**	0.13	1			
16	.212**	0.055	−0.072	.330**	.211**	0.108	.368**	.374**	.173*	0.081	0.152	.223**	.291**	.340**	.207**	1		
17	.204**	0.091	−0.048	.165*	.174*	−0.022	.169*	.194*	0.129	.196*	0.028	0.12	.202**	0.111	0.128	.396**	1	
18	.281**	−0.072	−0.03	0.128	0.123	0.078	0.149	0.116	0.12	0.13	.431**	.180*	.211**	0.128	.235**	.200*	−0.022	1
19	.358**	−0.051	0.054	.323**	.157*	.319**	0.102	.398**	0.076	0.122	0.039	.217**	.204**	0.127	.219**	.208**	0.128	.168*
20	.223**	−0.022	−0.022	.241**	0.027	0.02	−0.023	0.043	0.02	.188*	0.014	0.151	0.035	−0.019	.299**	0.082	0.119	.180*
21	.275**	−0.022	−0.022	.282**	0.047	−0.075	.161*	0.104	0.095	.303**	.187*	.246**	0.115	0.102	.268**	.431**	.179*	.241**
22	0.108	−0.068	−0.007	.251**	0.099	−0.084	0.125	0.072	0.094	.186*	0.106	0.11	0.097	0.045	.194*	.358**	0.135	0.088
23	0.032	0.015	0.015	−0.037	0.088	0.009	0.052	0.133	0.118	−0.023	.180*	0.149	.327**	.337**	.176*	0.125	−0.152	0.079
24	0.132	−0.022	−0.022	−0.077	0.063	−0.003	−0.06	−0.017	0.052	−0.093	0.145	0.042	0.112	0.031	−0.001	0.107	0.072	0.034
25	0.126	−0.045	−0.045	0.088	−0.025	−0.052	−0.004	0.115	−0.055	0.035	0.061	.235**	0.121	.384**	0.095	.192*	0.088	−0.019
26	.247**	0.003	0.009	.198*	.210**	.192*	.180*	.405**	.181*	0.076	.181*	.193*	.194*	0.145	0.039	.349**	.320**	0.117
27	0.087	−0.016	−0.026	.170*	0.141	0.051	.188*	.285**	0.036	0.1	.188*	.269**	.351**	.334**	.290**	.357**	.157*	0.144
28	0.008	0.035	−0.048	.169*	0.039	0.068	0.128	.178*	.230**	0.028	0.049	0.087	0.043	0.137	.209**	.219**	.281**	0.131
29	.263**	−0.108	−0.108	0.111	0.079	−0.012	−0.023	.200*	0.082	0.098	.318**	.263**	.310**	.276**	.173*	.230**	0.038	.162*
30	.406**	0.012	0.011	.445**	0.138	0.116	0.146	.204**	0.128	.213**	.174*	.172*	.241**	0.13	.280**	.368**	.264**	.214**
31	0.106	−0.048	−0.048	.306**	.250**	.159*	.204**	.211**	0.064	0.027	.171*	0.042	0.133	0.061	0.085	0.137	0.063	.170*

TABLE 3 (Continued)

	1 Local_Comm_commitment	2 Social_audit	3 Social_bench	4 Stakeholder_dialogue	5 Social_benefits	6 CSR	7 Social_certificates	8 Learning_capabilites_develp	9 Financial	10 Assets	11 Cost	12 Agility	13 Cust_satisfaction	14 Product_improvement	15 Sustainable_competitive_advantage	16 Supplier_improvement	17 Info_quality	18 Resources
32	.256**	0.145	0.04	0.047	0.103	0.133	−0.005	.230**	.200*	0.131	.209**	.259**	.226**	.224**	.193*	.250**	0.111	−0.005
33	.278**	−0.099	0.007	0.092	.168*	0.084	0.116	.292**	0.11	0.117	.270**	.282**	.386**	.310**	.243**	.338**	0.128	.214**
34	0.107	−0.033	−0.033	−0.004	0.033	−0.146	−0.092	0.015	0.049	0.04	.160*	0.097	0.148	0.05	−0.011	0.105	−0.006	−0.019
35	−0.061	−0.031	−0.031	−0.052	−0.04	−0.088	−0.087	0.031	−0.021	0.129	0.118	.202**	.209**	.224**	0.113	−0.061	0.01	0.027
36	.313**	0.086	0.087	.248**	.216**	0.005	.213**	0.109	0.137	0.143	.231**	.189*	.313**	.170*	0.135	.373**	.191*	0.11
37	0.102	.213**	0.084	.162*	0.063	−0.048	0.118	0.069	.177*	−0.043	0.11	−0.08	0.106	0.109	0.089	.183*	.269**	−0.032

*$p < 0.05$.

**$p < 0.01$.

TABLE 3 (Continued)

	19 Social_capital	20 Trust	21 Commitment	22 Integration	23 Demand_risk	24 Inventory_risk	25 Manufacturing_risk	26 System_risk	27 Supply_distribition_risk	28 Investment_risk	29 Product_design	30 Collaboration	31 Decision_policy	32 Pricing_strategy	33 Reconfigure_SC	34 Volume_delivery_flex	35 Process_flex	36 Multiple_supplier	37 Financial_management
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

TABLE 3 (Continued)

	19 Social_ capital	20 Trust	21 Commitment	22 Integration	23 Demand_ risk	24 Inventory_ risk	25 Manufacturing_ risk	26 System_ risk	27 Supply_ distribition_ risk	28 Investment_ risk	29 Product_ design	30 Collaboration	31 Decision_ policy	32 Pricing_ strategy	33 Reconfigure_ SC	34 Volume_ delivery_ flex	35 Process_ flex	36 Multiple_ supplier	37 Financial_ management
18																			
19	1																		
20	.221**	1																	
21	.304**	.324**	1																
22	.161*	.278**	.415**	1															
23	0.016	−0.148	0.003	−0.042	1														
24	−0.08	0.025	0.078	0.032	−0.013	1													
25	0.127	0.031	.158*	0.087	.177*	−0.052	1												
26	.384**	−0.035	0.142	0.153	0.065	0.003	0.06	1											
27	.184*	−0.048	0.102	0.099	.444**	−0.016	.256**	.287**	1										
28	0.012	0.046	−0.052	0.129	−0.128	0.04	0.075	.227**	0.036	1									
29	.231**	0.012	.181*	0.13	.289**	−0.053	.284**	.198*	.347**	0.029	1								
30	.459**	.265**	.387**	.323**	−0.018	−0.002	.222**	.334**	.236**	0.077	.299**	1							
31	.208**	−0.005	0.029	−0.064	0.099	−0.055	0.008	.357**	.173*	0.018	0.076	0.143	1						
32	.154*	0.033	.179*	0.139	.312**	0.144	0.101	.290**	.188*	−0.056	.206**	.159*	−0.021	1					
33	.227**	0.005	0.146	.238**	.250**	.175*	.178*	.378**	.513**	0.096	.339**	.330**	0.084	.351**	1				
34	0.066	−0.006	0.092	0.032	0.06	0.143	.274**	0.027	0.073	−0.022	.213**	−0.073	0.081	0.099	0.01	1			
35	0.013	0.033	0.08	0.005	0.141	−0.036	.404**	−0.083	0.043	0.029	0.13	−0.016	0.012	0.035	0.08	.448**	1		
36	.262**	0.074	.413**	.359**	0.067	.315**	0.084	.265**	.196*	−0.049	0.119	.288**	0.119	.213**	.328**	.182*	0.01	1	
37	−0.006	0.022	−0.009	0.009	0.055	.156*	0.118	.206**	−0.011	.423**	0.102	.211**	−0.028	0.086	0.115	0.067	−0.012	−0.026	1

*$p < 0.05$.

**$p < 0.01$.

between system risk and redesign of supply chain configuration is found. The importance of building close associations with the non-traditional stakeholder, i.e., NGOs, and often making them a part of supply chain activities are suggested as a viable solution for operating in these markets (Rammal et al., 2014; Scott, 2017). These collaborations create opportunities for MNCs despite the affordability and infrastructural challenges embedded in the environment because they allow the MNCs to increase their absorptive capacity while increasing the native capabilities (Ausrød et al., 2017; Zomorrodi et al., 2019).

Furthermore, international NGOs' collaboration with the government and local NGOs can also be beneficial (Heuer et al., 2020). These collaborations can serve as intermediaries from the base of the pyramid to international markets as they offer a platform to ensure the compatibility of local produces for international markets. Therefore, the strategical choice of collaboration for entering the BoP markets deals with the system risks.

Lastly, decision policy is also a suggested strategy to combat ingrained system risk in BoP environment. Better decision policy refers to the use of better decision policy and procedures to improve supply chain processes. For example, the organizations having the ability to deploy bureaucratic decision-making policies that support the logic of ensuring equality and fairness which are otherwise neglected in most developing countries can ensure a democratic governance system (Turker & Vural, 2017).

Investment risk and financial management

A correlation between investment risk and financial management was found in the BoP literature. Since the investment risk comprises lack of several resources in the BoP, organizations that realize the importance of financial management can excel in these markets even with the investment risk that prevails in the environment (Morais & Silvestre, 2018; Pode, 2013). For example, rural area where there is huge labor market which after training can be viewed instrumental in increasing market share and sales by tapping the large consumer base (Pode, 2013). Therefore, better financial management practices are ideal to combat investment risks.

Manufacturing risk and process flexibility

Manufacturing risk entails poor quality, lower process yields, and higher product cost. To combat manufacturing risk firms in BoP environment engage in process flexibility. Due to high labor market, it is possible to induce flexible workforce which enables a company to cope with uncertainty caused by frequent product changeovers due to quality, lower yield, or high cost (Brewer et al., 2019). For example, trained multi-skilled workers may lead to process flexibility (Miller, 1992). In addition, process flexibility could be achieved through the implementation of general-purpose machines, equipment, and technologies (Miller, 1992; Ulrich, 1995).

Inventory risk and multiple suppliers

An association between inventory risk and multiple suppliers has been found. Taking the informal market perspective, the actors of these markets often serve the need of temporal suppliers where the regular supplier fails to comply (Dembek et al., 2018). Inventory risk is mainly generated due to high costs of holding inventories, demand and supply uncertainty, rate of product obsolescence, and supplier fulfillment. For example, an automotive organization can take benefit from the informal market such as a small spare part holder to find an otherwise obsolete product. Similarly, these actors can serve as multiple suppliers without a need of long-term contract establishment thereby saving additional cost. Besides, these actors are widely spread in the BoP regions and could serve as potential infrastructure, otherwise lacking in these markets, which then allows the firms to cope with the demand and supply uncertainty pertaining to inventory risk.

Supply and distribution risk, redesign of chain configuration, and product design

Supply and distribution risks are associated with the risk of getting the raw material from the upstream supply chain actors and distributing the finished goods to the downstream supply chain actors. The significant sources of risk identified in BoP literature are the quality of service and high cost of transportation of the goods from producers to focal firm and to the retailer. To address this risk, redesigning of the supply chain and product design are suggested as the best strategy.

The redesigning of supply chain infrastructure requires the firms to build widely dispersed locations for their plants and forming network ties (Table 3). The buyer firms can benefit from the incorporation of the upstream producers and manufacturers into their supply chain activities which are already decentralized within the BoP communities (Calton et al., 2013). Therefore, the inclusion practices can serve as infrastructure and allow the smooth flow of products and services.

Moreover, the downstream inclusion of supply chain actors (from both formal and informal markets) could be a novel idea of reaching the mass (Vachani & Smith, 2008). By benefitting from both formal and informal markets and including them to the distribution of goods and services could help lower the cost of transportation (Ray & Ray, 2010). For example, the low-end retailer in a village can be used to sell the products to the BoP community, or cheap labor can be utilized for logistic purposes. These local incumbents also possess local knowledge necessary to reengineer the products for local demands (Lim et al., 2013). Therefore, the local inclusion serves both infrastructural as well as knowledge gaps required to design and disseminate the products. This highlights the BoP 2.0, where the firms need to be more inclusive to boost the economic flow by reaching the individuals or small-scale firms and making them a part of supply chain activities.

Demand risk and pricing strategy

The significant source of risk identified under the demand risk category is the small consumer base due to affordability issues, and the best practice to reduce the impact of this risk is pricing strategy. The demand for luxury products is not viable for BoP consumers (Karnani, 2007). To become successful in these markets, the focal firms should be aware of the products they want to offer to these communities and plan to strategically price the products in such a way

that the cost added on each stage would not end up with a high-price product thereby outmanoeuvring demand risk. For example, a Haitian supply chain implemented a social product model improving profitability, using renewable fuels for cooking and lighting products while providing one fit for all product for families (Bals & Tate, 2018). Therefore, multi-purpose products are beneficial in achieving pricing strategy and reducing demand risk (Suzic & Forza, 2021).

4.2.2 | Supply chain practices and performance

Decision policy and stakeholder dialogs

A relation between decision policy and stakeholder dialogs was found. The underlying logic implies that the supply chain actors of an organization, who promotes a democratic governance system, that interact and enter into some dependency relationship with a set of public-sector stakeholders such as national and local government organizations, international, national or local funding agencies, regulators, and elected officials can utilize these dependencies for range of activities such as obtaining funds or certification to lobbying (Tsujimoto et al., 2018; Turker & Vural, 2017). Therefore, organizations engaging in better decision polices can influence the governmental decisions by engaging in stakeholder's dialogs.

Collaboration, local community commitment, integration, stakeholder dialogs, supplier improvement, social capital, and commitment

A correlation between collaboration and local community commitment is observed. The collaborations can also facilitate the manufacturing of cost-efficient products through commitment to the community (Kaplinsky, 2011). The partnership with the NGOs provides a platform for both MNCs and local producers, which makes it easy for gathering the raw materials or other inputs cost-efficiently, i.e., through building the social capital (Reficco & Márquez, 2012). Moreover, integrating the local buyer and suppliers into the SC activities help facilitate the smooth flow of information and material (Karamchandani et al., 2011). Integrating local SC actors often demand training to the actors searching opportunities to become a part of economic activities. If provided, the multinational organizations create a sense of reciprocity leading to highly committed supplier and buyer base (Pellathy et al., 2019). Therefore, the likelihood of success while pursuing these strategies is highly contingent on the firm's social capital, its ability to integrate.

Multiple supplier and commitment, integration, supplier improvement, customer satisfaction, and local community commitment

Multiple suppliers imply that the focal firm is engaged in sourcing from multiple suppliers. These suppliers can be short or long term or temporal suppliers. However, a link to local community commitment suggests the sourcing based on long term from the local incumbents is widely discussed in the BoP literature, which also closely linked to the idea of upstream integration (Pellathy et al., 2019). Arguably, these multiple suppliers need continuous improvement in order to incorporate diverse needs and expectations of the customers as suggested by the focal firm (Lim et al., 2013).

Redesign of chain configuration and customer satisfaction, product improvement, and supplier improvement

Findings suggest a correlation between redesign of chain configuration and customer satisfaction, product improvement, and supplier improvement (Figure 5). It entails that creating distribution channels close to customer vicinity increases customer satisfaction (Nakata & Antalis, 2015). Moreover, the redesigning chains close to customers that also enable mass customizations of the products shifts the decoupling point thereby offering improved products to the customers (Bechtsis et al., 2018). Similarly, widespread SCs also promote training opportunities to the local suppliers in order to make them a part of their SCs. Therefore, redesigning chain configuration contributes to customer satisfaction, product improvement, and indigenous supplier improvement.

Product design and customer satisfaction and cost

Information on the needs and expectations of the customers helps in devising the characteristics of the product being produced. These novel and cost-efficient products with a focus on indigenous needs can help to tap their purchasing power by offering products at affordable rates (Anderson & Markides, 2007). Therefore, a correlation between product design and cost efficiency is found. This argument is also in line with the manufacturing of frugal innovative products serving the needs of the poor (Lim et al., 2013). However, even the cost-efficient products and services that are secondary to the basic needs of poor lack the potential to become successful in these markets (Karnani, 2007). Therefore, focusing on the customer expectation along with the cost in product design is crucial for success in BoP markets.

4.2.3 | Interlink between performance measures

Local community commitment and customer satisfaction, and social performance

Association between local community commitment and customer satisfaction as well as social performance have been found. It entails that considering the everyday needs of local community in the SC activities proffer dual benefits for the focal firms such as customer satisfaction and social performance (Mahapatra et al., 2019).

Stakeholders dialogs and sustainable competitive advantage

Stakeholders as an external entity plays a crucial role in sustaining a business specifically in the BoP environment (Mahapatra et al., 2019). Well sought out dialogs between public and private actors help the focal firms in achieving proficiency in dealing with the matters that underlines dependency and leveraging the unique benefits accrued in these dialogs. These unique benefits then help in sustainable competitive advantage (Hart & Dowell, 2011).

Social capital and learning and capability development, CSR, and commitment

Social capital for extending the BoP business concept serves as a pivotal step in comprehending the role of the local community in such ventures. The BoP scholars have realized the societal benefits emanated from the local community relationships (Akula, 2008; Scott, 2017). Firms through enabling capability development in BoP communities by creating and sustaining intra-group bonding and inter-group bridging social capital will likely increase knowledge transfer to BoP communities, leading to capability building among these communities (Ansari et al., 2012; Hill & Mudambi, 2010). Moreover, the MNEs opting for the BoP ventures realize on building social capital, which is pivotal to the venture's success. The success of the venture then can be seen in increased corporate social responsibility (CSR) through inter and intra culture diversity such as increasingly adopting cross-boundary team-working, appoint top international teams, and CEOs from emerging nations (Bardy et al., 2012). Moreover, despite the difference between resource-rich and resource-poor business ecosystems, these capability development frameworks can aid in empowering the impoverished, which then are obliged to reciprocate and turns into highly committed SC actors (Pellathy et al., 2019). BoP communities, specifically, can gain higher benefits from the capability enhancement initiatives because of their extensive human capital. Well-trained and specialized human capital then acts as committed partners for big MNCs and local producers alike (Hart & Dowell, 2011).

Commitment, trust, asset, and integration

Committed SC actors are considered trustworthy and a fruitful asset for the BoP ventures or big MNCs (Mahapatra et al., 2019). These committed actors can range from integration from upstream as well as downstream SCs. Therefore, relational performance measures are highly sought after in these environments and researchers encourage their integration (Bardy et al., 2012).

Supplier improvement and information quality, learning and capability development, product improvement, integration, and commitment

Supplier improvement in BoP regions is highly contingent on learning and capability developments initiatives of the focal firms (Dembek et al., 2018; Matos & Silvestre, 2013). Improving supplier by creating an environment of continuous information exchange so to avoid information asymmetry plays a crucial role in supplier improvement. As already discussed, investing in the training and development of these actors creates a sense of reciprocity in term of their commitment to the focal firms, whereas the focal firm's integration of these otherwise financially neglected buyers and suppliers helps them to excel in these markets. Therefore, creating a win-win situation for both sides.

Customer satisfaction and sustainable competitive advantage, product improvement, and cost

A correlation between customer satisfaction and sustainable competitive advantage has been found. Unique multiple purpose cost-efficient products that satisfy the needs of the large consumer base lead to sustainable competitive advantage (Hart & Dowell, 2011). However, even the cost-efficient products and services which are secondary to the basic needs of poor, lack the potential to become successful in these markets (Karnani, 2007). Therefore, a careful effort in customer expectation is needed in improving the characteristics of the products and services being offered.

Cost and resources and financial performance

Together with explanation presented above, cost efficient products acts as unique resources and enable the focal firms to attain financial growth. Therefore, a correlation between cost and resources and financial performance has been observed.

In sum, based on the overarching logic of the correlation findings presented above, an improved risk management model has been devised in Figure 7. The model represents that risk factors, strategies, process performance measures, and performance outcomes.

This model plays an important role in analyzing the tactical level measures necessary for the successful strategical implementation. Once the strategy is decided by the top management to prevent or mitigate a risk then related action plan needs to be devised, this step combines two phases of SCRM, i.e., (a) implement and execute and (b) review, and adapt (Ha & Tang, 2017). Institutionalizing PM approaches will help in addressing the most critical risks, while measuring the amount and need of resources such as information, material, finance, or products. First, it facilitates the implementation and execution of the risk management strategies by tracking and evaluating the performance measures linked to them (e.g., Blos et al., 2009; Chenhall & Langfield-Smith, 2007; Laihonen & Pekkola, 2016).

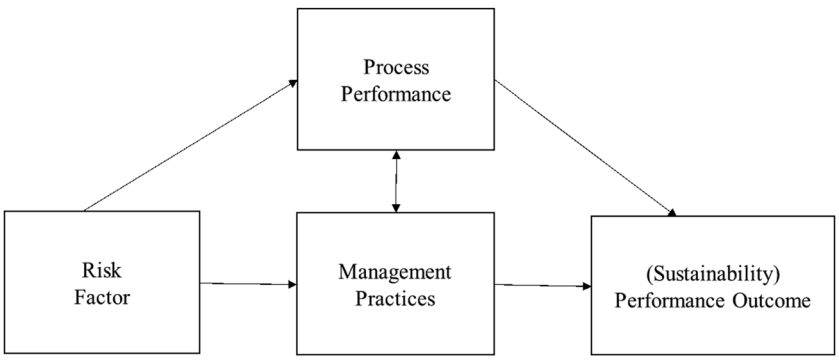

FIGURE 7 Model of risk management

Second, the risk response actions can be reviewed and adapted according to the priority and the available resources that become visible with performance metrics or indicators measuring them (Lauras et al., 2010). For example, a strategy such as "postponement" is devised for managing "capacity risk" and related performance measure such as "cost" linked to postponement can be analyzed. Measuring cost and information throughout the chain then depicts the decoupling point so to avoid the capacity risk. Therefore, linking these performance measures to the risk management strategies helps in ensuring that these strategies have been cascaded down the organization and reap strategical performance outcomes as intended. It further improves visibility to detect early threats of risks and adapt accordingly to ensure that the maximum risk can be avoided.

5 | DISCUSSION

BoP literature offers prominent papers highlighting risks, challenges, constraints, and their effect on the performance of the supply chain (London et al., 2010). However, less consideration is given to the management practices to reduce their impact based on performance measurement. The current paper is, therefore, advancement into the knowledge regarding management of SC risk through related performance measures to reach its targets. Furthermore, the broader SCRM literature often neglected the role of sustainability performance efforts (i.e., performance measurement systems) in the SCRM process, which is added in this paper and considered a contribution to the broader domain. Therefore, the paper contributes to both BoP and SCRM literature, discussed in the subsequent text.

It is worth noting that the risk management practices frequently mentioned in the BoP literature mainly comprised the strategical level "preventive" practices, which shows that the BoP literature considers the environment as an uncertain ecosystem for businesses and demands long-term solutions for the management of the risks therein. Nevertheless, the performance measures proffered are more tactical, showing that incorporating these measures could help neutralise the supply chain uncertainties engrained in the environment.

Furthermore, the value creation process, in the BoP markets, is profoundly inhibited by the local productivity constraints (London et al., 2010). These constraints are linked to the upstream supply chain risks identified as supply, and manufacturing risk. Furthermore, the supply risk due to vast geographical dispersion with poor infrastructure makes the acquisition of the raw material costly, which disables the local value creation (London et al., 2010). This often demands the incorporation of already dispersed local networks in the society, thereby redesigning the SC. Therefore, the management practices found to address the risk further help in achieving firm's performance goals through continuous monitoring and measuring cost.

Further, the transactional constraints in BoP markets, which can hinder the value capture process, are also discussed (Kistruck et al., 2013). These constraints include market access, market power, and market security (London et al., 2010) and are linked to the downstream supply chain risks. The market access deals with the distribution risk identified in this paper; however, the market power, which we highlighted as a demand risk realize largely on affordability related challenges. Furthermore, the demand forecast for a particular niche helps create a single function product that could hinder the product potential to serve the diverse needs of the BoP communities at a low price (Ahrens et al., 2019). Therefore, it is suggested to improve pricing strategies by mass customization through shifting the decoupling point closer to the customer can be beneficial in reducing the demand risk (Suzic & Forza, 2021).

Whereas the market security has not been addressed sufficiently in the literature so far. Supplier development and the use of social certification has been mentioned in BoP literature for bridging the institutional voids (Brix-Asala & Seuring, 2020). However, the standard and certificates, which are the standards to analyze the sustainability of suppliers, cannot adequately serve as security for the products offered based on them. For example, the certificates, where the power and opportunistic behaviors from the supplier as well as the non-governmental bodies can easily forge them, might not assure the sustainability of the products. Therefore, decision policy informing bureaucratic dependency with the stakeholders such as government and private can help in the management of the prevailing risks.

Furthermore, the BoP literature suggests that the risks, if managed appropriately, bring in social benefits on the one hand and tap the potential customers on the other (London et al., 2010). The focal firms will help the locals to utilize and enhance their skills by getting benefits from the learning opportunities provided by these large institutions. The information asymmetry and knowledge gap can be filled in this way and can further enhance the living standards of the indigenous. Therefore, the management of risk contributes to the social performance of the supply chain. However, the otherwise untapped markets can be the potential actors of the supply chain, but there is also a problem of opportunistic behaviors from either the suppliers or the distributors (Gold et al., 2013). Therefore, the BoP ecosystem demands collaborator that can initiate or regulate a fruitful relationship between the parties (Munir et al., 2020).

Further, collaboration as an overarching risk management practice has several limitations. On the one hand, strong government bodies with ethical power utilization through coercive pressure can help in creating shared value (Jajja et al., 2019; Marconatto et al., 2016). On the other hand, researchers caution also surges in the literature regarding weak regulatory authorities in these markets. Karnani (2007) mentions that people living in poverty are the result of government failure. Lack of reforms and power difference (Arora & Romijn, 2012) from the government can turn the otherwise fruitful collaboration into a massive failure. Similarly, authoritative government bodies can also influence the collaboration between NGOs and the firms, and these triggers also play a significant role in the firm's choice of building social alliances with the non-traditional partners (Murphy et al., 2012). Making the process more transparent by building collaboration through integrating locals by building strong social capital and regularly measuring its impact would help to overcome these challenges (Aman & Seuring, 2021). However, the BoP literature points out these performance measures but lacks an appropriate

performance measurement tool to monitor the progress. Nevertheless, a collaboration themed score card would help in this regard (Kaplan et al., 2010).

For general SCRM literature, the study at hand proffers several contributions. Previously, supply chain risk management literature highlights performance role in the risk management but somehow lacks in-depth exploration of it (Tummala & Schoenherr, 2011). By exploring it through BoP literature, it is found that the performance measures have been linked to various risk management strategies and incorporating them into performance measurement systems would not only facilitate the implementation and monitoring of risk management practices but also help achieving the sustainable long-term performance targets (Arzu & Erman, 2010; Beske-Janssen et al., 2015; Maestrini et al., 2017; Seuring & Müller, 2008).

5.1 | Practical implications

The risk management practices presented in this study can help managers devise a plan for managing associated risks. Further, the constructs suggested in this study can be used for the measurement of performance to timely control the risk, as it is often underlined that "what is not measured is not managed" (Manuj & Mentzer, 2008, p 216). Therefore, the firm's performance measurement plays a crucial role in the risk management process, and the managers should know and incorporate the performance measurement system to manage risks and thereby achieving high performance goals (Aman & Seuring, 2021; Grosvold et al., 2014).

5.2 | Future directions and limitations

The research holds several limitations, as well. The use of specific keywords might have resulted in the selection of most, not all, of the BoP papers, i.e., targeting a sample of risk papers from the entire BoP literature. The study at hand conceptualizes the role of performance measurement systems in the risk management process but could not find sufficient BoP literature studying performance measurement tools, instruments etc., which leaves a gap for future studies to address. It nudges future researchers to find how the highlighted performance measures and the related strategies can help managers of the BoP countries by conducting empirical research to support the initial explanation provided in this paper.

Besides, the findings' section sufficiently displays the correlation between the constructs alongside the frequencies in three frameworks. Highly correlated constructs with less frequencies demonstrate the gaps in BoP literature which future studies can address.

6 | CONCLUSION

In seeking to address the contemporary challenges in supply chain management for the sake of attaining sustainability, BoP researchers have focused on both internal and external practices. Further, the need to evaluate the compatibility of current SCRM and SCPM knowledge with the exclusive business environment of informal markets in emerging economies derives this research. Yet the solutions offered by the literature remain largely on the macro-management level. In the relevant literature, certain strategies developed in the context of supply chain operations in the developed world have been found suitable in the context of the developing world. The respective supply chain strategies address the questions about how risk management has been dealt within the BoP literature (Figures 4–6). The findings showed a broad strategical aspect of SC risk management practices and proffered the operational level performance measures which along with these practices can manage the related risks. The present findings also highlight how central aspects of supply chain and risk management like manufacturing and PM tools and instruments have been under researched in the BoP literature. The framework including process performance dimensions is the contribution to the broader SCRM stream where this performance aspect is only mentioned superficially. The study proffers strategical aspects along with the operational dimensions to manage risks prevailing in BoP environment.

ACKNOWLEDGEMENT

We like to thank the Deutscher Akademischer Austauschdienst (DAAD, German Academic Exchange Service) for funding of the project "Exploring focal firm's performance features in BoP supply chain management – taking the case of Pakistan", Grant number 57459038. Open Access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Please contact the corresponding author for a complete list of papers used for the content analysis.

ORCID

Sadaf Aman https://orcid.org/0000-0002-8438-4077
Stefan Seuring https://orcid.org/0000-0003-4204-9948
Raja Usman Khalid https://orcid.org/0000-0002-9680-1368

REFERENCES

Ahlstrom, D. (2010). Innovation and growth: How business contributes to society. *Academy of Management Perspectives*, *24*(3), 11–24.

Ahrens, F., Dobrzykowski, D., & Sawaya, W. (2019). Addressing mass customization trade offs in bottom of the pyramid markets. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 451–472.

Akula, V. (2008). Business basics at the base of the pyramid. *Harvard Business Review*, *86*(6), 53–57.

Akwei, C., & Zhang, L. (2018). Integrating risk and performance management in quality management systems for the development of complex bespoke systems (CBSs). *Production Planning and Control*, *29*(15), 1275–1289.

Ali, A., Mahfouz, A., & Arisha, A. (2017). Analysing supply chain resilience integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management An International Journal*, *22*(1), 16–39.

Al-Saa'da, R. J., Taleb, Y. K. A., Al Abdallat, Al-Mahasneh, R. A. A., Nimer, N. A., & Al-Weshah, G. A. (2013). Supply chain management and its effect on health care service quality: quantitative evidence from Jordanian private hospitals. *Journal of Management and Strategy*, *4*(2), 42–51.

Alvarez, S., & Barney, J. B. (2007). Discovery and creation alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, *1*(1–2), 11–26.

Aman, S., & Seuring, S. (2021). Interestingly its innovation: Reviewing sustainability performance management in the base of the pyramid (BoP). *Technovation*, *112*, 102394.

Anderson, J., & Markides, C. (2007). Strategic innovation at the base of the pyramid. *MIT Sloan Management Review*, *49*(1), 83–88.

Ansari, S., Munir, K., & Gregg, T. (2012). Impact at the bottom of the pyramid the role of social capital in capability development and community empowerment. *Journal of Management Studies*, *49*(4), 813–842.

Arnold, D. G., & Valentin, A. (2013). Corporate social responsibility at the base of the pyramid. *Journal of Business Research*, *66*(10), 1904–1914.

Arora, S., & Romijn, H. (2012). The empty rhetoric of poverty reduction at the base of the pyramid. *Organization*, *19*(4), 481–505.

Arzu, A. G., & Erman, E. T. (2010). Supply chain performance measurement: A literature review. *International Journal of Production Research*, *48*(17), 5137–5155.

Ausrød, V. L., Sinha, V., & Widding, Ø. (2017). Business model design at the base of the pyramid. *Journal of Cleaner Production*, *162*, 982–996.

Bals, L., & Tate, W. L. (2018). Sustainable supply chain design in social businesses advancing the theory of supply chain. *Journal of Business Logistics*, *39*, 57–79. Wiley-Blackwell.

Bandyopadhyay, K., Mykytyn, P. P., & Mykytyn, K. (1999). A framework for integrated risk management in information technology. *Management Decision*, *37*(5), 437–445.

Bardy, R., Drew, S., & Kennedy, T. F. (2012). Foreign investment and ethics how to contribute to social responsibility by doing business in less developed countries. *Journal of Business Ethics*, *106*(3), 267–282.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99–120.

Bechtsis, D., Tsolakis, N., Vlachos, D., & Srai, J. S. (2018). Intelligent autonomous vehicles in digital supply chains: A framework for integrating innovations towards sustainable value networks. *Journal of Cleaner Production*, *181*, 60–71.

Behzadi, G., O'Sullivan, M. J., Olsen, T. L., & Zhang, A. (2018). Agribusiness supply chain risk management: A review of quantitative decision models. *Omega*, *79*, 21–42.

Benoît, C., Norris, G. A., Valdivia, S., Ciroth, A., Moberg, A., Bos, U., Prakash, S., Ugaya, C., & Beck, T. (2010). The guidelines for social life cycle assessment of products: Just in time!. *The International Journal of Life Cycle Assessment*, *15*(2), 156–163.

Berger, E., & Nakata, C. (2013). Implementing technologies for financial service innovations in base of the pyramid markets. *Journal of Product Innovation Management*, *30*(6), 1199–1211.

Berger, R., Chong, J. C., & Kim, J. B. (2011). Responsible leadership for multinational enterprises in bottom of pyramid countries: The knowledge of local managers. *Journal of Business Ethics*, *101*(4), 553–561.

Beske-Janssen, P., Johnson, M. P., & Schaltegger, S. (2015). 20 years of performance measurement in sustainable supply chain management: What has been achieved? *Supply Chain Management An International Journal*, *20*(6), 664–680.

Blos, M. F., Quaddus, M., Wee, H. M., & Watanabe, K. (2009). Supply chain risk management (SCRM): A case study on the automotive and electronic industries in Brazil. *Supply Chain Management: An International Journal*, *14*(4), 247–252.

Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta analytic and narrative review of the research. *Review of Educational Research*, *78*, 367–409.

Boyle, E., Humphreys, P., & McIvor, R. (2008). Reducing supply chain environmental uncertainty through e-intermediation: An organisation theory perspective. *International Journal Production Economics*, *114*(1), 347–362.

Braunscheidel, M. J., & Suresh, N. C. (2009). The organizational antecedents of a firm's supply chain agility for risk mitigation and response. *Journal of Operations Management*, *27*(2), 119–140.

Brewer, B., Ashenbaum, B., & Blair, C. W. (2019). Cross functional influence and the supplier selection decision in competitive environments: Who makes the call? *Journal of Business Logistics*, *40*(2), 105–125.

Brix-Asala, C., & Seuring, S. (2020). Bridging institutional voids via supplier development in base of the pyramid supply chains. *Production Planning and Control*, *31*(11–12), 903–919.

Calton, J. M., Patricia, H. W., Laura, P. H., & Bevan, D. (2013). Building partnerships to create social and economic value at the base of the global development pyramid. *Journal of Business Ethics*, *117*(4), 721–733.

Chen, I. J., & Paulraj, A. (2004). Towards a theory of supply chain management: The constructs and measurements. *Journal of Operations Management*, *22*(2), 119–150. Portico. https://doi.org/10.1016/j.jom.2003.12.007

Chenhall, R. H., & Langfield-Smith, K. (2007). Multiple perspectives of performance measures. *European Management Journal*, *25*(4), 266–282.

Chesbrough, H. W., Shane, A., Megan, F., & Stephane, G. (2006). Business models for technology in the developing world: The role of non governmental organizations. *California Management Review*, *48*(3), 48–61.

Christopher, M., & Holweg, M. (2017). Supply chain 2 0 revisited a framework for managing volatility induced risk in the supply chain. *International Journal of Physical Distribution & Logistics Management*, *47*(1), 2–17.

Christopher, M. L., & Peck, H. (2004). Building the resilient supply Chain. *International Journal of Logistics Management*, *15*(2), 1–14.

Daly, A., & Zannetti, P. (2007). Air pollution modeling—An overview. *Ambient Air Pollution*, 15–28.

Das, D. (2018). Sustainable supply chain management in indian organisations: An empirical investigation. *International Journal of Production Research*, *56*(17), 5776–5794.

Davis, T. (1993). Effective supply chain management. *Sloan Management Review*, *34*, 35–35.

de Soto, H. (2000). '*The mystery of capital why capitalism triumphs in the west and fails everywhere else*.' Basic books.

Dembek, K., York, J., & Singh, P. J. (2018). Creating value for multiple stakeholders: Sustainable business models at the Base of the Pyramid. *Journal of Cleaner Production*, *196*, 1600–1612.

Duarte, A. L., Macau, F., e Silva, C. F., & Sanches, L. M. (2019). Last mile delivery to the bottom of the pyramid in Brazilian slums. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 473–491.

Elaydi, R., & Harrison, C. (2010). Strategic motivations and choice in subsistence markets. *Journal of Business Research*, *63*(6), 651–655.

Environmental Pollution Centers. (2019). Accessed December 20, 2019. https://www.environmentalpollutioncenters.org/noise-pollution/#:%;:text=Noise%20pollution%20is%20generally%20defined,or%20consistent%20the%20exposure%20is

Fairtrade International. (2019). Accessed December 20, 2019. https://www.fairtrade.net/standard/aims

Fan, Y., & Stevenson, M. (2018). A review of supply chain risk management definition. *International Journal of Physical Distribution and Logistics Management*, *48*(3), 205–230.

Fink, A. (2019). *Conducting research literature reviews: From the Internet to paper*. Sage publications.

Fisher, M. L. (1997). What is the right supply chain for your product? *Harvard Business Review*, *75*(2), 105–116.

Galariotis, E., Villa, C., & Yusupov, N. (2011). Recent advances in lending to the poor with asymmetric information. *Journal of Development Studies*, *47*(9), 1371–1390.

Gino, F., & Staats, B. R. (2012). The microwork solution. *Harvard Business Review*, *90*(12), 92–97.

Gold, S., Hahn, R., & Seuring, S. (2013). Sustainable supply chain management in base of the pyramid food projects: A path to triple bottom line approaches for multinationals? *International Business Review*, *22*(5), 784–799.

Goldstein, R. D. (1999). *Child abuse and neglect: Cases and materials* (p. 178). West Group.

Golicic, S. L., Lenk, M. M., & Hazen, B. T. (2020). A global meaning of supply chain social sustainability. *Production Planning and Control*, *31*(11–12), 988–1004.

Gouda, S. K., & Saranga, H. (2018). Sustainable supply chains for supply chain sustainability impact of sustainability efforts on supply chain risk. *International Journal of Production Research*, *56*(17), 5820–5835.

Grant, R. M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, *33*(3), 114–135.

Greg, H. (2006). Five steps to IT risk management best practices. *Risk Management*, *53*(7), 34–40.

Größler, A., & Grübner, A. (2006). An empirical model of the relationships between manufacturing capabilities. *International Journal of Operations & Production Management*, *26*(5), 458–485.

Grosvold, J., Hoejmose, S. U., & Roehrich, J. (2014). Squaring the circle management, measurement and performance of sustainability in supply chains. *Supply Chain Management An International Jouurnal*, *19*(3), 292–305.

Gunasekaran, A., & Sandhu, M. (Eds.) (2010). *Handbook on business information systems*. World Scientific.

Gupta, A., & Maranas, C. D. (2003). Managing demand uncertainty in supply chain planning. *Computers and Chemical Engineering*, *27*(8–9), 1219–1227.

Ha, A. Y., & Tang, C. S. (2017). *Handbook of information exchange in supply chain management*. Springer.

Hahn, R., & Gold, S. (2014). Resources and governance in base of the pyramid partnerships assessing collaborations between businesses and non business actors. *Journal of Business Research*, *67*(7), 1321–1333.

Hall, J., Matos, S., Sheehan, L., & Silvestre, B. (2012). Entrepreneurship and innovation at the base of the pyramid: A recipe for inclusive growth or social exclusion? *Journal of Management Studies*, *49*(4), 785–812.

Halme, M., Lindeman, S., & Linna, P. (2012). Innovation for inclusive business intrapreneurial bricolage in multinational corporations. *Journal of Management Studies*, *49*(4), 743–784.

Harrison, T. P. (2001). Global supply chain design. *Information Systems Frontiers*, *3*(4), 413–416.

Hart, S. L., & Dowell, G. (2011). A natural resource based view of the firm fifteen years after. *Journal of Management*, *37*(5), 1464–1479.

Hens, L. (2012). Overcoming institutional distance expansion to baseof the pyramid markets. *Journal of Business Research*, *65*(12), 1692–1699.

Heuer, M. A., Khalid, U., & Seuring, S. (2020). Bottoms up delivering sustainable value in the base of the pyramid. *Business Strategy and the Environment*, *29*(3), 1605–1616.

Hill, T. L., & Mudambi, R. (2010). Far from Silicon Valley: How emerging economies are re shaping our understanding of global entrepreneurship. *Journal of International Management*, *16*(4), 321–327.

Howell, R., van Beers, C., & Doorn, N. (2018). Value capture and value creation: The role of information technology in business models for frugal innovations in Africa. *Technological Forecasting and Social Change*, *131*, 227–239.

Hudnut, P., & DeTienne, D. R. (2010). Instructors note envirofit international: A venture adventure. *Entrepreneurship Theory and Practice*, *34*(4), 797–802.

Hult, G. T. M., Christopher, W. C., & Ketchen, D. J. Jr. (2010). Risk uncertainty and supply chain decisions: A real options perspective. *Decision Sciences*, *41*(3), 435–458.

IGI Global. (2020). Accessed December 20, 2019. https://www.igi-global.com/dictionary/gender-diversity-in-the-senior-ma

Ivanov, D., & Dolgui, A. (2020). Viability of intertwined supply networks extending the supply chain resilience angles towards survivability: A position paper motivated by COVID 19 outbreak. *International Journal of Production Research*, *58*(10), 2904–2915.

Jajja, M. S. S., Asif, M., Montabon, F. L., & Chatha, K. A. (2019). The influence of institutional pressures and organization culture on supplier social compliance management systems. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 552–574.

Kaplan, R. S., Norton, D. P., & Rugelsjoen, B. (2010). Managing alliances with the balanced scorecard. *Harvard Business Review*, *88*(1), 114–120.

Kaplinsky, R. (2011). Schumacher meets Schumpeter appropriate technology below the radar. *Research Policy*, *40*(2), 193–203.

Karamchandani, A., Kubzansky, M., & Lalwani, N. (2011). The globe is the bottom of the pyramid really for you? *Harvard Business Review*, *89*(3), 107–112.

Karnani, A. (2007). Doing well by doing good: Case study fair & lovely whitening cream. *Strategic Management Journal*, *28*(13), 1351–1357.

Khalid, R. U., Seuring, S., Beske, P., Land, A., Yawar, S. A., & Wagner, R. (2015). Putting sustainable supply chain management into base of the pyramid research. *Supply Chain Management: An International Journal*, *20*(6), 681–696.

Khanna, T. & Palepu, K. G. (2005). 'Spotting institutional voids in emerging markets.'

Kistruck, G. M., Beamish, P. W., Qureshi, I., & Sutter, C. J. (2013). Social intermediation in base of the pyramid markets. *Journal of Management Studies*, *50*(1), 31–66.

Kistruck, G. M., Webb, J. W., Sutter, C. J., & Ireland, R. D. (2011). Microfranchising in base of the pyramid markets institutional challenges and adaptations to the franchise model. *Entrepreneurship: Theory and Practice*, *35*(3), 503–531.

Kolk, A., Rivera-Santos, M., & Rufín, C. (2014). Reviewing a decade of research on the base bottom of the pyramid (BOP) concept. *Business and Society*, *53*(3), 338–377.

Koster, M., Vos, B., & van der Valk, W. (2019). Drivers and barriers for adoption of a leading social management standard (SA8000) in developing economies. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 534–551.

Laihonen, H., & Pekkola, S. (2016). Impacts of using a performance measurement system in supply chain management a case study. *International Journal of Production Research*, *54*(18), 5607–5617.

Lashitew, A. A., Narayan, S., Rosca, E., & Bals, L. (2021). Creating social value for the base of the pyramid: An integrative review and research agenda. *Journal of Business Ethics*, *178*, 445–466.

Lauras, M., Marques, G., & Gourc, D. (2010). Towards a multi-dimensional project performance measurement system. *Decision Support Systems*, *48*(2), 342–353.

Lim, C., Han, S., & Ito, H. (2013). Capability building through innovation for unserved lower end mega markets. *Technovation*, *33*(12), 391–404.

London, T., & Anupindi, R. (2012). Using the base of the pyramid perspective to catlyze interdependence based collaborations. *Proceedings of the National Academy of Sciences*, *109*(31), 12338–12343.

London, T., Anupindi, R., & Sheth, S. (2010). Creating mutual value lessons learned from ventures serving base of the pyramid producers. *Journal of Business Research*, *63*(6), 582–594.

London, T., & Hart, S. L. (2004). Reinventing strategies for emerging markets beyond the transnational model. *Journal of International Business Studies*, *35*(5), 350–370.

Maestrini, V., Luzzini, D., Maccarrone, P., & Caniato, F. (2017). Supply chain performance measurement systems: A systematic review and research agenda. *International Journal of Production Economics*, *183*, 299–315.

Mahapatra, S., William, W. S., & Padhy, R. (2019). Alignment in the base of the pyramid producer supply chains: The case of the handloom sector in Odisha, India. *Journal of Business Logistics*, *40*(2), 126–144.

Manhart, P., Summers, J. K., & Blackhurst, J. (2020). A meta analytic review of supply chain risk management assessing buffering and bridging strategies and firm performance. *Journal of Supply Chain Management*, *56*(3), 66–87.

Manuj, I., & Mentzer, J. T. (2008). Global supply chain risk management strategies. *International Journal of Physical Distribution and Logistics Management*, *38*(3), 192–223.

Marconatto, D. A. B., Barin-Cruz, L., Pozzebon, M., & Poitras, J. E. (2016). Developing sustainable business models within BOP contexts mobilizing native capability to cope with government programs. *Journal of Cleaner Production*, *129*, 735–748.

Matos, S., & Silvestre, B. R. (2013). Managing stakeholder relations when developing sustainable business models: The case of the Brazilian energy sector. *Journal of Cleaner Production*, *45*, 61–73.

Mayring, P. (2015). Qualitative content analysis: Theoretical background and procedures. In *Approaches to qualitative research in mathematics education* (pp. 365–380). Springer.

McMullen, J. S. (2011). Delineating the domain of development entrepreneurship: A market based approach to facilitating inclusive economic growth. *Entrepreneurship: Theory and Practice*, *35*(1), 185–193.

Mena, S., de Leede, M., Baumann, D., Black, N., Lindeman, S., & McShane, L. (2010). Advancing the business and human rights agenda dialogue, empowerment, and constructive engagement. *Journal of Business Ethics*, *93*(1), 161–188.

Miller, K. D. (1992). A framework for integrated risk management in international business. *Journal of International Business Studies*, *23*(2), 311–331.

Moktadir, M. A., Dwivedi, A., Khan, N. S., Paul, S. K., Khan, S. A., Ahmed, S., & Sultana, R. (2021). Analysis of risk factors in sustainable supply chain management in an emerging economy of leather industry. *Journal of Cleaner Production*, *283*, 124641.

Morais, D. O., & Silvestre, B. S. (2018). Advancing social sustainability in supply chain management: Lessons from multiple case studies in an emerging economy. *Journal of Cleaner Production*, *199*, 222–235.

Munir, M., Jajja, M. S. S., Chatha, K. A., & Farooq, S. (2020). Supply chain risk management and operational performance: The enabling role of supply chain integration. *International Journal of Production Economics*, *227*, 107667.

Murphy, M., Perrot, F., & Rivera-Santos, M. (2012). New perspectives on learning and innovation in cross sector collaborations. *Journal of Business Research*, *65*(12), 1700–1709.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, *23*(2), 242–266.

Nakata, C., & Antalis, E. (2015). Enhancing market exchanges at the base of the pyramid: The roles of national culture, nontraditional capitals, and transformative technologies. *International Marketing Review*, *32*(6), 762–782.

Nakata, C., & Weidner, K. (2012). Enhancing new product adoption at the base of the pyramid: A contextualized model. *Journal of Product Innovation Management*, *29*(1), 21–32.

Parmigiani, A., & Rivera-Santos, M. (2015). Sourcing for the base of the pyramid: Constructing supply chains to address voids in subsistence markets. *Journal of Operations Management*, *33*, 60–70.

Paul, S. K., & Chowdhury, P. (2021). A production recovery plan in manufacturing supply chains for a high demand item during COVID 19. *International Journal of Physical Dis-tribution & Logistics Management*, *51*(2), 104–125.

Pellathy, D. A., Mollenkopf, D. A., Stank, T. P., & Autry, C. W. (2019). Cross functional integration: Concept clarification and scale development. *Journal of Business Logistics*, *40*(2), 81–104.

Perez-Aleman, P., & Sandilands, M. (2012). Building value at the top and the bottom of the global supply chain MNC NGO partnerships. *California Management Review*, *51*(1), 24–49.

Pode, R. (2013). Financing LED solar home systems in developing countries. *Renewable and Sustainable Energy Reviews*, *25*, 596–629.

Prater, E. (2005). A framework for understanding the interaction of uncertainty and information systems on supply chains. *International Journal of Physical Distribution & Logistics Management*, *35*(7), 524–539. https://doi.org/10.1108/09600030510615833

Prater, E., Biehl, M., & Smith, M. A. (2001). International supply chain agility—Tradeoffs between flexibility and uncertainty. *International Journal of Operations & Production Management*, *21*(5/6), 823–839.

Ramachandran, J., Pant, A., & Pani, S. K. (2012). Building the BoP producer ecosystem: The evolving engagement of Fabindia with Indian Handloom Artisans. *Journal of Product Innovation Management*, *29*(1), 33–51.

Rammal, H. G., Rose, E. L., Ghauri, P. N., Tasavori, M., & Zaefarian, R. (2014). Internationalisation of service firms through corporate social entrepreneurship and networking. *International Marketing Review*, *31*(6), 576–600.

Ray, P. K., & Ray, S. (2010). Resource constrained innovation for emerging economies: The case of the Indian telecommunications industry. *IEEE Transactions on Engineering Management*, *57*(1), 144–156.

Rebehy, P. C. P. W., Costa, A. L., Campello, C. A. G. B., de Freitas Espinoza, D., & Neto, M. J. (2017). Innovative social business of selective waste collection in Brazil cleaner production and poverty reduction. *Journal of Cleaner Production*, *154*, 462–473.

Reficco, E., & Márquez, P. (2012). Inclusive networks for building BOP markets. *Business and Society*, *51*(3), 512–556.

Rehman, A. U., Jajja, M. S. S., Khalid, R. U., & Seuring, S. (2020). The impact of institutional voids on risk and performance in base-of-the-pyramid supply chains. *The International Journal of Logistics Management*, *31*(4), 829–863.

Rivera-Santos, M., & Rufín, C. (2010). Global village vs small town understanding networks at the base of the pyramid. *International Business Review*, *19*(2), 126–139.

Rivera-Santos, M., Rufín, C., & Kolk, A. (2012). Bridging the institutional divide partnerships in subsistence markets. *Journal of Business Research*, *65*(12), 1721–1727.

Rosca, E., Möllering, G., Rijal, A., & Bendul, J. C. (2019). Supply chain inclusion in base of the pyramid markets. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 575–598.

Samson, D., & Gloet, M. (2018). Integrating performance and risk aspects of supply chain design processes. *Production Planning and Control*, *29*(15), 1238–1257.

Sawhney, R. (2006). Interplay between uncertainty and flexibility across the value-chain: Towards a transformation model of manufacturing flexibility. *Journal of Operations Management*, *24*(5), 476–493.

Schrader, C., Freimann, J., & Seuring, S. (2012). Business strategy at the base of the pyramid. *Business Strategy and the Environment*, *21*(5), 281–298.

Schuster, T., & Holtbrügge, D. (2012). Market entry of multinational companies in markets at the bottom of the pyramid: A learning perspective. *International Business Review*, *21*(5), 817–830.

Schuster, T., & Holtbrügge, D. (2014). Benefits of cross sector partnerships in markets at the base of the pyramid. *Business Strategy and the Environment*, *23*(3), 188–203.

Scott, I. (2017). A business model for success: Enterprises serving the base of the pyramid with off-grid solar lighting. *Renewable and Sustainable Energy Reviews*, *70*, 50–55.

Seelos, C. & Mair, J. 2007. 'Profitable business models and market creation in extreem poverty Pdf.' 49–64.

Selviaridis, K., & Norrman, A. (2014). Performance based contracting in service supply chains a service provider risk perspective. *Supply Chain Management An International Journal*, *19*(2), 153–172.

Seuring, S., Brix-Asala, C., & Khalid, R. U. (2019). Analyzing base of the pyramid projects through sustainable supply chain management. *Journal of Cleaner Production*, *212*, 1086–1097.

Seuring, S., & Gold, S. (2013). Sustainability management beyond corporate boundaries from stakeholders to performance. *Journal of Cleaner Production*, *56*, 1–6.

Seuring, S., & Müller, M. (2008). Core issues in sustainable supply chain management: A Delphi study. *Wiley Online Library*, *17*(8), 455–466.

Shim, J. P., Warkentin, M., Courtney, J. F., Power, D. J., Sharda, R., & Carlsson, C. (2002). Past, present, and future of decision support technology. *Decision Support Systems*, *33*(2), 111–126.

Shivarajan, S., & Srinivasan, A. (2013). The poor as suppliers of intellectual property: A social network approach to sustainable poverty alleviation. *Business Ethics Quarterly*, *23*(03), 381–406.

Simangunsong, E., Hendry, L. C., & Stevenson, M. (2012). Supply chain uncertainty: A review and theoretical foundation for future research. *International Journal of Production Research*, *50*(16), 4493–4523.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339.

Steers, R. M. (1977). Antecedents and outcomes of organizational commitment. *Administrative Sciences. Q.*, 46–56.

Sustainable Development Indicator Group. Accessed December 20, 2019. (1996). https://www.hq.nasa.gov/iwgsdi/Waste_Po%20duction.html

Sutter, C. J., Kistruck, G. M., & Morris, S. (2014). Adaptations to knowledge templates in base of the pyramid markets: The role of social interaction. *Strategic Entrepreneurship Journal*, *8*(4), 303–320.

Suzic, N., & Forza, C. (2021). Development of mass customization implementation guidelines for small and medium enterprises (SMEs). *Production Planning and Control*. https://doi.org/10.1080/09537287.2021.1940345

Tang, C. S. (2006). Perspectives in supply chain risk management. *International Journal of Production Economics*, *103*(2), 451–488.

Tanskanen, P. (2013). Management and recycling of electronic waste. *Acta Materialia.*, *61*(3), 1001–1011.

Tashman, P., & Marano, V. (2009). Dynamic capabilities and base of the pyramid business strategies. *Journal of Business Ethics*, *89*(SUPPL 4), 495–514.

Taylor, D. H. (2006). Strategic considerations in the development of lean agri-food supply chains: A case study of the UK pork sector. *Supply Chain Management: An International Journal*, *11*(3), 271–280. https://doi.org/10.1108/13598540610662185

Tomlin, B. (2006). On the value of mitigation and contingency strategies for managing supply chain disruption risks. *Management Science*, *52*(5), 639–657.

Tracy, D. L., & Knight, J. E. (2008). Lean operations management: Identifying and bridging the gap between theory and practice. *Journal of American Academy of Business, Cambridge*, *12*(2), 8.

Tsujimoto, M., Kajikawa, Y., Tomita, J., & Matsumoto, Y. (2018). A review of the ecosystem concept—Towards coherent ecosystem design. *Technological Forecasting and Social Change*, *136*, 49–58.

Tummala, R., & Schoenherr, T. (2011). Assessing and managing risks using the supply chain risk management process (SCRMP). *Supply Chain Management*, *16*(6), 474–483.

Turker, D., & Vural, C. A. (2017). Embedding social innovation process into the institutional context: Voids or supports. *Technological Forecasting and Social Change*, *119*, 98–113.

Ulrich, K. (1995). The role of product architecture in the manufacturing firm. *Research Policy*, *24*(3), 419–440.

United Nations. (2020). Accessed December 20, 2019. https://www.un.org/en/observances/human-rights-day

Vachani, S., & Smith, N. C. (2008). Socially responsible distribution distribution strategies for reaching the bottom of the pyramid. *California Management Review*, *50*(2), 52–84.

van der Vorst, J. G., Beulens, A. J., De Wit, W., & van Beek, P. (1998). Supply chain management in food chains: Improving performance by reducing uncertainty. *International Transactions in Operational Research*, *5*(6), 487–499.

van der Vorst, J. G. A. J., & Beulens, A. J. M. (2002). Identifying sources of uncertainty to generate supply chain redesign strategies. *International Journal of Physical Distribution and Logistics Management*, *32*(6), 409–430.

van donk, D.P. and van der Vaart, T., 2005. A case of shared resources, uncertainty and supply chain integration in the process industry. *International Journal of Production Economics*, *96* (1), 97–108.

VanSandt, C. V., & Sud, M. (2012). Poverty alleviation through partnerships: A road less travelled for business, governments, and entrepreneurs. *Journal of Business Ethics*, *110*(3), 321–332.

Varadarajan, R. (2014). Toward sustainability public policy, demarketing for a better world. *Journal of International Marketing*, *22*(2), 1–20.

Varadarajan, R., & Kaul, R. (2018). Doing well by doing good innovations: Alleviation of social problems in emerging markets through corporate social innovations. *Journal of Business Research*, *86*, 225–233.

Varga, V., & Rosca, E. (2019). Driving impact through base of the pyramid distribution models. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 492–513.

Webb, J. W., Kistruck, G. M., Ireland, R. D., & Ketchen, D. J. Jr. (2010). The entrepreneurship process in base of the pyramid markets: The case of multinational enterprise nongovernment organization alliances. *Entrepreneurship: Theory and Practice*, *34*(3), 555–581.

Weekes-Marshall, D. (2020). The role of internal audit in the risk management process: A developing economy perspective. *The Journal of Corporate Accounting and Finance*, *31*(4), 154–165.

Wong, C. Y., & Arlbjorn, J. S. (2008). Managing uncertainty in a supply chain reengineering project towards agility. *International Journal of Agile Systems and Management*, *3*(3–4), 282–305.

Yang, B., Burns, N. D., & Backhouse, C. J. (2004). Management of uncertainty through postponement. *International Journal of Production Research*, *42*(6), 1049–1064.

Yang, B., & Yang, Y. (2010). Postponement in supply chain risk management: a complexity perspective. *International Journal of Production Research*, *48*(7), 1901–1912.

Zomorrodi, M., Fayezi, S., Lau, K. H., & McMurray, A. (2019). Supply chain adaptations for the base of the pyramid business towards a theoretical model. *International Journal of Physical Distribution and Logistics Management*, *49*(5), 599–624.

How to cite this article: Aman, S., Seuring, S., & Khalid, R. U. (2023). Sustainability performance measurement in risk and uncertainty management: An analysis of base of the pyramid supply chain literature. *Business Strategy and the Environment*, *32*(4), 2373–2398. https://doi.org/10.1002/bse.3254