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Additional Information

Performance measurement in SMEs: Systematic literature review and research directions

The purpose of this paper is double. First, the research about performance measurement (PM) in small and medium-sized enterprises (SMEs) will be analysed in order to know its evolution. Next, the research gaps in the business context of these companies will be identified. This paper presents a systematic literature review of 131 articles of PM in SMEs between 2006 and 2019. A conceptual framework is proposed to characterize the studies according to three factors: (1) purpose of the approach; (2) scope of PM; and (3) business context in which the studies are articulated. The reviewed papers were selected from Scopus and Web of Science databases. For this study, we considered the works conducted in the manufacturing sector, and excluded those that focused on the services sector. The results show that most of the studies are concentrated in the context of individual company, on the other hand networks, clusters, and supply chains have received less attention. The information collected herein identifies research gaps that have not been dealt with in detail and are transformed into guidelines to be dealt with by new future specific works in the domain of PM in SMEs.

Keywords: performance measurement, small- and medium-sized enterprises, systematic literature review; conceptual framework.

1. Introduction

Performance measurement (PM) is a practice that companies adopt to improve their competitiveness (Chalmers et al., 2012). Its applicability is currently being extended to reinforce companies' organisational structures, and to consequently help them extend their business (Saunila et al., 2014; Bianchi et al., 2015)

Companies now understand that to be able to compete in constantly changing scenarios, it is necessary to monitor and understand their performance (Taticchi et al., 2010) to not only satisfy stakeholders, but to also manage their development over time and to achieve high operation levels (Cocca & Alberti, 2010; Sharma & Bhagwat, 2007). For small- and medium-sized enterprises (SMEs), this situation is no different and,

despite there being some limitations between theory and practice, PM is a basic factor to manage and improve their performance (Hudson et al., 2001; Carpinetti et al., 2008; Surjan & Srivastava, 2019).

The increasing complexity in SMEs and their sensitivity to differences in managerial culture and management systems are indicated as influencing factors to be considered in future studies (Garengo et al., 2005). In this sense; Antonelli, Boucher and Burlat (2011) points out that SMEs performance in collaborative environments as well as the contribution to their economic growth also increases the complexity of the measurement system and its management. In the global economy, collaboration is no longer an option but a requirement for organizations that want to achieve and maintain a competitive advantage in the market (Mircea et al., 2016) and with this, the measurement of actions in collaboration becomes a challenge (Pekkola & Ukko, 2016).

The scientific literature highlights the development of PM in SMEs for different purposes, scopes and applications, which increasingly centre on a systemic vision (Heinicke, 2018). A line of work fully centres on performance measurement systems (PMSs) so they can be designed, implemented, and used (Hudson et al., 2001). There are also works that study the factors which support the process to successfully implement and apply PMSs (Neely, 2005; Ahmad et al., 2006; Bhagwat & Sharma, 2007; Garengo & Bititci, 2007; Surjan & Srivastava, 2019); however, the need to pay attention to the particularities of SMEs and their influence on PMS is still evident (Heinicke, 2018).

Previous reviews of the literature on PM in SMEs (Table 1) highlight the main approaches developed for the purpose of performance measurement and management (Brem et al., 2008; Taticchi et al., 2010); other proposals regarding the use, development, design, etc. of PM are presented by Heinicke (2018); nevertheless, reviews that focus on

the scope of the different PM proposals and, at the same time, consider the business context in which SMEs are developed have not been evidenced yet.

In this sense, based on this lack of knowledge, this work carries out a systematic literature review to collect and analyze relevant works in the field of PM in SMEs on different business contexts.

Table 1. Works of literature review on PM in SMEs

Authors	Title	Contribution	Limitation
Brem et al. (2008)	Performance measurement in SMEs: Literature review and results from a German case study	The study lists the main contributions focused on theoretical models of PM in SMEs	This work does not address the specific requirements for the implementation of the PMS in SMEs and the particular considerations presented by these companies.
Taticchi et al. (2010)	Performance measurement and management: A literature review and a research agenda	This work focuses on performance measurement and management (PMM) for small and medium enterprises (SMEs) and large companies and propose a research agenda for the future.	The research presented in the paper is limited to the PMM context
Heinicke (2018)	Performance measurement systems in small and medium-sized enterprises and family firms: a systematic literature review	This study summarizes the development and design, influencing factors, and consequences of PMSs in SMEs	An assessment of the investigated topics illustrates the particularities of PMSs in SMEs especially in family-controlled firms.

The diversity of the contributions made on this matter has led to a framework being developed to analyse the literature and fulfil the purpose of this work. According to Cocca and Alberti (2010), the main characteristics that a PMS has to show in order to be suitable for SMEs can be classified in three categories: performance measures, the PMS as a whole, and the relations between the PMS and the environment in which it operates. After considering the business context: individual company (Gunawan et al., 2008) and collaborative companies (Bhagwat & Sharma, 2007; Carpinetti et al., 2008) a conceptual framework is proposed and applied throughout this study.

With the application of the conceptual framework, the present study addresses the following questions:

Q1: How has the research into SMEs performance measurement evolved?

Q2: What are the research gaps in the business context related to SMEs?

This paper is arranged as follows: Section 2 presents a description of the research methodology and the developed framework; Section 3 assesses the literature review according to the aforementioned framework; Section 4 offers the identification and discussion of research directions. Finally, Section 5 provides the conclusions.

2. Material and methods

2.1 Selection of studies

This study began with a rigorous and systematic literature review to not only contribute to the descriptive knowledge of the area referred to, but to also identify those gaps that provide opportunities for new research works to be conducted. The present research work takes the Scopus and Web of Science databases as a reference and used this search string; “performance measurement” or “performance evaluation” or “performance assessment” and “small to medium” or “small and medium” or “SME”; to collect the works that include these key words. The search period covered 2006-2019.

For the literature review, this work has followed a rigorous process of searching and analyzing articles based on the review model proposed by Conforto et al. (2011). The process followed to select papers had six steps (Figure 1): step 1) 1076 references were obtained with the string employed with the databases; step 2) the group of references was filtered, which left 846 works, including scientific articles, books and book sections; step 3) repeated registers were eliminated, which left 773 papers; step 4) 374 papers were selected for their Title, Keywords and Abstract; step 5) filtering based on the Introduction and Conclusions left a group of 181 papers; step 6) after reading all the articles completely, 131 were selected.

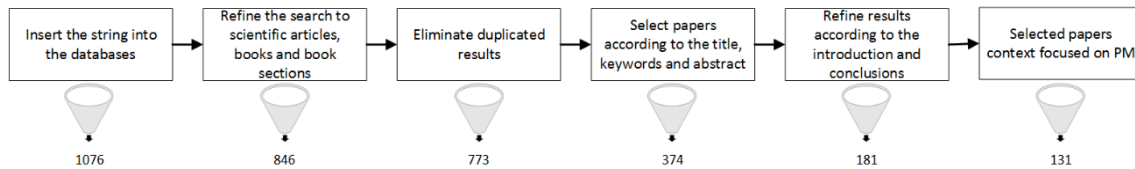


Figure 1. Databases and the search procedure result

2.2 Criteria

For the present study, the criteria of dates, resources and business sector were basic for the inclusion and exclusion of articles. Therefore, only articles published between 2006-2019, corresponding to articles, books and book chapters and also developed in the context of the manufacturing sector, were considered.

3. Conceptual framework to evaluate PM in SMEs

131 articles were characterised by examining the time when the research works were conducted, the regions or countries in which the case studies were based, and the journals that published these works. Initially, this work led to various descriptions, methods and proposals that allowed the conceptual framework and its phases to be set up (Figure 2).

Next, we did a detailed literature analysis by applying the conceptual framework, which was built with two phases and three key evaluation criteria (purpose, scope and business context).

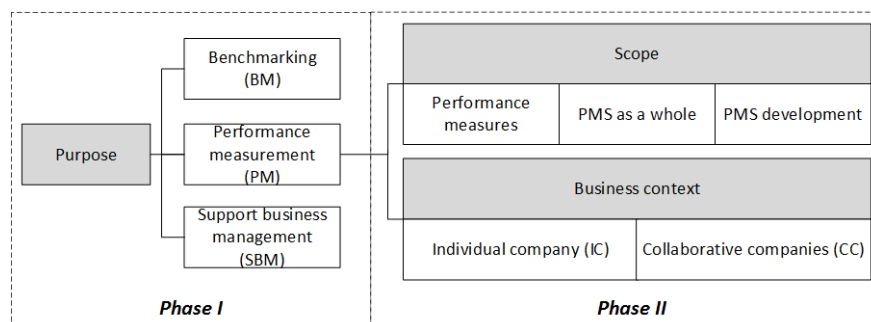


Figure 2. Framework to evaluate PM in SMEs

In Phase I, the **Purpose** of the works is evaluated. The works were classified according to three perspectives: A) “Benchmarking” process, regarding to the use of this tool for the recognition of the knowledge level and the application of PM at an internal or sector level; B) the perspective of developing, implementing and use of “PM” proposals; and C) using PM to “support business management” (SBM).

In Phase II, the works in the PM perspective were jointly analysed according to the “Scope” and “Business contexts” criteria. The **Scope** criterion is based on the general guidelines of the model proposed by Cocca and Alberti (2010) to evaluate PMSs in SMEs, as presented in Table 2. According to the categories below, the main characteristics of a suitable PMS for SMEs were compiled.

- ***Performance measures:*** this category includes those works about the definition or use of performance measures.
- ***PMS as a whole:*** the studies in this category include the best practices for designing PMS in SMEs.
- ***PMS development:*** here we find the works that indicate PMSs being applied and used, along with the limitations we found.

Table 2. The main features that a PMS should display to be suitable for an SME

Table 2. The main features that a PMS should display to be suitable for an SME

Performance measures	PMS as a whole	PMS development
Derived from strategy	All stakeholders considered	Periodic evaluation existing PMS
Link operations to strategic goals	Flexible, rapidly changeable and maintainable	Strategy development
Simple to understand and use	Balanced (internal/external, financial/non-financial)	Long- and short-term planning
Clearly defined/explicit purpose	Synthetic	Information sharing and communication
Stimulate continuous improvement/right behavior	Easy to implement, use and run	Manager's commitment
Relevant and easy to maintain	Causal relationships shown	Employee involvement/support
Easy to collect	Strategically aligned	Facilitator
Provide fast, accurate feedback	Graphically and visually effective	Maintenance procedure
Monitoring past performance	Incrementally improvable	Systematic targets setting
Planning future performance	Linked to rewarding system	Roles assignment and responsibilities sharing
Promote integration	Integrated with IS	Performance revision procedure
Defined formula and source of data		Linking performance to compensation process
		Procedures clearly defined
		IT infrastructure support

Source: Revised, Cocca and Alberti (2010, 193)

The **Business** context criterion is related with the level from which an enterprise's action is analysed: individual company and collaborative companies.

4. Results and discussion

4.1 *Characterising the works*

Figure 3 (a) shows which countries most frequently conduct research cases and the evolution of the publications over time; them, Brazil, followed by Italy and India are the countries with the leading research contribution on the subject. Figure 3 (b) presents the journals with the most reviewed articles (between 2 and 8 articles per journal); a relatively high occurrence of publications in the International Journal of Productivity and Performance Management can be seen, followed by Benchmarking, International Journal of Globalisation and Small Business and Production Planning &

Control.

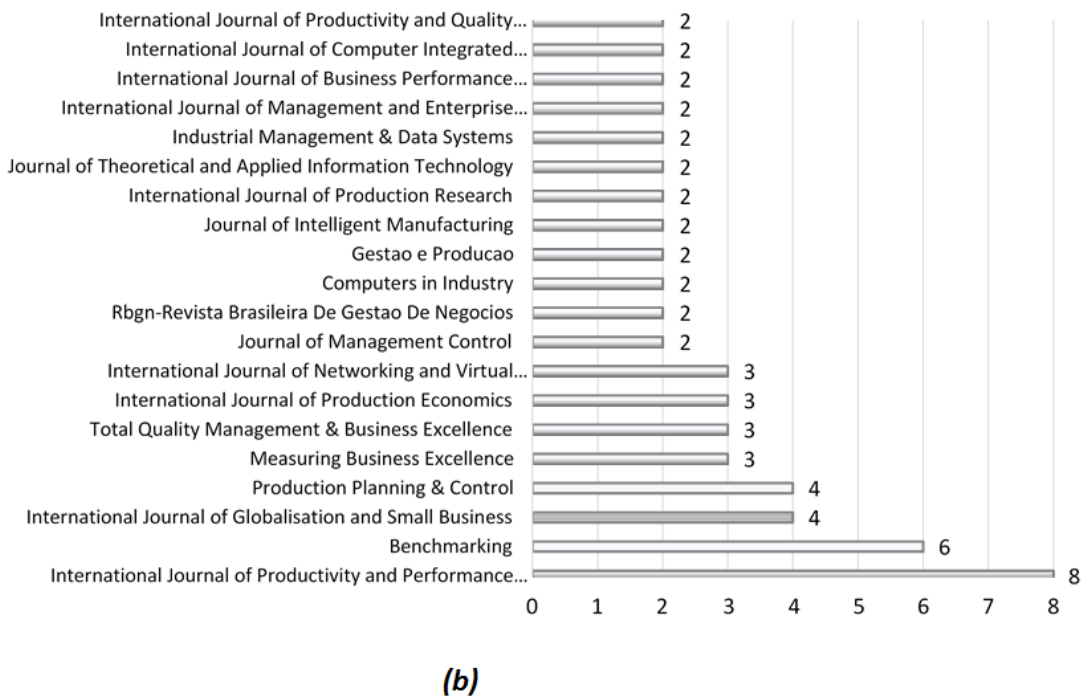
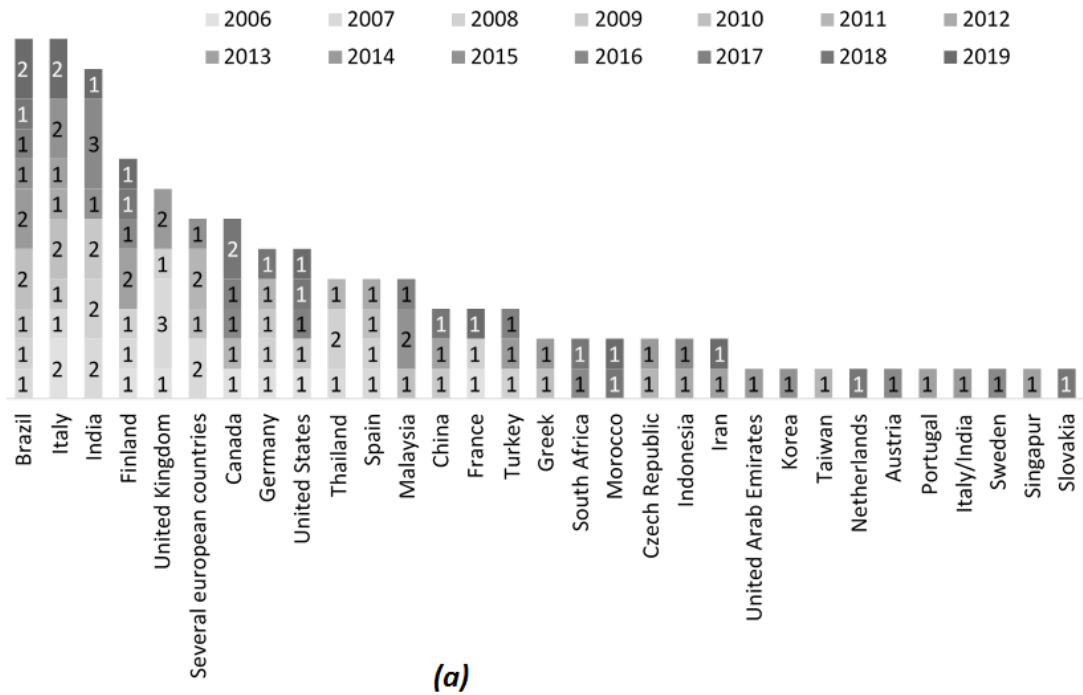


Figure 3. (a) Publication of different countries, year-wise; (b) principal journals of the reviewed papers

Table 3 includes details of the global analysis done of the papers according to the purpose (first analysis criterion)

Table 3. Brief description and purpose of Reviewed Papers

Reference	Brief description of the study	Purpose
Sousa et al. (2006)	The gap between the theory and practice of performance measurement is assessed	PM
St-Pierre & Delisle (2006)	360 ° Benchmarking of SMEs performance evaluation systems to support their development	BM
Grando & Belvedere (2006)	Benchmarking of the performance levels of small enterprises, industrial districts made up of SMEs, and large enterprises of the same industrial sector	BM
Perrini & Tencati (2006)	It is proposed to evaluate the corporate sustainability from the point of view of the stakeholders	PM
Ahmad et al. (2006)	Model that integrates an AHP decision tool and DEA data analysis model	PM
Laitinen (2006)	Based on the financial statements, the performance of the SMEs virtual network is evaluated	PM
Berrah et al. (2006)	It combines performance measurements based on mathematical tools (Choquet) with criteria interactions and the unipolar and bipolar scales	PM
Guenther & Kaulich (2006)	Identification of environmental aspects to be considered by the SMEs to sustainable performance evaluation	PM
Plüss (2006)	Performance measurement and cooperative management	SBM
Ahmad & Piovoso (2007)	Benchmarking the SMEs groups performance in the same sector	BM
Smith & Smith (2007)	Model to implement performance measurement in SMEs	PM
Alfaro et al. (2007)	Model that integrates a methodology, an architecture, and a performance measurement structure	PM
Garengo & Bititci (2007)	Identify the contingency factors that influence performance measurement practices in SMEs	PM
Sharma & Bhagwat (2007)	It approaches the strategy, competitive priorities, observed / perceived benefits by the effective management of PMS and the observed barriers in the implementation of PMS practices	PM
Caroleo et al. (2007)	Identification of patterns for the analysis and networks evaluation	PM
Carpinetti et al. (2007)	Conceptual model for performance management from innovation and performance measurement of SMEs	PM
Bhagwat & Sharma (2007)	Model to evaluate the performance of a supply chain based on BSC	PM
Phusavat (2007)	Performance measurement in an enterprise as part of the SMEs Revitalization Program	PM
Garengo & Bernardi (2007)	Evaluation of the importance of PMS in the SMEs competitiveness	SBM
Garengo et al. (2007)	Evaluation of the relationship between information systems and performance measurement	SBM
Khan et al. (2007)	Process improvement from the base of performance measurement	SBM
Okkonen (2007)	Relationship of performance measurement in management capacity and organizational dialogue	SBM
Ukko et al. (2007)	Performance measurement and information flow evaluation	SBM
Brem et al. (2008)	The critical requirements for the implementation of PMS in SMEs are determined	PM

Soto-Acosta (2008)	Process for the development and selection of performance metrics to measure the effectiveness of different electronic business schemes in SMEs	PM
Anand & Kodali (2008)	Performance measurement system for an organization in a LEAN environment	PM
Berrah et al. (2008)	Evaluation of the relationship between performance measurement criteria with integral aggregation Croquet operators	PM
Gunawan et al. (2008)	The relevance of a performance measurement system and performance measures in a case study are evaluated	PM
Phusavat & Manaves (2008)	Performance baseline of three SMEs evaluated with BSC	PM
Carpinetti et al. (2008)	Conceptual model for a cluster performance measurement	PM
Varamäki et al. (2008)	Model for the network performance evaluation	PM
Bhagwat et al. (2008)	Model for the performance evaluation of a supply chain based on BSC-AHP	PM
Phusavat & Jaiwong (2008)	Development of a strategic map based on performance measurement	SBM
Zehir et al. (2008)	Performance measurement for business reengineering	SBM
Ahmad & Qiu (2009)	SMEs performance evaluation to develop competitive	BM
Sardana (2009)	Model for the evaluation of sustainable performance in SMEs	PM
Singh et al. (2009)	Model to evaluate the performance of SMEs within the internationalization scheme of their operations	PM
Galdámez et al. (2009)	Model for the performance evaluation of a local cooperative network	PM
Jaehn (2009)	Performance evaluations as a factor in the value-added process in enterprises organized in a network	PM
Thakkar et al. (2009)	Model for the performance evaluation of a supply chain based on BSC-SCOR model	PM
(Garengo, 2009)	Measurement of performance aligned with quality management programs	SBM
Lima & Carpinetti (2010)	Design of a performance measurement system and a compatible technological tool	PM
Wang & Ahmed (2010)	Performance evaluation model, business and family considerations	PM
Alfaro Saiz et al. (2010)	Global Performance Management (GPM) approach that includes a methodology, an information architecture and a technological solution for the information treatment from the evaluation of performance	PM
Amrina & Yusof (2010)	Model for PM in manufacturing environment	PM
Bortoluzzi et al. (2010)	Model to evaluate the operational performance level: sales process	PM
Cocca & Alberti (2010)	Proposal to evaluate the performance measurement system in SMEs	PM
Taticchi et al. (2010a)	Study on the adoption of performance measurement systems in SMEs	PM
Taticchi et al. (2010b)	Performance measurement: literature review	PM
Argyropoulou et al. (2010)	Implementation of BSC for performance evaluation	PM
Gimbert et al. (2010)	Performance measurement and reformulating strategies	SBM
Sousa & Aspinwall (2010)	Performance measurement and development of quality management systems	SBM

Gomes & Yasin (2011)	Evaluation of performance measurement in SMEs with a vision of global growth	BM
Ciemleja & Lace (2011)	Model of a sustainable performance measurement system	PM
Bahri et al. (2011)	Performance evaluation model based on commercial practices and EVAs	PM
Chmelíková (2011)	Performance measurement system: case study	PM
Villa & Taurino (2011)	Network and cluster configurations and the evaluation of their performance	PM
Banomyong & Supatn (2011)	Performance evaluation model based on the cost dimensions, time, and reliability	PM
Merkel et al. (2011)	Performance measurement to improve innovation capacity	SBM
Shen & Hsieh (2011)	Quality assessment and performance measurement in projects	SBM
Chalmeta et al. (2012)	Design and implementation of a performance measurement system	PM
Garengo & Biazzo (2012)	Circular methodology to strategically implement a PMS in SMEs	PM
Simpson et al. (2012)	Model to evaluate the performance and business success	PM
Ferreira et al. (2012)	Model to evaluate the cooperative network performance from basic indicators KSF, KPF, KPI) for the performance measurement	PM
Widyaningrum & Masruroh (2012)	Performance measurement system for the marine fisheries supply chain	PM
Hwang et al. (2013)	Know the status of the implementation of performance measurement systems in the Singapore construction industry	BM
Cardoso Vieira Machado (2013)	BSC: knowledge and application level	PM
Zhang & Zhou (2013)	System of PM indicators based on BSC, Performance Prism, AHP and the Delphi method	PM
Giovannoni & Maraghini (2013)	Analysis of the performance measurement system, the difficulties, and integration mechanisms	PM
Shi et al. (2013)	Model for the evaluation and optimization performance, combining DEA / CFI	PM
Behrouzi & Wong (2013)	Proposal that quantifies the operation of a Lean supply chain with respect to stochastic and diffuse uncertainties of performance measures	PM
Saunila & Ukko (2013)	Performance measurement and innovation capacity	SBM
Bulak & Turkyilmaz (2014)	Evaluate the efficiency of manufacturing SMEs through the performance measurement	BM
Bourlakis et al. (2014)	Sustainable performance measurement in organizations concentrated in a supply chain	PM
Ahmad & Alaskari (2014)	Methodology for performance evaluation in the manufacturing sector	PM
Behery et al. (2014)	BSC application for performance measurement	PM
Garengo & Sharma (2014)	Contingency factors and performance measurement systems	PM
Gloria & Oprime (2014)	Restrictions evaluation in the implementation of performance measurement systems in SMEs	PM

Taylor & Taylor (2014)	Relationship between the size of the organization and the PMS implementation level	PM
Zizlavsky (2014)	Implementation of BSC for performance measurement	PM
Pereira & Oyadomari (2014)	Performance measurement system and quality management	SBM
Bianchi et al. (2015)	Design and Implementation of a system for dynamic performance measurement with a sustainable development vision	PM
Ahmad et al. (2015)	Identification of factors that affect the implementation of PMS in SMEs	PM
Bitencourt Machado et al. (2015)	Evaluation of the performance measurement and of the main measurements applied in the SMEs evaluated	PM
Cosenz & Noto (2015)	Combination of traditional management methods with systems dynamics models	PM
Dwivedi & Chakraborty (2015)	Performance evaluation with BSC - ABC and combined	PM
Wong et al (2015)	The importance of non-financial measures in the SMEs performance is analyzed with BSC	PM
Kim, et a. (2015)	Evaluation of the level of collaborative performance	PM
Luning et al. (2015)	System performance evaluation for food safety of animal origin - European case	PM
Haider, et al (2016)	Comparative evaluation of the performance of enterprises that operate in the water supply sector	BM
Falle et al. (2016)	Evaluation of sustainable performance through the use of BSC	PM
Kustiyahningsih et al. (2016)	Design and application of a model that includes fuzzy logic to approach complexity of the performance evaluation criteria in SMEs	PM
Lonbani et al. (2016)	Implementation of the BSC in an SME and its moderating role with the uncertainty of the environment	PM
Maduekwe & Kamala (2016)	Evaluation of the use and effectiveness of the performance metrics used by the SMEs	PM
Pekkola et al. (2016)	Model for performance evaluation in a turbulent environment	PM
Thanki & Thakkar (2016)	Evaluation of the operational and environmental performance of SMEs through the measurement of efficiency	PM
Vidyadhar et al. (2016)	Model for the performance evaluation of SMEs with LEAN manufacturing in a diffuse environment	PM
Winroth et al. (2016)	Set of relevant performance indicators to be considered by a manager for sustainable production	PM
Charkha & Jaju (2016)	Performance measurement in supply chains: literature review	PM
Irhamni et al. (2017)	This study discusses the improvement of the integrated performance measurement system based on information technology	PM
Singh et al. (2018)	Development of a set of measures and metrics for assessing sustainability performance of manufacturing SMEs	PM
Bahri et al. (2017)	Performance measurement and management system (PMMS) based on the connections between business practices and financial results	PM
Sorooshian (2017)	This study tests the validity of the new performance measurement system, Engine For Smaller Enterprise (E4SE) model	PM

Rostamzadeh et al. (2017)	Framework to assess supply chain management performance measurement (SCMPM) of small-medium sized enterprises (SMEs) under uncertainty	PM
Larsson et al. (2017)	This study identifies strengths and weaknesses in the communication of performance measures and propose guidelines for the visualization of performance measures in SMEs	PM
Hourneaux et al. (2017)	This study identifies the justifications for using PMMS and how much each of them explains the actual use of these systems	PM
Böyükba & Güner (2017)	A hierarchical performance evaluation model is structured based on the six main competency dimensions that are determined by expert evaluation and based on the literature review	PM
Oriot et al. (2017)	This article deals with SPMS used by SME CEOs and the way in which the latter measure their strategic performance	PM
Wu et al. (2018)	Performance measurement system focused on economic, environmental and social performance; includes 59 secondary indicators	PM
Marchand & Raymond (2018a)	Proposal for the design and evaluation of PMS in the SMEs context	PM
Pešalj et al. (2018)	The study addresses the use of management control (MC) and performance measurement (PM) systems in the SMEs context	PM
Masocha (2018)	This study investigated the question of whether environmental sustainability influences firm performance; a multidimensional construct was researched	PM
Marchand & Raymond (2018b)	This study discusses the effective use of the Performance Measurement and Management System (PMMS) and the benefit to SMEs	PM
Severgnini et al. (2018)	This study analyzes the dimensions "Expectations of Continuity and Partnership" as an element to assess stakeholder contribution in the performance evaluation process of Micro, Small and Medium Enterprises (MSMEs)	PM
Heinicke (2018)	This study provides comprehensive insight about performance measurement systems (PMSs) in SMEs	PM
Sulistiyowati & Rodiyah (2018)	This study determines the level of application of performance measurement in small and medium industries	PM
Khihel & Harbal (2018)	This study evaluates the concept of global performance and its implementation in Small and Medium Enterprises	PM
Dobrovic et al. (2018)	This paper points out the importance of non-financial indicators in small and medium-sized enterprises	PM
Singh et al. (2018)	A method for evaluating sustainability using integrated fuzzy analytical hierarchical process (FAHP) and fuzzy inference system (FIS) approach	PM
Rantala & Ukko (2018)	Implementation of performance measurement practices and challenges in university-industry innovation networks	PM
Oufkir & Kassou (2019)	Model for measuring the performance of knowledge	SBM
Trianni et al. (2019)	This study evaluates the level of adoption of industrial sustainability indicators and the issues preventing their effective measurement	PM
Länsiluoto et al. (2019)	This study analyzes the relationship between market orientation, PMS adoption, and performance	SBM
Surjan & Srivastava (2019)	Conceptual model for measuring the MSMEs performance	PM
Russo et al. (2019)	This study analyses the relationship between performance indicators and the behavior of innovation intermediaries funded with public resources in Italy	SBM

Villa & Taurino (2019)	A framework for SME performance evaluation	PM
Dey et al. (2019)	This study evaluates relationships between the criteria and sub-criteria for sustainability performance measurement that facilitates to identify improvement measures for every SME using a structural equation modelling (SEM)	PM
Severgnini et al. (2019)	Develop of a bibliometric study of the Performance Prism Framework and to develop a multiple case study of micro and small business	PM
Yadegari et al. (2019)	Performance measurement model in a supply chain	PM
Tasdemir et al. (2019)	Model for the measurement of sustainable performance and internal and external benchmarking in small, medium and large companies	PM
Costa et al. (2019)	Main barriers in the use of the Balanced Scorecard (BSC) in MSMEs	PM

4.2 Purpose

Figure 4 (a) illustrates the purpose dealt with in the studies. We found that 80% of the papers were about PM, which they did using proposals to both define performance measures and measuring models, and to analyse PM in research cases; 14% took PM as a tool to improve businesses as a reference; 6% of the works focused on PM as a basic element for benchmarking in SMEs.

4.3 Scope

Figure 4(b) depicts how we evaluated the scope of the studies. We identified that 38% of them dealt with the process to develop PMS, 44% centred on proposals of PMS as a whole, and 18% included studies that considered some elements from the performance measures category.

4.4 Business context

Figure 4 (c) shows how 76% of the works about PM in SMEs were conducted according to an individual company outline and 24% used in the business context at collaborative companies' level (networks, cluster or supply chain).

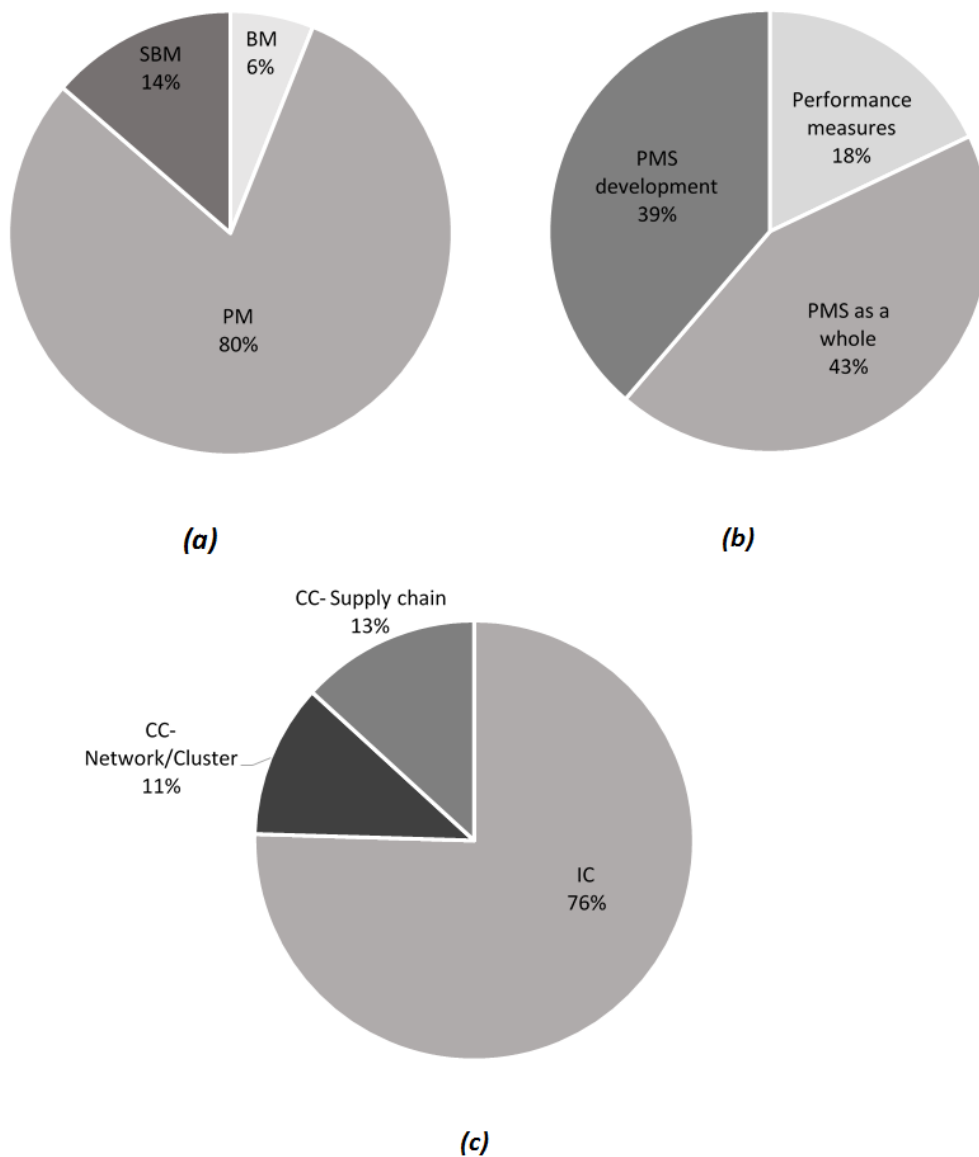


Figure 4. (a) Purpose of the studies; (b) Scope of the studies; (c) Business context

4.5 Performance measurement in SMEs

Following the outline considered in Phase II of the previously described framework, 105 of the papers that focus on PM were analysed. Table 4 shows the studies categorized from a joint vision of the scope and business context. Most studies address the individual company context, with less emphasis in the collaborative context; in this sense, networks, clusters and supply chains are the business contexts mostly identified at the collaborative

level. Collaboration schemes diversity answers to the needs to adapt to a constantly changing economic context that SMEs faced (Antonelli et al., 2011).

The analysis of the studies scope identifies that a large number of proposals are concentrated in the PMS categories as a whole and PMS development. This indicates that the increase in the environment complexity noted above is being addressed with increasingly comprehensive proposals.

The present study identified the main business context levels of SMEs on which the studies were based: an individual company, the network/cluster and from the SC perspective. Here an individual company is understood as that which performs its operations alone; a cluster corresponds to the geographic concentration of companies and interconnected institutions (Porter, 1998); an interorganisational network consists in collaborative agreement among companies, where shared goals are identified, and they work together to share knowledge and to improve competition (Antonelli et al., 2011); the supply chain covers the efforts made to produce and deliver an end product, from the supplier's supplier to the customer's customer, by five basic pillars (plan, source, make, deliver and return) (Thakkar et al., 2009).

Generally, due to the fact that SMEs exhibit distinct characteristics that differentiate them from the majority of their counterparts (Hudson et al., 2001), the proposals to address the PM in SMEs are becoming more specific and diverse, through which it is intended to pay attention to the SMEs requirements in the different business contexts.

Table 4. Categorisation of the studies that focus on PM

<i>Scope Business context</i>	<i>Performance measures:</i>	<i>PMS as a whole:</i>	<i>PMS development:</i>
<i>Individual company</i>	Berrah et al. (2006) Guenther & Kaulich (2006) Soto-Acosta (2008) Zhang & Zhou (2013)	Perrini & Tencati (2006) Ahmad et al. (2006) Alfaro et al. (2007) Anand & Kodali (2008)	Sousa et al. (2006) Smith & Smith (2007) Garengo & Bititci (2007) Sharma & Bhagwat (2007)

		<p>Bitencourt Machado et al. (2015)</p> <p>Maduekwe & Kamala (2016)</p> <p>Thanki & Thakkar (2016)</p> <p>Winroth et al. (2016)</p> <p>Irhamni et al. (2017)</p> <p>Singh et al. (2018)</p> <p>Larsson et al. (2017)</p> <p>Masocha (2018)</p> <p>Severgnini et al. (2018)</p> <p>Dobrovic et al. (2018)</p> <p>Singh et al. (2018)</p>	<p>Berrah et al. (2008)</p> <p>Sardana (2009)</p> <p>Singh et al. (2009)</p> <p>Lima & Carpinetti (2010)</p> <p>Wang & Ahmed (2010)</p> <p>Amrina & Yusof (2010)</p> <p>Bortoluzzi et al. (2010)</p> <p>Cocca & Alberti (2010)</p> <p>Taticchi et al. (2010b)</p> <p>Ciemleja & Lace (2011)</p> <p>Bahri et al. (2011)</p> <p>Chmelíková (2011)</p> <p>Simpson et al. (2012)</p> <p>Shi et al. (2013)</p> <p>Cosenz & Noto (2015)</p> <p>Kustiyahningsih et al. (2016)</p> <p>Pekkola et al. (2016)</p> <p>Vidyadhar et al. (2016)</p> <p>Bahri et al. (2017)</p> <p>Hourneaux et al. (2017)</p> <p>Böyükba & Güner (2017)</p> <p>Oriot et al. (2017)</p> <p>Marchand & Raymond (2018a)</p> <p>Pešalj et al. (2018)</p> <p>Heinicke (2018)</p> <p>Sutjan & Srivastava (2019)</p> <p>Villa & Taurino (2019)</p> <p>Severgnini et al. (2019)</p> <p>Tasdemir et al. (2019)</p>	<p>Brem et al. (2008)</p> <p>Gunawan et al. (2008)</p> <p>Phusavat & Manaves (2008)</p> <p>Alfaro Saiz et al. (2010)</p> <p>Taticchi et al. (2010a)</p> <p>Chalmeta et al. (2012)</p> <p>Garengo & Biazzo (2012)</p> <p>Cardoso Vieira Machado (2013)</p> <p>Giovannoni & Maraghini (2013)</p> <p>Ahmad & Alaskari (2014)</p> <p>Behery et al. (2014)</p> <p>Garengo & Sharma (2014)</p> <p>Gloria & Oprime (2014)</p> <p>Taylor & Taylor (2014)</p> <p>Zizlavsky (2014)</p> <p>Bianchi et al. (2015)</p> <p>Ahmad et al. (2015)</p> <p>Dwivedi & Chakraborty (2015)</p> <p>Wong et al (2015)</p> <p>Falle et al. (2016)</p> <p>Lonbani et al. (2016)</p> <p>Sorooshian (2017)</p> <p>Marchand & Raymond (2018b)</p> <p>Sulistiyowati & Rodiyah (2018)</p> <p>Khibel & Harbal (2018)</p> <p>Rantala & Ukko (2018)</p> <p>Trianni et al. (2019)</p> <p>Costa et al. (2019)</p>
<i>Collaborative companies</i>	<i>Networks /Clusters</i>	<p>Laitinen (2006)</p> <p>Carpinetti et al. (2007)</p> <p>Kim, et a. (2015)</p> <p>Luning et al. (2015)</p>	<p>Carpinetti et al. (2008)</p> <p>Varamäki et al. (2008)</p> <p>Galdámez et al. (2009)</p> <p>Ferreira et al. (2012)</p>	<p>Caroleo et al. (2007)</p> <p>Jaehn (2009)</p> <p>Villa & Taurino (2011)</p>
	<i>Supply chains</i>		<p>Bhagwat & Sharma (2007)</p> <p>Bhagwat et al. (2008)</p> <p>Thakkar et al. (2009)</p> <p>Banomyong & Supatn (2011)</p> <p>Widyaningrum & Masruroh (2012)</p> <p>Rostamzadeh et al. (2017)</p> <p>Wu et al. (2018)</p> <p>Dey et al. (2019)</p> <p>Yadegari et al. (2019)</p>	<p>Phusavat (2007)</p> <p>Argyropoulou et al. (2010)</p> <p>Behrouzi & Wong (2013)</p> <p>Bourlakis et al. (2014)</p> <p>Charkha & Jaju (2016)</p>

Performance measures are tools that allow organisations to convert a strategy into action (Rey-Marston & Neely, 2010), control performance (Bulak & Turkyilmaz, 2014), drive alignment of local actions, provide feed-back to the organisation and serve as learning mechanisms (Haider et al., 2016) and, finally, quantify past and present actions (Sousa et al., 2006) . The development of SMEs doubtlessly indicates the need for clear simple processes and tools to both apply and maintain them (Soto-Acosta, 2008).

The development trends found regarding PM underline the changes made in the way PM is dealt with, which range from static approaches and those that focus on financial aspects for multidimensional and dynamic systems (Garengo, 2009). This means they have to identify stakeholders' requirements and consolidate them in strategically aligned tools that are flexible, adaptable and balanced, and which specify the causal relations between objectives and measurements (Berrah et al., 2008; Carpinetti et al., 2008; Gimbert et al., 2010; Sousa & Aspinwall, 2010). They must also include mechanisms to manage the information that these systems produce (Alfaro Saiz et al., 2010).

As for developing PMS, we found several contributions made by the scientific community; on the one hand, some works sought to reinforce the process of setting up a measuring system (Smith & Smith, 2007; Garengo & Biazzo, 2012; Zizlavsky, 2014); on the other hand, those that identify the factors that affect the development and use of PMSs (Berrah et al., 2008; Carpinetti et al., 2008; Gimbert et al., 2010; Sousa & Aspinwall, 2010). Other works dealt with the factors that promote the implementation of PMSs (Garengo & Sharma, 2014; Taylor & Taylor, 2014). Finally according to the vision of Cocca and Alberti (2010), including good practices strengthens the process by which PMSs are implemented, used and developed.

We now go on to describe the characteristics of the works based on the business context and scope:

4.5.1 Individual company:

Performance measures: they indicate the relevance of a series of metrics for planning organisational development, encouraging continuous improvement and support decision making, among others (Bitencourt Machado et al., 2015). The relevance of performance measures in operational terms is also stressed as they maintain the efficient use of resources (Thanki & Thakkar, 2016). The selection and construction of performance measures are key elements so that a PMS can contribute to SMEs' development (Soto-Acosta, 2008; Zhang & Zhou, 2013; Larsson et al., 2017; Singh et al., 2018; Dobrovic et al., 2018).

PMSs as a whole: they stress stakeholders' participation, are balanced proposals with internal/external and financial/non-financial aspects, with a strategic alignment and characteristics towards incremental improvement; promote the inclusion of a computer-based support tool to develop proposals; analyse the causal relations between performance measures or between management levels; are synthetic and easy to implement and use (Lima & Carpinetti, 2010; Wang & Ahmed, 2010; Chmelíková, 2011; Ciemleja & Lace, 2011; Shi et al., 2013; Bölükba & Güner, 2017; Marchand & Raymond, 2018b; Surjan & Srivastava, 2019; Villa & Taurino, 2019) and; with characteristics like flexibility, rapid and maintainable change (Cosenz & Noto, 2015; Pekkola et al., 2016; Vidyadhar et al., 2016).

PMSs development: typical factors of the process by which the measuring system is implemented and developed are identified. Clearly defined procedures containing a strategic basis; procedures followed to review performance; limiting factors for

developing a PMS (Garengo & Bititci, 2007; Sharma & Bhagwat, 2007; Gunawan et al., 2008; Cocca & Alberti, 2010; Sulistiyowati & Rodiyah, 2018; Khihel & Harbal, 2018; Costa et al., 2019). Finally, were identified some works that emphasised the development and inclusion of IT tools to support information processing (Alfaro Saiz et al., 2010; Ahmad et al., 2015; Cosenz & Noto, 2015).

4.5.2 *Networks/clusters:*

Performance measures: they refer to specific measures like: financing (Laitinen, 2006), innovation (Carpinetti et al., 2007), individual and collective performance (Galdámez et al., 2009), aspects related to internal collaboration, (Kim et al., 2015), food safety (Luning et al., 2015) as a response to strategic requirements.

PMSs as a whole: include stakeholders' considerations, elements for balance measurements, and propose strategic alignment along with a graphic and visually effective diagram, plus a causal analysis of the internal relations in the system (Carpinetti et al., 2008; Ferreira et al., 2012; Galdámez et al., 2009; Varamäki et al., 2008).

PMSs development: this deals with the importance of support from IT (Caroleo et al., 2007; Villa & Taurino, 2011), and stresses the relevance of a procedure followed to review performance (Jaehn, 2009).

4.5.3 *Supply chains:*

PMSs as a whole: they stress how important it is to include the criteria given by stakeholders; they consider elements that enable accurate balanced measurements, and a strategic vision that allows continuous improvement, and to analyse the causal relations among the system's elements (Bhagwat & Sharma, 2007; Rostamzadeh et al., 2017; Wu et al., 2018; Dey et al., 2019; Yadegari et al., 2019).

PMSs development: this stresses having to evaluate the performance review process (Phusavat, 2007; Charkha & Jaju, 2016), and considers aspects related to implementing PMSs (Argyropoulou et al., 2010).

Regarding to Q1, the research advances around the PM in SMEs have been discussed and presented in this section

4.6 *Critical discussion*

According to our literature review, the contributions related to the development of performance measurement proposals for SMEs are increasing. In the development of these proposals, an attempt has been made to take into account the particular characteristics of these companies, both in terms of the design and implementation process and their use, finding a great diversity of scientific contributions. Additionally, the study revealed that due to the relevance of SMEs in the world economy, they need specific treatment in the area of knowledge of PM to address their development and generate improvements; Of 105 articles reviewed, 11% involve the context of networks/clusters and 13% the supply chain, this shows that the business context in which SMEs are integrated, is a relevant factor in the measurement process and consequently efforts are being made to tackle it. 80% of the studies reviewed are related to aspects focused on best practices for the design, implementation and use of the PMS; this shows us some difficulty in addressing the diversity of factors that can affect SMEs, which implies developing more specific PMS. In summary, it is imperative that experts and specialists direct efforts to strengthen PM proposals increasingly focused on the problem of SMEs, either at a particular or at least sectoral level.

5. Research directions

Our literature review provided interesting future research lines. First of all, Phase I of the proposed framework identified PM as not only a tool for conducting benchmarking studies, but also as a platform to perform improvement actions. These approaches can be looked at more closely by conducting works that deal with different business contexts.

In the framework's Phase II, the simultaneous analysis of the scope and business contexts indicated that the works conducted on the "PMSs" and "PMSs development" categories mainly focused on individual companies. Thus, studies into networks, clusters and SCs could help to develop new comprehensive proposals to contribute suitable solutions for the specific problems in these areas.

The present study stressed that collaboration is a worthy consideration for solving uncertainty in this setting as it promotes the association of SMEs in networks or clusters and does so by promoting their consolidation in supply chain. The view of more global structures can be used as a competitiveness factor as it challenges the development and use of PMSs with organisational characteristics and specific governance mechanisms for SME.

Measuring performance in SMEs has evidenced an alignment towards competitive strategies in which the demands of an environment become increasingly more important. Some factors are stressed: sustainability (Falle et al., 2016; Wu et al., 2018; Masocha, 2018; Dey et al., 2019), dynamism (Cosenz & Noto, 2015); the natural environment (Thanki & Thakkar, 2016); involving LEAN practices (Vidyadhar et al., 2016); collaboration (Ferreira et al., 2012). PMSs are dynamic processes in which strategies, resources and requirements are permanently developed.

We now go on to look at the factors that influence PM practices in SMEs, and the various considerations taken from the perspectives of good practices (Brem et al., 2008;

Cocca & Alberti, 2010), contingency factors (Garengo & Bititci, 2007; Garengo & Sharma, 2014; Taylor & Taylor, 2014), barriers to implementation and development (Sharma & Bhagwat, 2007; Taticchi et al., 2010; Costa et al., 2019), challenges (Ahmad et al., 2015), constraints (Gloria & Oprime, 2014) and uncertainty (Rostamzadeh et al., 2017; Singh et al., 2018) All this indicates that the authors are concerned about contributing to a successful measuring process. We also identified some research gaps for the elements that could influence measurement systems being developed.

As regards *individual companies*, future research could examine:

- (1) Developing PMSs that respond to specific competitive strategies for different enterprises and sectors;
- (2) Defining mechanisms that reinforce the system's implementation, application and maintenance phases;
- (3) Taking PM to tactical and strategic levels;
- (4) Developing motivation, control and award proposals to reinforce the enterprise's continuous improvement;
- (5) Developing IT tools to support the measuring and communication process. This aspect was identified among the factors that influenced measuring practices.

For *networks/clusters*, some study proposals were identified by:

- (1) Determining the performance measures for different sectors is a constantly evolving development area;
- (2) Designing PMSs in which the group of involved stakeholders actively and really participates to provide the system with relevant elements that validate their strategic alignment;

- (3) Designing PMSs with these characteristics: flexibility, rapid response to change and easy maintenance, stressed as attributes to take into account;
- (4) Developing proposals to implement, use and maintain systems;
- (5) Analysing factors that influence the measurement process practice, e.g.: social capital, technology, collective efficiency and individual performance, etc., which could become research approaches.

In *supply chains* settings, we identified many studies in the categories for designing and developing a PMS. We identified the importance of dealing with:

- (1) Developing measurement systems for specific sectors and environments that respond to very specific characteristics and problems;
- (2) Flexibility, rapid response and easy maintenance characteristics as they have proven important for designing a measurement system;
- (3) Conducting studies that centre on supporting the implementation, use and development of PMSs.

Research gaps identified in the SMEs business context and discussed in this section have addressed the question Q2.

6. Conclusions

Thanks to our systematic literature review, this work contributes to knowledge about how measuring performance in SMEs has evolved both theoretically and practically between 2006 and 2019. After reviewing 131 works, we went on to specifically analyse 105 of them to centre on PM. With Phases I and II of the developed conceptual framework, works were analysed integrally using three factors: purpose, scope, and business context.

Having applied the framework, the systematic vision of the addressed studies indicated that the vast majority were in the PMSs design and development categories, and the importance of a strategic alignment towards the enterprise's conceived competitive option stood out.

With the framework's Phase I, research gaps were identified which point out measuring performance as a tool to perform benchmarking practices or as a platform to incorporate improvement actions.

Our results showed that academicians and businesspeople permanently show interest in contributing to develop SMEs when taking the reinforcement of PM as a reference. We found that 80% of the analysed works dealt with PM according to measuring systems' requirements, design and development. The remaining 20% indicated the use of PM as an improvement tool or for benchmarking within the context of performance management.

Most of the works (76%) included a design or specific PM development in individual enterprises. The emphasis on networks, clusters and supply chains was less marked, respectively with 11% and 13%. The countries that most practiced PM were Brazil, Italy and India.

The analysis done of the works' scope indicated that there was plenty of interest (38%) in contributing to the process that implements and develops PMSs. This reveals the applicability and contribution of these systems to SMEs' business development.

Although the literature highlights the importance of PM in SMEs, the own characteristics of these companies and their business contexts at a collaborative level are still little studied factors, which represents a significative gap to be addressed.

Although this study provides some important results in the field of SMEs performance measurement, some limitations should be considered. The study exclusively

considers articles in the context of manufacturing; another limiting aspect of this work is that it only includes articles with specific emphasis on measuring performance in SMEs; studies that focus on highlighting the relationship or influence of performance measurement with respect to very specific factors such as innovation, logistics, social development, logistics, among others, were excluded.

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Appendix A: Search string used in research

(TITLE-ABS-KEY ("performance measurement" OR "performance evaluation" OR "performance assessment") AND TITLE-ABS-KEY ("small to medium" OR "small and medium" OR "SME")) AND PUBYEAR > 2005 AND PUBYEAR < 2020 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "ch") OR LIMIT-TO (DOCTYPE , "bk"))